PROCEEDINGS OF THE

EXCAVATION

DAMAGE PREVENTION WORKSHOP

September 8-9, 1994
Washington, D.C.
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EXCAVATION-DAMAGE PREVENTION WORKSHOP

SEPTEMBER 8-9, 1994

PROCEEDINGS

NATIONAL TRANSPORTATION SAFETY BOARD

IN COOPERATION WITH

UNITED STATES DEPARTMENT OF TRANSPORTATION

RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION
MESSAGE FROM THE CHAIRMAN

Excavation-caused damage is the single largest cause of pipeline accidents reported to the U.S. Department of Transportation’s Office of Pipeline Safety (OPS). This type of accident accounts for about 22 percent of all pipeline accidents and costs the public more than $20 million annually in property damages. It also costs the public untold millions of dollars in service losses when electrical services, water and sewage operations, and communications systems, such as telephones, cable television, and traffic control systems, are damaged.

Most States have one-call notification systems through which excavators can notify buried-facility operators about planned projects so that operators can mark the locations of their underground facilities before excavating. However, the full potential of the one-call system is not being realized, primarily because State road departments and Government-owned water, traffic-control, and sewer systems most often are not required to participate.

The Safety Board believes that for the Nation to achieve maximum benefit from excavation-damage prevention programs, we must have:

- Full participation from all organizations that excavate or that operate buried facilities.
- Statewide one-call notification centers that accept emergency notifications 24 hours a day.
- Effective State damage-prevention requirements that include compliance monitoring and effective enforcement.
- Comprehensive education programs for buried-facility operators, excavators, and the public that explain how to use the damage-prevention program and the penalties for improper or nonuse.

On September 8 and 9, 1994, the National Transportation Safety Board and the Department of Transportation’s Research and Special Programs Administration (RSPA) jointly sponsored an Excavation-Damage Prevention Workshop in Washington, DC. The purpose of the workshop was to increase awareness of the potentially catastrophic consequences for public safety from excavation-caused damage to buried
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INTRODUCTION

Concerned by a recent rash of excavation-caused pipeline accidents, the Safety Board decided, on July 12, 1994, to conduct a workshop to address ways to prevent such mishaps. During the 16-month period before approving the workshop, six serious pipeline accidents were caused by excavation damage. They were:

- Allentown, Pennsylvania: On June 9, 1994, a marked 2-inch-diameter natural-gas service line was separated at a compression coupling by a contractor who was removing an underground fuel storage tank for a housing authority. Gas escaped from the building gas service line, entered the 8-story building, which was a retirement home, migrated to all floors through vertical electrical conduit openings and a trash chute, and then exploded. One person was killed, and about 95 others injured. The building and several other adjacent ones were severely damaged.

- Edison Township, New Jersey: On March 23, 1994, a 36-inch natural-gas pipeline ruptured, resulting in a large fire that injured more than 100 people, destroyed eight apartment buildings, caused the evacuation of 1,500 residents, and resulted in more than $25 million in property damages. The pipeline company had not been notified of excavation in the area of the rupture.

- Green River, Wyoming: On May 3, 1994, a 10-inch-diameter natural-gas gathering pipeline was ruptured by employees operating excavation equipment for a highway contractor. Two contractor employees were killed, and two others were injured, one of whom died later. The one-call notification center for the area was not used, and the pipeline operator did not participate in the excavation-notification system.

- St. Paul, Minnesota: On July 22, 1993, a city sewer crew struck and ruptured a gas service line that had been marked by the gas company. Gas migrated from the break and entered and exploded within a building, killing 3 people and injuring 12 others.

- Cliffwood Beach, New Jersey: On June 9, 1993, a contractor for the gas company struck and ruptured an inactive, unmarked gas service line. Gas migrated into an adjacent house from a second break in the line, destroyed the house, killed three people, and injured three others.

- Reston, Virginia: On March 29, 1993, a 36-inch-diameter pipeline ruptured, releasing more than 400,000 gallons of diesel fuel into the Potomac River, causing substantial environmental damage and community disruption, but no injuries. The rupture resulted from damage by heavy construction
equipment, but there was no record of when the construction work was performed. Environmental damage and clean-up costs exceeded $10 million.

In preparing for the workshop, Safety Board staff consulted with many organizations representing private companies and local, State, and Federal agency interests about excavation-damage prevention measures. The following associations were asked to participate in the workshop:

American Legislative Executive Council  
Alliance of American Insurers  
American Association of State Highway and Transportation Officials  
American Association of Airport Executives  
American Gas Association  
American Insurance Association  
American Petroleum Institute  
American Public Gas Association  
American Public Power Association  
American Public Works Association  
American Road Builders Association  
American Society of Civil Engineers  
American Water Works Association  
Association of Metropolitan Sewer Agencies  
Associated General Contractors  
Association of American Railroads  
Association of Oil Pipe Lines  
Association of Underground Contractors  
Conference of Mayors, U.S.  
Council of State Governments  
Edison Electric Institute  
Independent Petroleum Association  
International Right-of-Way Association  
International Union of Operating Engineers  
Interstate Natural Gas Association of America  
National Society for Trenchless Technology  
National Association of Regulatory Utility Commissioners  
National Association of Towns and Townships  
National Conference of State Legislatures  
National Association of Counties  
National Cable Television Association  
National Contractor Association  
National Governors Association  
National League of Cities  
National Rural Electric Cooperative Association  
National Rural Water Association  
National Utility Contractors Association  
Network Reliability Committee  
One Call Systems International  
Power and Communication Contractors Association  
Water Environment Association

The following Federal agencies and administrations were also asked to participate in the workshop:

U.S. Department of Transportation  
Federal Aviation Administration  
Federal Highway Administration  
Research and Special Programs Administration  
U.S. Federal Communications Commission  
U.S. Department of Energy  
Federal Energy Regulatory Commission  
U.S. Department of Labor
Occupation, Safety, and Health Administration

The National Transportation Safety Board and the United States Department of Transportation share a common commitment to minimizing excavation-caused pipeline accidents. The two agencies combined resources to make it possible for industry and government agencies to address the problems that keep us from achieving our common objective of preventing damage to buried facilities.

The purposes of the workshop were threefold:

- To facilitate the various related industries and levels of government in addressing problems that keep us from achieving a common objective: prevention of damage to buried facilities;

- To receive and exchange information about programs that are working effectively, about experience with problems, and about potential solutions;

- To identify strategies to address these problems.

WORKSHOP STRUCTURE

Safety Board staff coordinated its planning for the workshop with people responsible for excavation-damage prevention programs, managers of one-call notice centers, operators of buried facilities, and trade associations. Based on the comments received, Safety Board staff determined that the workshop should be designed to attract the broadest possible participation, to encourage participants to develop consensus agreements on which to build future actions, and to review through discussions the basic elements of existing excavation-damage prevention programs. The selected discussion areas were:

- Essential elements of an effective one-call notification system;

- Responsibilities of buried-facility operators;

- Responsibilities of excavators;

- Effective administration of a State damage-prevention program.

Panels, or discussion groups, were formed to develop consensus agreements. Each group was led by a facilitator and, to the extent possible, was composed of representatives from each interest area. The desired balance of interests was not achieved because some topics did not attract the desired participation.

Trade associations that represented interest areas, excavators, pipeline operators, communication systems, electric utilities, States, local governments, water and sewer systems, and excavation-notice centers were asked to select three participants for each discussion group. Representatives from other affected industries, such as insurance, airports, and buried-facility
contract locators, were added to provide more diverse participation.

All workshop sessions were transcribed by court reporters.

**WORKSHOP AGENDA**

A plenary session was held on the morning of the first day. Speakers gave formal presentations about the safety and economic consequences of excavators damaging buried facilities, novel damage-prevention programs in some States that are significantly reducing the occurrence and consequences of excavation-caused damage, new techniques being used to more accurately locate buried facilities, and the need for all to work together in deciding how to improve present damage-prevention programs. After each presentation, the participants questioned the presenters and stated their own views. At the end of the morning session, the workshop moderator charged the discussion groups with cooperating and achieving. He also explained the operating procedures for the discussion groups.

The discussion groups met during the afternoon of the first day and the following morning. Thus, the discussion-group leaders and participants could reflect on the results of the first afternoon, plan for the second session, and have informal discussions with others during the evening. Every group had someone who typed each proposal that was under consideration into a word processor. The proposal was then projected on a screen so that it could be viewed by both group members and the audience. Agreed-upon concepts were stored in the word processor, printed out at the end of the day for the facilitator's review, and later used in developing a group report on consensus agreements.

On completion of the discussion groups, a second plenary session was held in which each discussion-group facilitator reported on the discussions and consensus agreements of the group. Groups achieved almost unanimous agreement on many points, but often there was isolated but strong opposition. The audience's comments and discussions that followed reflected the differing viewpoints. After closing remarks from representatives of both the Safety Board and RSPA, the workshop was adjourned. The facilitators' reports were distributed to the participants to support them in implementing changes in their State's program.
OPENING REMARKS

Chairman Jim Hall welcomed the participants and expressed pleasure that almost every industry affected by excavation-caused damage to pipeline and other buried facilities was represented.

The ultimate purpose of the workshop, he stated, is to improve public safety by minimizing the amount and consequences of excavation-caused damage to buried facilities. He stated that while the Safety Board and RSPA are making the workshop possible, its ultimate success depends on each person’s active participation in the deliberations and on his actions for implementing the consensus agreements reached. Chairman Hall said that the solutions to excavation-caused damage lie with the participants and their State governments through the prevention programs they develop.

Chairman Hall told the audience that during the next 2 days, the government agencies would listen to them about programs that are working effectively, about their experiences with problems, and about potential solutions so that both government and industry can jointly develop strategies for addressing identified problems. He emphasized that he wanted to hear from as many people as possible.

He encouraged participants to be candid in their comments and to participate fully in the workshop, which, he said, was designed to encourage participation.

He said he hoped that each participant would take home what he learned there and then support the changes in his State’s damage-prevention program necessary to make the program more effective. He said a participant’s efforts could have a ripple effect that would be felt for years to come.

Chairman Hall cited several recent pipeline accidents, noting that almost everyone in the room is aware of the
consequences of damaging pipelines through excavation activities. He said that as the participants commit themselves during the workshop to looking for solutions that will prevent similar tragedies, it is both important and fitting to remember that such tragedies can occur in their home communities unless excavation-damage prevention programs are improved. He reflected that it does not take much imagination to envision what can happen if gas leaks into a basement or if an explosive volatile liquid is released in an urban area.

Then he questioned, "What happens when other facilities are damaged? Who cares really if water service is interrupted, or if we can't make a phone call, or a long distance call for a few hours?"

Aside from the billions of dollars assessed against society every year to pay for these damages, he asked that participants consider the other repercussions from excavation-caused damage to buried facilities other than pipelines. He said anyone can live with the loss of phone service from time to time, except when he needs to call an ambulance, the police, or the fire department. Anyone can live with the loss of electricity from time to time, unless he is the person who is connected to life-sustaining medical equipment at home, as an increasing number of people are these days. Anyone can also live with the loss of water service from time to time unless he is the individual whose life depends on kidney dialysis equipment.

Chairman Hall noted that reliable communication and electrical services also are vital to safety in many daily activities. He cited the following examples of the effect of excavation-caused damage on the Federal Aviation Administration's (FAA's) air traffic control systems:

The FAA reported that during a recent 2-year period, 1,444 equipment outages or disruptions in air traffic services were caused by 590 cable cuts nationwide. In May 1991, four FAA air control centers were taken out of service for a 5-hour period.

In other words, what may be an inconvenience to the majority can be a matter of life or death to others. Chairman Hall pointed out that at the very least, damage to buried communication systems interrupts such business operations as the stock exchange, banks, airports, hospitals, and schools.

He stated that one of the biggest tragedies of excavation-caused accidents is that they are among the most preventable. When digging equipment hits a pipeline or a cable, it is because someone or some group of people has failed to fulfill an obligation to society.

Chairman Hall pointed out to the audience that the problem of excavation-caused damage to buried facilities is not a new one to the Safety Board; nor is the present workshop the first action taken by the Safety Board or the Department of Transportation to
reduce the number and consequences
of such occurrences. In 1972 the Safety
Board conducted a workshop that made
a difference, just as he hopes this one
will.

Many of the same agencies and
associations represented at this
workshop and even some of the same
people sitting in this room today
cooperated to make that workshop
successful. Working with the Safety
Board, they examined the problem,
discussed many ideas, and offered
solutions.

The Safety Board, as a result of its 1972
workshop, issued recommendations to
the Department of Transportation, to
industry and government associations,
and to individual pipeline operators,
calling for them to establish a program
for preventing excavation-caused
damage.

Chairman Hall said that since those
early recommendations, a great deal of
progress has been made. The American
Public Works Association (APWA) has
established utility location and
coordination councils in communities
throughout the Nation and a National
Utility-Coordinating Council. It has also
established guidelines for determining
good locations for buried facilities and
for standardizing the colors used to
mark the location of buried facilities. In
1972 there were three city-wide one-call
excavation-notification centers, one in
Rochester, New York, one in Chicago,
Illinois, and one in Portland, Oregon.
Now there are notification centers in all
States but one—Hawaii. Twenty-seven
States have single statewide centers.
From no State laws on preventing
excavation damage, now 29 States
require participation in State-mandated
programs, with 2 additional States
expected to follow suit. The country has
gone from having no Department of
Transportation pipeline regulations that
address the problem of excavation-
caused damage to mandating that all
natural-gas pipeline operators must
have excavation-damage prevention
programs. A similar requirement is
expected soon for liquid pipeline
operators.

Through partnership—and he
emphasized that word partnership—with
Federal and State governments, local
authorities and trade groups, the
industry's innovations have produced
results. As evidence of the results, he
pointed out that the percentage of
serious pipeline accidents attributable to
excavation has declined since 1972,
from 50 to about 20. Even so,
excavation-caused damage remains the
single largest cause of pipeline
accidents.

Chairman Hall stated that it is evident,
however, that present damage-
prevention programs are yielding
diminishing returns. He holds this belief
because the number of excavation-
caused accidents has barely declined in
the last 2 years. In 1992 and 1993, the
last 2 years for which data are available,
excavation-caused accidents accounted
for about 22 percent of the pipeline
accidents reported to the Department of
Transportation. Clearly, he noted, more
needs to be done to eliminate these accidents.

Chairman Hall explained that both the Safety Board and the Department of Transportation have congressional mandates about pipeline safety improvements. Thus, the two agencies are likely to talk more about pipeline operations when they consider excavation damage. Yet, both agencies recognize that it takes cooperation from all buried-facilities operators, excavators, and State agencies to effectively reduce excavation-related damage.

Although the consequences of damaging other buried facilities are not usually as catastrophic as the consequences of damaging fuel-transportation pipelines, Chairman Hall said, they surely endanger public safety and health, seriously disrupt major services and businesses, and cost consumers, industry, and government billions of dollars annually. To emphasize the scope of the task facing the buried-facility industries, Chairman Hall talked about the aviation industry. He pointed out that although the jet transportation fleet enjoys a remarkably high level of safety, Boeing Aircraft, which is at the cutting edge and always looking to the future, estimates that if the accident rate remains the same in aviation, because of the increased traffic in the next 20 years, there might be a major jet crash every week.

Chairman Hall stated that several steps should be taken now to avoid future catastrophes and that he thought the Department of Transportation and the Safety Board agree on what the steps should be:

- All buried-facility operators, regardless of ownership, should participate in statewide excavation-damage prevention programs.

- All excavators should notify the one-call center before beginning work.

- Authorities should enforce programs to identify violators, such as the individual who damaged the pipeline in Edison, New Jersey.

- All of us should inform nonparticipants about damage-prevention program requirements.

He emphasized that workshop participants may suggest other improvements that may require years to
implement, but, he noted, that is what this workshop today is all about. It is up to the participants to determine what needs to be done to prevent these needless accidents.

He wished the participants well as they attempt to accomplish that mission during the workshop.

**Administrator D. K. (Dave) Sharma** began his remarks by stating that as the new RSPA Administrator he does not stand before the workshop as an expert in pipeline safety nor as someone who has great knowledge of the actions that need to be taken to improve excavation-damage prevention programs. Even so, it is his opinion that excavation-damage reduction is essential for improving pipeline safety. He assured participants that he and the Secretary of Transportation are both committed to the Department’s pipeline safety program. Both he and the Secretary have pledged to do, in an expeditious manner, what they can to minimize excavation-caused damage to pipelines.

He thanked the participants for coming to the workshop, which he called a landmark event in the effort to improve the safety of all underground utilities. He said that this is the first time the entire community of underground operators has come together to address facility-damage prevention.

Administrator Sharma also thanked Chairman Hall and the Safety Board staff for doing so much to co-sponsor the conference and for inviting members of RSPA. He said that RSPA comes in the spirit of cooperation and help. If there was ever a time to get serious about underground-facility damage prevention, he said, now is it. Public opinion has completely focused on the issue, and it has the attention of the policymakers right at the very top level and in Congress and legislatures around the country.

He stated that in the last 5 months, more people and organizations have talked about underground-facility damage prevention than ever before. And they comprise all parts of society—individuals, companies, associations, many of which are here: Congress, and not just one government agency, but quite a few of them. Believe it or not, he said, the agencies are, indeed, talking to each other.

The agencies also have accomplished quite a bit. First through their discussions, they have identified some of the principal elements which they all believe are vital for improving excavation-damage prevention programs. The Chairman has just addressed them. Administrator Sharma said he would list the elements again:

- All must call before digging. It is so obvious. It is so important, but it is not always done.
- All facility operators must be members of the one-call system.
- Third, the public must be aware that there is such a system and of how it works. Not everyone knows how to use the system—even though it may
be as simple as dialing an 800 number.

- And as Jim said, the law must be enforced. The enforcement must be simple and expeditious. It should not take that much time.

The Administrator mentioned another accomplishment—that some States have made more progress in this area than the Federal Government. New York, Virginia, and Nebraska have already passed one-call legislation, which is quite similar to the Federal bill being considered by the House and the Senate. New Jersey has a bill supported by the governor, who has indicated that she will sign it once it reaches her desk.

Congress is actively working on this issue. The members of both the House and the Senate are listening to the concerns many of the participants here have and to the views the participants represent. They are trying to put it all together to develop meaningful one-call legislation that everyone can live with.

The Administrator asked, what remains to be done with all the views that are out there to really weave them into the final language? The Clinton Administration recommends that the sections in the bill on the State and the model program be combined. The Administrator emphasized that the most important elements are that all excavators must call and that all facility operators must be members.

He said that if everything is correctly done, using the one-call centers will be the fastest and most cost-effective way of ensuring that all excavation is being done safely. Safer operations translate directly into fewer injuries, and that translates directly into reduced health care costs.

Once the one-call program comes to life, it has to be used to be effective. To be used, people have to know about it. At the National Pipeline Summit following the Edison, New Jersey, incident, Secretary Peña, made it clear that the country needs a broad-based public education program on one-call. He has given his strong support to a national advertising campaign. In the near future, it may be settled how that campaign should be run, who it should seek to reach, and what media should be used.

A major unanswered question to consider in this conference is the oversight of underground-facility damage-prevention laws. Everyone agrees on the need for an effective program. Yet, no single agency has authority over all underground-facility operators and all excavators. Only a few States have authority under a single agency over all people subject to the excavation-damage prevention requirements such that effective assessments are possible. It has been found that when oversight responsibility is placed in one agency, it seems to work quite well. This is an issue to consider in this workshop.

The problem of excavation around underground facilities transcends narrow interests. It is important that
everyone work together beyond his own area of self-interest for a greater good. Everyone must be willing to give a little extra in this new era of partnership. The Clinton Administration is actively promoting interagency cooperation and collaboration. The Administrator went on to say that he truly believes that the damage-prevention program envisioned in the bill before Congress is an excellent model for application of this kind of collaborative spirit, this spirit of participation.

He concluded by saying that he and Secretary Peña are absolutely committed to the objective of improving pipeline safety. The excavation-damage prevention program, because it offers the best opportunity for increasing pipeline safety, has a high priority for action. He added that both he and the Secretary would work with each of the participants to achieve that objective.

she said, the State finally got what was needed.

The magic ingredients were the passing of a law mandating the creation of a one-call system. That law, she said resulted in Dig-Safe, Inc., which is one of if not the best one-call centers in the country.

Next, the law was amended, requiring everyone, including homeowners who excavate or contract to excavate, to notify of proposed excavations, either in writing or through Dig-Safe. The law also requires that utility operators locate and mark their facilities within 72 hours (excluding Saturdays, Sundays, and holidays) of being notified.

The excavators have to take reasonable precautions in the area, and they have to maintain the markings. Most importantly, they have to notify the utility operators immediately should they damage any underground facilities.

The Massachusetts Department of Public Utilities (DPU) defined excavation to include anything causing the movement or removal of earth, rock, ledge, or other materials in the ground to form a cavity, hole, hollow, or passage, by any means at all—whether it be by hand digging or by power tools.

The State legislature empowered the DPU as the administrator of the law by giving it the authority to enforce the law and assess fines. Previously, the Commonwealth had the fines written into the law, but it had no effective way
to levy them. Someone had to file suit in order to do that.

She stated that as soon as the DPU was given the authority, it began issuing a series of orders to administer the damage-prevention program. First, it issued an order delegating to the DPU's chief engineer the responsibility for program administration, eliminating the need for the DPU to hold executive sessions or set up committees to study violations of the law.

To help the utilities report, the DPU provided a generic reporting form. When the violations come in, they are assessed and assigned to one of two categories--those to be further pursued and those not to be pursued. The ones that are not to be pursued are entered into the database. For those classified for further action, the DPU issues a notice of probable violation and establishes a date for an informal hearing. The person or company to which the notice is issued has until the hearing date, approximately 30 days, to respond. Anyone who does not respond is automatically deemed guilty and must pay a fine.

- Anyone who responds can do it in one of three ways: by appearing on the hearing date and stating his position, by sending a letter explaining why he is not guilty, or by sending a check for the amount of the penalty and a signed consent order. Most respond either by coming to the hearing or by sending a letter. Either way, the DPU can decide the case without having to visit the site. However, there are occasions when the DPU does need to go out in the field. Actually, it has had to perform site visits as part of closing a case only four times in the last 2 years.

Ms. Soares stated that with the new authority, the DPU was not given any additional staff. However, it issued regulations requiring all utilities subject to the Dig Safe law to report to the DPU within 30 days any excavation-damage incident. This alleviated the need to have investigators throughout the State to look for violations.

She listed the typical excuses excavators give for not having notified:

- I wasn't really digging.
I didn’t call Dig-Safe because I knew exactly where all the lines were or were supposed to be.

I wasn’t going to be digging for long.

The company didn’t put the line in the right way.

I always obey the Dig-Safe rules. But, if I called every time I was going to dig, Dig-Safe would just be following my company around all the time.

She listed her favorite excuses, which, she said, are more creative:

I wasn’t excavating; I was digging holes;

I only used a backhoe to save man hours;

The problem was the gas company didn’t use the right kind of glue. So, when my backhoe caught the main, it just came apart.

Obviously in such cases, those people are found to be at fault. But people do come in showing that they had a valid reason, such as they provided the required notification, but the utility company did not mark, or it miss-marked the location of its lines. In such instances, the DPU cites the utility company.

Excavators also can file reports with the DPU when they believe the utilities have violated the law. The DPU encourages them to use the same form that the utilities use to report alleged violations. Excavators are becoming more aware of how the DPU works and are doing a better job of documenting the facts for the DPU’s review. Often, they carry cameras in their trucks to photograph or videotape the area before they begin to work. By doing that, they have a record of where and how utilities marked the locations of their lines. Should a utility line be damaged during excavation, these records can be assessed to determine whether the lines were correctly marked.

In administering the program, the DPU kept fines at a reasonable level—$200 for the first offense and $500 to 1,000 for subsequent offenses. This reduces the number of cases referred to adjudicatory hearings and, in turn, keeps to a minimum the number of man hours necessary to maintain the program.

The financial problem for the excavators is not the fines imposed by the DPU. It is the cost resulting from damage. When a utility line is damaged by an excavator, he is looking at least 4 hours of downtime for his crew, plus the repair cost to the utility companies. That cost can run anywhere from several hundred dollars to hundreds of thousands of dollars. A recent issue of a trade magazine estimated the average cost of severing an AT&T line as $395,000. One excavator recently quoted his own estimated cost as exceeding $25,000 for hitting an unmarked telephone line. This cost was for his crews and for fines he had to pay for tying up a heavily congested area.
Additionally, in 1993, the insurance companies in Massachusetts suddenly realized there is a one-call law. The word quickly spread that they could refuse coverage if an excavator did not provide proper notification of planned excavations.

All this has helped to bring the number of violations down substantially. Since 1986, the DPU has blanketed the State with information about its administrative enforcement actions: about 3,000 notices of probable violation, resulting in more than 1,600 civil penalties, amounting to more than $400,000.

The most meaningful result of the DPU's program is that excavation-caused damage to natural-gas pipelines dropped significantly—from 1,138 incidents in 1986 to 412 in 1993 (see figure 1). The DPU measures its success not in the dollars collected (see figure 2), but in the decreased damage to underground utilities. With more than a 63-percent decrease in damage since 1986, the DPU has been successful.

Stephen G. Rieben--Connecticut Call Before You Dig: Mr. Rieben echoed Chairman Hall's earlier comments and stated that he hoped that during the next 2 days the participants would share their experiences with buried-facility protection programs so that each could take home information to augment and make better his local program.

He said that Connecticut passed its first call-before-you-dig-law in October 1978. It was a result of joint lobbying by utilities and contractor associations throughout the State. Since that time, Connecticut has been improving its law and the system that serves the law. Since passage of the law, damage to underground facilities has decreased by over 60 percent. And more specifically, damage caused by not giving notice to
buried-facility operators has declined more than 85 percent.

He emphasized that the statistics are even more meaningful than they seem because the net trench miles (the number of miles of pipe, cable, and conduit underground) has more than doubled.

Mr. Rieben said that from the Connecticut perspective, there are three keys to a successful damage-prevention program. The first one is education. It is every owner's and operator's responsibility to continually advertise the public-safety and economic issues related to digging near their facilities.

The one-call system can be an extremely effective tool in this regard by reaching its tentacles right into the heart of utility and contractor associations, and it is very important to keep a very high profile through presentations and seminars, through safety meetings, through providing items to remind excavators to notify, through public service announcements, and through other opportunities. All of these items are part of an effective education endeavor, and it comes as no surprise that a damage-prevention program needs to be on top of this type of education program.

The second key is the one-call system. A strong one is necessary, one that can pull together support, not only from its utility members, but from the excavators who use the system. The one-call...
program has got to be able to pull
together disparate groups and have
them work jointly with State regulators
to promulgate safe excavation practices.

Mr. Rieben stated that he was happy to
hear mentioned several times by other
presenters that the one-call system
must include every owner and operator
of underground facilities. If a one-call
system is to do what its name implies,
everyone who owns a facility that
crosses or is in the public thoroughfare
must participate. Comprehensive one-
call is what is needed.

The third key to success is the
enforcement of a just State law.
Connecticut appreciates the recent
intense scrutiny from the Federal
Government of buried-facility protection.
However, Mr. Rieben said, anything that
comes from the Federal level should
simply offer broad guidelines that inspire
States to implement their own
sufficiently stringent State legislation.

He stated that the he believes the
ultimate authority lies at the State level.
And, he said, a law is only as good as
its enforcement. In 1978, the
Connecticut law had only one penalty
provision: if an excavator failed to call
before he dug and if he damaged
facilities, he could be fined up to
$10,000.

It was a silly fine. No one wanted to fine
a Mom and Pop contractor $10,000 for
ripping out a small residential water
service. So, the penalty was not used.

But, as is so often and sadly the case, a
tragedy occurred in Connecticut that
changed that. An excavator who had
used the one-call system struck a
natural-gas pipeline. He did not damage
the facility at the point of contact,
though. He had unknowingly pulled a
gas service several yards down the
street out of its coupling.

Gas seeped into the basement of a
restaurant. It eventually ignited. Seven
people were killed in the ensuing
explosion. The result was a change in
the penalties and fines and the overall
enforcement of the call-before-you-dig
law. Suddenly, Connecticut had fines
that could be levied against anyone who
was found to be in noncompliance with
any aspect of the call-before-you-dig
law—not just for failure to notify.

The State got serious about enforcing
the law, but it had a problem. The
DPUC had already been charged with
the administrative sanctions, with
holding the hearings, and with
assessing the fines; but it did not have
the manpower to make someone in the
Department a field investigator.

So, the DPUC got together with the one-
call system and came up with the
position of compliance supervisor—a
person whose sole function is
investigating incidents of
noncompliance, collating and receiving
reports of damage from utilities and
excavators, and compiling the
information and forwarding it to the
DPUC for action. Such a position is a
very valuable resource for an overall
excavation-damage prevention program.

The Connecticut compliance supervisor works out of the one-call system center and reports to the center manager. His sole purpose is investigating incidents of noncompliance. He has to be an unbiased, third-party observer whose function is ascertaining the facts. He serves as an expert witness at DPUC hearings at which fines are assessed.

The program attempts first to obtain compliance through education and cooperation. For a first-time offender, the compliance supervisor makes telephone calls to explain the program. He follows that up by mailing information that explains the program, how it should be used, and how to be in full compliance.

He visits if there is a second offense. He reviews the offender's track record and explains the changes that have to be made.

For third-time offenders, he develops a case history report on excavation damage and sends it to the DPUC for action. It generally involves interrogatories being sent, a hearing being held, penalties, and so on.

Mr. Rieben stated that while the procedures he just described are usually followed, there are exceptions. A first- or second-time offender can be fined if the circumstances warrant it, if there are a number of injuries, or if the past performance merits it.

Mr. Rieben said the compliance supervisor is really an asset to the overall enforcement program. And, yet, he is not part of the enforcement of that call-before-you-dig law.

Because the compliance supervisor works with the one-call system, he is viewed as an unbiased, third-party investigator. He is seen as someone who wears a white hat, and he acts more as a facilitator than a policeman.

And it works because the contractors all want to be his friends. They realize that his testimony, if ever needed, can be integral to their defense.

The utilities support him because they understand his success ensures less damage to their plants. And the DPUC appreciates having ears and eyes out in the field and having a credible, dependable expert witness at hearings. Best of all, he serves as an ongoing educational emissary for the one-call program. It is a win/win situation.

So, in Connecticut, the three keys to success have been, number one, an education program that involves all those that have a stake in plant protection. And it's a program that is ongoing--constantly, continually--all the time.

Number two is a strong comprehensive one-call system that can bridge the gap between excavators, utilities, and State regulators. It has as its members all owners and operators of underground facilities.
And, number three, a State law that commands enforcement. Mr. Rieben emphasized that you can put teeth in a law, but unless you exercise those jaws once in a while and take a bite, those teeth do you absolutely no good.

He encouraged other participants to consider using in their States the idea of a compliance supervisor to educate people about the law and to enforce it. He stated that Connecticut has found that this in itself can be a very effective tool in creating a successful program to protect plants from underground excavation.

**Essentials of Effective Damage-Prevention Programs and the Need to Work Together**

*Roger Kiffmeyer*--Minnesasco: He began by thanking the people responsible for the workshop because, as he said, I think, for the first time, I see people from all aspects of the industry getting together to try to share some ideas and try to get this one-call damage-prevention law put into place.

He stated that he had worked for Minnesasco for 34 years and of that time, 26 years had been in damage prevention. It was in 1979, he thought, that he met with his counterpart for Northern States Power Company, and they decided that something had to be done to accommodate the excavator-industry needs.

According to Mr. Kiffmeyer, at that time he and his counterpart were chasing each other around the city trying to locate their buried facilities in advance of excavations, and it just was not working.

*Roger Kiffmeyer*

They were just getting to a point where no one was getting anything done. Because of that meeting, he stated, they began promoting the development of a one-call notice program that would require excavators to provide notice 24 hours before beginning excavations. He said it also was the first time he had experienced a lack of support from his company, even though it was required by Federal regulation to promote the development of one-call notification and excavation-damage prevention programs.

He stated that it was very difficult for him to understand why his peers and managers would not support the concept. Although frustrated by the lack of support, he and others were able to get the program started. However,
throughout the process, their greatest opposition came from the companies for which they worked.

In 1982, he and his counterpart were able to develop sufficient grassroots support for a damage-prevention program, and they called a meeting of representatives of the excavating community to discuss what could be done to minimize excavation damage to buried facilities.

He stated that after 2 years of meetings and study of various one-call centers throughout the world, they developed a proposal for a notification center, sent the proposal out for bid, and awarded the contract. But their own companies stopped further action, saying, "No, we're not ready for it."

In 1986, he stated, there was an accident in which two people were killed when gasoline was released from a failed pipeline and ignited. That accident, he said, had nothing to do with excavation damage, but it started a legislative process requiring an excavation-damage prevention program. After that, it did not take long to get a notification center.

Luckily, he said, Minnesota had a legislative body that recognized the need to obtain input from the utility industry. The Metropolitan Utility Coordinating Committee he had helped form was called upon exclusively to assist in developing the legislation for the damage-prevention program. The utility industry and the excavating community worked together to establish Minnesota's law, which gave the Commissioner of Public Safety authority to enforce the law. He stated that they got the legislation passed and the notification center operating in 11 months.

He said that Minnesota's notification center startup was a flop. The center began operating on October 1, when, the founders thought, most excavation operations would be ending. But they had vastly underestimated the number of calls they would get and were not equipped to handle them. They were lucky to have a vendor who was able to bring in staff from other States to help operate the center and get it back on track. That flop turned out to be a blessing in disguise because the center had the winter months in which to make the necessary modifications and to get ready for the spring startup.

He said that he now believes that Minnesota's damage-prevention program is highly successful. It includes a very effective education program, and the law is enforced by the Department of Public Safety's Office of the Public Safety. The Minnesota program has a unique board of directors, made up of volunteer representatives from associations, and represents the entire interest group rather than an individual company. The director of the Office of Pipeline Safety is a member also.

Mr. Kiffmeyer stated that Minnesota now has a good damage-prevention program and a good law. It requires everyone involved with or affected by excavations to be a member of the program. There
are 1,039 members, including the department of transportation, which required a year to get itself involved.

And then it required considerable innovation on the parts of a vendor and the board of directors to develop a method that allowed the department to operate within the system.

All municipalities that have underground facilities are also in the system. Again, the system includes a process that makes it economically possible for them to participate.

Some people initially thought Minnesota would not be able to accomplish what it did, and certainly not as quickly as it did. But, there was teamwork, and a lot of support. The Commissioner of Public Safety and his staff helped greatly to accomplish this task.

Now it appears that there will be some type of Federal mandate for excavation-damage prevention programs. Mr. Kiffmeyer said that his concern about any Federal mandate is that it not ruin the good notification systems now operating throughout the country. Instead, the centers should be supported.

He stated that any damage-prevention program should be State-enforced under Federal guidance. These programs also need sufficient flexibility to allow people in the various States to work with one another in identifying the best ways of getting excavators and buried-facility operators to work together. Both entities need to look at the current needs of the other and at the existing program to ensure that it does a reasonable job of meeting the needs of both groups. There must be sufficient flexibility to deal with changes in either industry. It must be possible to adapt to those changes.

Mr. Kiffmeyer expressed his pleasure at seeing the Safety Board and the Department of Transportation host the workshop and encourage people to come together to resolve the issues at hand.

He told the participants that for the next 2 days they would have an opportunity to state their views on something that is very important. He encouraged them to open up and share their experiences without fear of what others might think about their suggestions or the issues they might raise. He said that it is just a matter of getting everybody together to get a federally mandated law that supports the States that are doing their job and helps the other States that need to improve. It is not that difficult, but it takes a lot of teamwork and a lot of effort.

As I see it, he stated, that is what we are here today to do--to work together to develop a Federal mandate to produce effective damage-prevention programs. It needs to be done soon in order to avoid more incidents in which deaths occur.
Present and Future Roles of Subsurface Engineering in Protecting Buried Facilities from Excavation Damage

James Anspach—So-Deep, Inc.: He began by asking the participants to consider his viewpoint as complementary to the existing focus on one-call systems. He believes the current focus of the one-call system is to mark active utilities on the ground surface just before construction begins. However, he also believes that effective damage-prevention planning should begin during the design of a project and that designing construction around and away from existing utilities is an effective way to lessen the risk of damage.

Ideally, the utilities that are depicted on a constructor’s plans should not differ from those marked in the field. Unfortunately, many times they do. Mr. Anspach asked, “What’s an excavator to do at that point? Does he believe his plans? Does he believe the markings on the ground?”

Confusion and conflicting information can mean higher project costs due to redesign, delays, and maybe even utility damage.

Engineers currently use utility owners' records as a basis for their designs. It is difficult to depict utility data accurately on the plans because references change, drawings are schematic, utilities get abandoned, and records often reflect the design more than the actual building. Sometimes records no longer exist. Engineers know this and disclaim responsibility for utility information on plans. However, the same techniques that utility owners use to mark their facilities at the time of construction can be used by the engineers at the time of design. If the engineers survey utilities using more advanced techniques, such as electromagnetics, magnetics, and ground-penetrating radar, the information can be plotted on the plans to produce a comprehensive horizontal depiction of the utilities on a site.

The engineer can then design around existing utilities to the extent possible, which depends on utility-relocation cost estimates, future maintenance and safety issues, and regulations. When a utility conflicts with the design, it can either be redesigned to be out of the way or exposed to further determine the...
nature of the conflict. New vacuum excavation techniques provide a safe means of exposing a utility. The engineer then knows the depth, size, condition, and material of the utility, and the types of backfill soils. Maybe he can modify his design slightly to avoid further utility relocations.

This system of identifying, surveying, and taking responsibility for the comprehensive and accurate depiction during design of virtually all utilities on a site is a component of a new engineering discipline called subsurface utility engineering. Although subsurface utility engineering may produce additional costs during the design phase of a construction project, these costs are more than recouped by the resulting lowering of the expense of utility relocation, redesign, extra work orders, claims, and construction bid prices.

Mr. Anspach stated that the Federal Highway Administration conservatively estimates that if all State highway departments in the Nation used subsurface utility engineering, more than $100 million dollars of public money could be saved each year. The total saved would be much higher if it included the amount saved by the decrease in property damage or injury that results from utility damage during construction. The $100 million figure covers just Federal-aid highway projects. If military, airports, and other large projects routinely utilized subsurface utility engineering, the savings to the Nation could be in the billions of dollars per year.

One-call notification systems are necessary because not all construction, such as tree plantings, fence building, and utility and street maintenance, proceeds with a formal design. Also, utilities may change during the time lag between design and construction. Ongoing construction may obliterate features on the plans. These systems are a critical last check in the damage-prevention process. But one-call notification systems have flaws other than not providing services during design.

Mr. Anspach asked "Do utility owners typically mark both their active and abandoned facilities? Do current owners mark the location of utility owners who are out of business, but who still have structures in the ground?" He said that usually they mark only their own active facilities. When a contractor exposes an abandoned or unmarked facility, he may believe it is the nearby active or marked one and, consequently resume use of his mechanized equipment until he strikes and severs the active facility.

Mr. Anspach suggested that future damage-prevention programs need to include the identification of all buried facilities, not only before construction begins, but throughout the project planning, and design phases. The cost of this should be borne by the person or agency best able to recoup this initial expense through subsequent savings in costs and time. That entity is the project owner. Some Federal agencies are recognizing this and are promoting the use of subsurface utility engineering as
a means of saving public money and increasing public safety.

Making the most effective use of this damage-prevention tool, subsurface utility engineering, requires the support of all professionals involved in the damage-prevention business. They need to recognize that creating a map of existing conditions based on incorrect and incomplete information will invariably result in an incorrect and incomplete design, which will invariably result in construction problems, increased cost, and, possibly, utility damage. A combination of subsurface utility engineering during design and one-call notification systems with a response just before construction begins provides an integrated, cost-effective, and responsible means of lessening the risks of utility damage during construction.

Prevention of Damage During Excavations

George Speakman—Henkles and McCoy, on Behalf of the National Utility Contractors Association: Mr. Speakman began by expressing his pleasure in attending the workshop to represent the utility contractors. He stated that he looked forward to networking with the participants, both in the panel discussions and in the one-on-one discussions, which, he said, at times are even more important.

He said that his company, for which he had worked for almost 30 years, is a major force in underground construction. It is a utility contractor specialist and is quite familiar with underground hazards. The National Utility Contractors Association (NUCA), which has almost 1,600 member firms,

George Speakman

is dedicated also to increasing and maintaining the infrastructure.

He told participants that he and they were at the workshop to discuss what is right and wrong with the existing system and that everyone should speak out. Do not hold back. We are all ladies and gentlemen, he said, and we do know how to conduct ourselves in group panel discussions. But, he said, if there is anything that you feel needs to be said, this is where it needs to be heard.

He cautioned that they should try not to ruin the present network of one-call systems, which, to the extent that it is
allowed to work, does work. This workshop is a golden opportunity to make progress on some very, very important issues.

He stated that his company has been involved with major underground excavating activity for over half a century and is all too familiar with the hazards and the dangers associated with working in and around live gas, energized electric lines, high-volume communications facilities, hazardous material zones, and numerous other high-risk situations.

He said that employees do not get up in the morning thinking, "I will hurt myself today at work. I will cause property damage today at work. I will interrupt somebody's life today because of an accident that I will cause."

He said that everyone wants to arrive home at the end of his shift ready to enjoy the next segment of life. It used to be that if an excavator discovered an otherwise unknown underground structure and if that object happened to be a live conduit for electricity, waste products, communications circuitry, drinking water, or heating fuel, the worst that happened was that the lights went out, the telephones went dead, and the excavator smelled funny for a couple of days.

But that is not the way it is today. Moreover, insurance carriers know it, and the general public knows it.

This is an age of potential instant disaster. At the next drop of a hat, the next blink of an eye, the next bend in the road, or the next twist of a shovel in the ground, one false step can threaten our very existence--as contractors, as business men and women, as productive members in the society.

He said that about 8 years ago, some people in New Jersey began working as a committee of excavators and owners to find ways of expanding the one-call system. They wanted to include all owners of underground facilities. So they explored and studied legislation in various States that had similar laws. They held seminars and took booths at trade shows and conventions. Yet they could not muster the support necessary to enact broader and tougher legislation that would do what they sought to do.

He said that it was also noteworthy that in the past 8 years the joint committee has worked together with the utility associations and created a video product that has been shown on public television networks and throughout the State to tell the public about the need to use the one-call system correctly. He said that the effort did not produce any significant increase in the number of participants in the Garden State underground-plant locating service.

While there are a few more excavators who use the system properly and correctly, every day, excavations are done in New Jersey that the owners of the buried facilities know nothing about and that cause damage.

Mr. Speakman then said that in March 1994, a pipeline ruptured in Edison Township, New Jersey. Now, legislators
are lining up to be the first to put their names on a bill that they think will help to stop a disaster of Edison's proportions from happening again. These reactions may result in burdensome regulations being added to the already overly regulated utility systems, causing added costs to buried-facility owners and contractors in an attempt to obtain compliance from underground-facility owners who do not now participate in the State's damage-prevention program.

He said that contractors, including his own company, have some work to do to clean up their act. Some simply do not call and excuse their actions by saying, "Hey, I'm a good contractor. I was only putting in a guard rail." Others do not call within an appropriate amount of time. Some are not specific enough about the location of their intended excavation.

Mr. Speakman acknowledged that contractors need to take some responsibility for these problems by bringing them to light here and addressing them. But, he said, others have responsibilities, too.

He stated that he personally is sick and tired of the local departments of transportation in New Jersey and other entities not participating in the damage-prevention programs and claiming that they are too busy, too broke, or too ignorant to mark their loop detectors and their other buried traffic facilities. But, Mr. Speakman said, "Heaven help me if I hit one because I'm going to get the bill."

Mr. Speakman said that in addition to himself, there are at least six other contractors from the NUCA and the Associated General Contractors (AGC) participating in the workshop. They are looking forward to discussing with the participants some of their war stories from their side of the coin. Everyone in this room knows that there are no easy solutions—only intelligent choices. Mr. Speakman said he hoped that the workshop could reach some consensus agreements about some of the available intelligent choices.

He then related information about three incidents that involved his company, which, he said, have echoed throughout the construction industries. In the first instance, he said, a telephone company was asked to mark the location of its facilities along the road shoulder. It marked in a single line, using the appropriate color to indicate the presence of a cable. His company dug by hand and found a 200 pair communication cable. Believing it had found what had been marked, his company began excavating, using a machine. About 10 feet farther along the line, the company again found a cable—this time with a "$200,000 cable finder." It turned out to be a loop from the cable that had been installed away from the cable alignment. It had nothing to do with the excavation, but was simply spare cable. It was looped away from the normal cable alignment rather than being cut off. Now, whose fault was that?

He stated that the telephone company responded to the request to mark the
cable location. His company did what the law required it to do, and still damage occurred. Why?

Next, Mr. Speakman talked about an incident involving a gas pipeline company. The gas company acknowledged that it had buried facilities in the area of the proposed excavation, and it marked the location of its line within an intersection, adding the initials HP, which means high pressure. The line was marked on the intersection paving, indicating that finding the line involves removing the paving. Mr. Speakman's company used a 90-pound jackhammer to remove the 10-inch-thick reinforced concrete over the gas line and found that the high-pressure gas main was encased in the 10-inch reinforced concrete road pavement.

He questioned, "Who is at fault for hitting that line?" The gas company did what it was supposed to do. It told his company where the line was. It even told the company what it was. Mr. Speakman's company abided by its portions of the law. It asked for the location. It heeded the marked location, and it hand-dug to the extent possible to find the line.

The third incident involved a water and sewer operation, and, he said, it was a typical scenario. His company notified a one-call center of the proposed excavation and was told that regulated utilities were in the area. He stated that in the area where he works, there are very few water companies and no sewer owners, but his company had seen indications that water and sewer systems were present in the general area of the proposed excavation. When his company asked the town's departments to locate the water and sewer facilities in the area, one stated that it had neither the time nor manpower to mark its line locations. The other frankly advised that it did not know where its facilities were located. His company dug carefully, but it scored a hit anyway. He asked, "Guess who got the bill?" In settling the dispute that arose over the bill, he said, his company won the battle while losing the war. He stated that the participants should try to obtain a permit to excavate in a road in a town after an experience like his.

Mr. Speakman stated that it was fortunate that no one was hurt in the instances he cited, but said that there was some property damage and a lot of hard feelings—and all of it needless.

Concerning the existing damage-prevention systems, he stated that nearly all private-sector utility contractors are excavators, but not all excavators are utility contractors. Home builders, home owners, the utility companies, themselves, and State and local governments are also excavators under the terms of most laws. Notably missing from almost every proposed solution to damage prevention is the concept that one who abides by the intent of the requirements will receive some immunity from liability and/or indemnification for losses because he has obeyed the law.

He suggested that since everyone recognizes that the best way to save
money in a liability case is to avoid the incident in the first place, perhaps incentives, such as immunity from liability, would be more effective than punitive measures in damage-prevention laws in encouraging people to participate in the prevention program.

He expressed the concern that most laws are a 20-percent approach to the problem. From polls taken of his counterparts within his company around the country, most of whom deal with underground utility construction, he learned that more than 80 percent of the location requests made to buried-facility owners are answered quickly and that the location markers are reasonably accurate.

Yet most laws address those situations that occur less than 20 percent of the time. Consequently an excavator or a facility owner has to do his work with one arm tied behind his back.

Another problem, he related, is that both the excavator and the facility owner take advantage of the so-called emergency provisions that are in most State damage-prevention laws. If an excavator has to excavate because loss of life or major property destruction is imminent, he is allowed to dig without providing the normal notification so long as he records the emergency condition.

He stated that his company has worked for some facility owners that call during normal working hours offering "emergency" work even though they have available crews. The facility owner says that there is no time for the normal notification and facility location requests—"just go dig." His company has taken such jobs and in the process damaged another owner's buried facilities. He asked, "Guess who gets the bill for that? If anyone is hurt, guess who gets the bill?" He added, that sometimes the facility his company hits is also one of his company's customers.

Add to the conditions described in the above situations the hold-harmless indemnification clauses that all contractors working for utilities have to sign if they are to get their share of the work, and you have, he said, one of the many dilemmas a contractor faces every day.

Excavating means contractors, excavators, and buried-facility owners are taking risks. They all fight weather, traffic, production schedules, peer pressure, competition from other excavators, jurisdictional disputes, equipment breakdowns, regulatory influence, permit restrictions, and unknown subsurface conditions. But something can be done about the last one.

He cautioned against "shooting ourselves in the foot" at this workshop. What is right with the various excavation-damage prevention programs ought to be preserved. And there is a lot right with them. Deciding how and what to improve is the point of being here.

During this workshop, he said, let's put on our thinking caps, consider what input we can provide to have a positive
impact in terms of saving human life and property, reducing suffering, and eliminating a potential source of economic hardship to ourselves, our businesses, and our society in general.

He went on to say that if the participants can accept the notion that everything happens for a good reason, then take what you learn here back to your homes, your families, your businesses, your law makers, your trade associations, your people in the field and your municipalities. Let our voices be heard, he said. Let our ideas and those of others here today and tomorrow be heard, discussed, argued, disputed, resolved. If we can do this, then we will have come here for a good purpose.

AUDIENCE COMMENTS

The workshop moderator, Barry Sweedler, Director of Safety Recommendations, Safety Board, asked that oral comments be limited so that as many participants as possible can comment. He said that more complete written comments of any length can be made later. And there will be two opportunities during plenary sessions for audience participation, now and on the second day of the workshop, when reports are received from the four panels. Moreover, each work group will have an audience, and he encouraged each group facilitator to encourage audience participation.

Stan Newsham: I am the manager of gas distribution for the Boston Gas Company and also the chairman of the board of directors of Dig Safe, Incorporated, which represents five New England States. I am glad to see this group come together. I am sorry it took 22 years to do that. And I am sorry that it takes major incidents or problems to bring this about.

In Massachusetts, we have tried to be proactive, rather than reactive. Right now, we have amendments in the legislature to bring about basically what you are trying to do here--have all excavators notify the center of planned excavations and require hand-digging to locate the marked buried facilities. We are looking at requiring pre-marking, which would be a tremendous savings to the ratepayers. It would be a great addition to public safety.

Bob Cave: I am the director of the American Public Gas Association, a national association composed of municipally-owned gas systems that activity participate in one-call systems. Unfortunately, a lot of other municipalities do not.

Mr. Kiffmeyer mentioned that his State has been very successful in getting its municipalities to participate in the State damage-prevention program. It would be helpful if he discussed how they have gotten these municipalities to cooperate.
Mr. Kiffmeyer: When we started, the one thing that our rates committee could not come to grips with was how to set a rate that would entice everyone to join and not be a burden to anyone. We decided to use a per-call charge, which worked out very well for everybody but the League of Cities, which said that the municipality did not have the money to join the system.

When we started, our charge was $5.00 per call, which, for a small system, can be rather costly. Now, we are down to $1.75 per call. We have instituted a "no location required clause" in the contract: if you get a notice of excavation in a map quarter-section in which you do not have facilities, you can call the center within 24 hours and advise that no location action is required. Then, you are not charged for the call.

Under this system, a small Minnesota municipality having a street light system or sewer and water mains in a limited section does not have to pay for calls about excavations at locations away from its buried facilities. This procedure is subsidized by Minnegasco because we take every call and mark our lines. While we pay about $2.50 for each call,
it is still cheaper than having our system damaged.

**Dan Coty:** I am operations manager for Northern Utilities in Portland, Maine. I am also chairman of the Maine Utility Dig Safe Group and a director on the board of the New England Dig Safe. Maine is one of the few States that has mandatory pre-marking for all nonemergency excavations. Even though others here have commented about damage-prevention programs reaching a plateau in that much less damage is occurring because excavators now are calling, we continue to sustain damage, either because of poor communications, because of inadequacy of the center information for describing a location, or because of people simply failing to exercise proper caution in excavating.

I hope this group will consider advocating mandatory pre-marking for all excavations. Statistics in Maine dramatically demonstrate the effectiveness of pre-marking in preventing damage. Our contractors’ association, as represented by the AGC of Maine, supports our pre-marking requirements as it limits the AGC’s liability and, when damage occurs, assists in determining who was right and who was wrong.

**Dick Thies:** I am vice president of Madison Gas and Electric Company. I have been involved in damage prevention for almost 25 years, and my people are responsible for operating about 1,600 miles of system, serving almost 100,000 customers.

There are two issues I wish to raise that should be considered by participants. First, what should contractors do when they have destroyed or covered over the surface location markings placed by facility owners? Too often when a contractor begins excavating, the markings are destroyed or covered over. I have seen a lot of damage that has occurred after the location marks have been covered up or destroyed due to the excavation. Usually this occurs when the contractor is performing some work he did not plan on doing when he first started the job. I am not convinced that pre-marking everything is going to be a solution.

I support engineering in advance of construction. In Wisconsin and in Madison, we promote it. By designing a facility to be installed so that it misses other buried structures, you can minimize the potential for damage. But, there are going to be unknowns that are going to develop.

If the location marks we make over our facilities are removed, then the contractor has the responsibility for again asking us to mark the facilities or asking us to offset the markings from areas of excavation.

Second, it is very important that we try to minimize the amount of damage that we are getting and that we do not exempt people from having to participate.

**Walter Axsmith:** I work for the Metropolitan Edison Company of Reading, Pennsylvania, and also am the
chairman of the Pennsylvania one-call system.

There are two issues that I want to add to our discussions in the workshop. One is about customer-owned service lines. Many water and sewer company lines end at the property line, and their owners mark those system segments when asked. The system segments between the property line and the building served by the water and sewer systems are owned by the customer. Who is going to mark the customer-owned line segments? Quite often those lines are not marked. This issue is becoming an increasingly important one in Pennsylvania.

The second question relates to a contractor's financial participation in the one-call system. Again, there are varying viewpoints, and I believe this workshop is a good place to discuss this issue.

**Phil Becker:** I am a member of the AGC and the NUCA, and I am an underground utility contractor. I would like to charge each group participant in this workshop with recognizing that contractors are not enemies. We are part of this team. Keep in mind that we are promoting a partnership concept which should include the one-call system operators.

Discrimination is something that I am going to address now. Qualifying a contractor is not legal in most instances because it is very difficult to qualify a contractor on his experience or his financial capability or anything. But, an approach that I am hearing from the gentlemen speaking this morning and from others is education. And it is something that we have been promoting in the construction associations quite extensively.

What comes out of this workshop has to promote education to contractors—training, some type of a training for all excavators, not just contractors. **Excavators** also includes the owners of buried facilities, the people in charge of construction projects, and the people that are operating the excavation equipment. They also must be trained.

And this is where I come to the subject of discrimination. If equipment operators are to be qualified in some manner for the equipment they operate, you should consider the "competent-person" requirement that we as contractors have. But you should consider also what training facility owners and others need. All of us need to understand what it takes to excavate around a buried facility. The work groups need to look into methods for educating and gaining cooperation in lieu of penalties.

I well recognize that an excavator who creates a problem all the time should have some type of penalty. However, I believe most accidents can be eliminated through effective training.

**Jack Watts:** I am with Contracting Enterprises in Roanoke, Virginia, and also a member of the AGC.

I echo what Phil said about not being the enemy. In Virginia, Miss Utility (the
one-call notification system) has established an associate membership for excavators and contractors. And there are over 20 members now. It has been in existence 2 or 3 years. I encourage other one-call centers to establish this type of membership if you do not have one, and I encourage all excavators and contractors to participate in all of the one-call operations and meetings in the areas in which they operate.

**Linda Durbin:** I work with Cable TV Montgomery. I would like for us to consider what we can do to hold a builder accountable for maintaining the location marks. Once the buried-facility location is marked, builders grade the next day and completely wipe out all the marks. It is an ongoing situation where they grade and regrade.

**Nancy Nickell:** I am with Thompson Publishing Group here in town. I am the editor of the *Newsletter on Chemical Safety*. I cover primarily the Emergency Planning and Community Right-to-Know Act. So I write a lot about relief valves and stuff like that.

Hearing the talk about these marks, I am surprised at how low-tech this sounds. Is there any effort to bury some device in the ground that has some kind of capability to send out a signal so that you can find it? Why do you have to depend on marks on the ground to tell you what's under the ground? They do not always correlate with what is under the ground—that is what I am hearing. I am just wondering if there is some sort of effort to change this so that people will have a better idea of what is there.

**Jim Anspach:** To briefly address that issue, in subsurface utility engineering, a permanent marker is buried within the backfill at points of potential conflict between construction and buried facilities.

Even though an excavator may destroy the surface markings, there is a permanent marker all the way down to the utility that has actually been physically exposed previously. Its position has been documented. So there are safeguards during the engineering aspects that are placed. During new construction, many utility owners are burying remote types of targets that can be identified from the surface by geophysical equipment.

**Steve Wallace:** I am with Thor Enterprises. We manufacture underground warning tape, or ribbon. Underground warning tape was developed in 1963 and has been widely used in marking subsurface system infrastructures for the past 31 years. The warning tape comes in a metal-detectable variety for nonmetallic system installations, such as a polyethylene gas line or a fiberoptic cable.

It is normally installed 12 to 18 inches below grade, so it acts as a last line of defense, a flag, if you will, that is encountered by the excavator. To give you some indication of the widespread popularity of this product, our company alone manufactures approximately
100,000 miles of it per year. And I would estimate that, in the United States alone, there are more than a quarter of a million miles of warning tape installed over buried plant. So for 30 years, the utilities have taken those kinds of precautions.

**Randy Doctor:** I work for Illinois Gas and currently, under the direction of the Gas Research Institute (GRI), I am working on a project that is considering new technologies that address means of preventing excavation damage. A number of people at this workshop are a part of this project. The GRI looks forward to listening to everyone's comments during the workshop, and we invite everyone to also participate in our work project.

**CHARGE TO THE WORK GROUPS**

**Barry Sweedler:** Our speakers this morning set the stage for this workshop. As we go forward, our philosophy on preventing excavation damage to buried facilities should be that excavators and the buried-facility operators will work together with representatives of governments at all levels to provide an effective framework for achieving our mutual objective. If we can achieve that and use it as our starting point for improving present prevention programs, I think we will be quite successful.

The expertise for identifying what needs to be done and the leadership for ensuring implementation are present in this room today. Over the next 2 days, you will be reviewing what is working now and what is not working. Keep the what's-working-good procedures; if they need to be fine tuned, you are the people who can determine how to do it. As far as the what's-not-working procedures, you have the experience to recommend the changes that need to be made.

The workshop will separate into four work groups. Each group has been assigned to discuss and develop recommendations for improving a specific segment of the overall damage-prevention program. Group one will address the essential elements of an effective one-call notification system operation. Group two will address the responsibilities of buried-facility operators. Group three will address the responsibilities of excavators. Group four will address the effective administration of a statewide excavation-damage prevention program.

Each work group has about 20 panelists, who are representatives from all the interested groups that were selected by their trade or organizational associations to serve on the panel. Each panel has representatives from communications, from electric, water, sewer, and pipeline operators, from contractor interests, from local State and Federal governments, from one-call notification centers, and, in some instances, from other areas.

We selected the group discussion process and the panelist-selection
procedure to obtain the broadest possible interest representation and experience. Also, each work group has been assigned a facilitator to help move discussions along and, to the extent possible within the limited time available, provide opportunity for participation from all who desire to comment.

I hope that in your discussions, you will reach agreement on the changes that need to be made for minimizing excavation-caused incidents. I am sure we will not get 100-percent agreement, but you should strive to achieve a strong consensus. Each group should also allow for the presentation of minority viewpoints.

The group facilitator should periodically provide an opportunity for comments and questions from the audience. While we have assigned panelists to represent each of the interested groups, I would like the audience to observe the discussion, and I would like the facilitator to elicit discussion from the audience because all input is needed.

I suggest that the groups convene at 1 o'clock, but if you decide you need more time, that is up to you. You can work into the evening or start early in the morning.

Tomorrow afternoon, we will reconvene the plenary session to receive reports on the work of each group and to learn about the consensus recommendations they have developed for improving excavation-damage prevention programs.
GROUP 1

What Are the Essential Elements for Effective One-Call Notification-System Operations?

Facilitator
ROBERT CHISHOLM, Alberta One-Call Corporation

Panelists:
Wayne S. Olson, Jr., Pacific Bell
Larry C. Moss, AT&T
Victor Gates, Metro Vision of Livonia
Roscoe Johnson, Town of Vienna, Virginia
W. Lee Gaines, Gaines & Company, Inc.
Larry Wheeler, Southern Natural Gas Company
Jack Watts, Contracting Enterprises, Inc.
David Blew, Public Service Electric & Gas Company
Larry Shamp, Shell Pipe Line Corporation
Gary Laird, Columbia Gas
William Gute, Office of Pipeline Safety/RSPA/DOT
Joesph T. Finnan, Pennsylvania Public Service Commission
Mark Selker, Ohio Public Utilities Commission
A Jaiyeola, District of Columbia Public Service Commission
James Holzer, Oregon Utilities Notification Center
Greg Obsincs, Ohio Utilities Protection Service
Ron Olitsky, California Underground Service Alert
Wayne S. Olson, Pacific Bell

Robert Chisholm: We are challenged to reach consensus on the essential elements of an effective one-call system. In an effort to provide some focus, I would like to introduce the term digging community, which is you, me, each of us, and all of us, whether as homeowners building a fence or planting a tree, as utility companies maintaining our systems, or as contractors installing sewers or water mains.

We are here in the interests of public safety and in the interests of preserving the integrity of our own underground systems to talk about damage-prevention strategies and initiatives. We must recognize that damage prevention has no ownership, no
citizenship, no birth certificate. Responsibility for preventing damage to buried facilities is not restricted to the digging community or to the owners of buried facilities. It involves each of us and all of us. As individuals and as organizations, we are responsible for our actions; and yes, we are responsible for our inaction.

In addressing the essential elements of an effective one-call system, we must consider the expectations of the digging community, as well as the expectations of the facility owners. Our findings will be presented tomorrow in plenary. To accomplish this, I suggest we focus on the adjective effective as it applies to one-call systems. I hope we have the time to dissect essential elements into what must be, what should be, what could be.

In my experience, one-call systems are not static organizations. And we have the full range across the country. We have one-call systems that have what must be in place, systems that have most of what should be in place, and systems that are working on what could be. We have other one-call systems that do not have what must be in place.

We have a very distinguished panel here today with representation from most, if not all, stakeholders in the prevention of damaged buried facilities. The only group that is missing, as far as I can see, is the railways. And that, I do not think, is any surprise.

Each panel member will have the opportunity to propose the essential elements of an effective one-call system and to entertain discussion, comments, and questions. As your facilitator, I will keep an eye on the clock and stifle repetition. And I will allow each of you the opportunity to contribute to our deliberations while I try to keep track of the essential elements of an effective one-call system as they emerge.

Summary of Panelists’ Discussions

Notice-Center Operator: Should a buried-facility operator be allowed to operate a notice center? Panelists first wanted to know if there still were any in-house notice centers. From comments, it was concluded that several such operations exist and that some facility operators are considering whether they should operate a notice center. Bell Telephone in Ontario, Canada, is a facility owner that is considering operating a notice center. It was observed that many in-house operations have been run by operators of telephones and other buried facilities. Michigan operates an in-house notice center that many think is one of the most effective in the world. Other notice centers cited as being operated previously by a buried-facility operator included those in Alabama and Georgia.

Panelists’ comments suggested that a facility operator operating a notice center would appear to be involved in a conflict of interest and that such an operation could create a credibility problem with the digging community.

The panelists discussed many pros and cons of a operator operating a notice center. However in consideration of the
panel's task of defining the essential elements necessary for an effective notice center, the panelists agreed to not address the issue.

The panelists suggested that a one-call system be defined as a communication system that is established by two or more utilities, government agencies, or other operators of underground facilities, so that contractors and members of the public have to make only one call to announce their intent to use equipment for excavating, tunneling, demolition, or any other similar work.

**Participation:** Panelists agreed that all owners of buried facilities should participate in the notice center. They agreed there should be no exemptions for municipalities, cities, water works, or whatever entity a State might consider exempting. The only exemption would be for owners of private facilities and the exemptions would be restricted to their land and their use.

The cost to contractors and facility owners must be minimal, and the best available information about the depth of marked facilities should be provided to excavators. Both excavators and buried-facility operators need to recognize that using a one-call system is essential to preventing damage.

Most panelists viewed encouraging contractors to become active members of the one-call system as a means of increasing contractor responsibility for using the system and as a means of making the notification system work better for the benefit of both the contractors and the operators.

In support of increasing contractor involvement, one panelist noted that contractors now can have associate memberships in Virginia's Miss Utility system for $100 a year and that the system has 23 associate members. The associate memberships were offered primarily to develop interaction between excavators, and according to the panelist, the memberships have been a wonderful success. Communication between excavators and operators has increased, and the improvement in communication has helped resolve many excavation-damage problems.

Others suggested that the language used in the definition should reflect a need to broaden participation of contractors in one-call systems, rather than specify the methodology of how to do it. Panelists agreed that increased participation from the excavation community is necessary to achieve greater one-call system effectiveness.

A center-operator panelist stressed the importance of a contractual arrangement between the members and the one-call organization, if for no other reason than to limit liability and make sure that all are working from the same script.

Panelists concluded that the only exemption should be for people excavating over only their own facilities if they have complete control of the land and if no other buried facilities are present.
Panelists said it was hard to get the following groups to participate in excavation-damage prevention programs: the Bureau of Land Management, the National Park Service, military installations, Federal agencies, managers of Native America lands, farmers, and others who are incidental excavators. One panelist observed that half the farmers he knows have a half broken-down backhoe and sometimes decide to go out on their own and dig to save money. They need to call the notice center beforehand, just to be certain that they can do the work safely. Calling does not keep them from saving money, but it does mean that they have to become better planners of their excavations.

A Federal Communications Commission (FCC) representative described the following findings from a 10-month summary of reports from communication companies. The reports were of network outages that had affected 30,000 or more potential users for 30 or more minutes.

- The FCC's review of the 50 outages revealed that 32 could have been avoided had the excavators, the operators, and the locator followed the best practices of the industry.

Following the best practices includes notifying the one-call system. The one-call system is not used everywhere it is available; instead, in some areas excavators and owners have direct working agreements. Of the 32 avoidable outages, 17 involved an excavator who failed to notify, either through the one-call system or directly. In five cases, the excavator notified the telephone company but cut the cable anyhow. None of the accidents was necessarily the excavator's fault. In eight instances, the communication-facility owner was at fault. In four of those instances, the damage was done by the owner or his contractor. In the remaining four, the cables were damaged because of locating or marking errors.

**Funding:** The group noted that some States collect an annual fee from contractors for using the system, while others charge municipalities less than others to participate because their use of the system is considered a nonfunded mandate. In some States, contractors are indirectly charged through permit fees. For example, California's damage-prevention statute allows local government agencies to recover all costs of membership and participation in the one-call system through the permit fees it charges contractors. Panelists agreed that the costs incurred by excavators, either directly or indirectly, can
adversely affect the effectiveness of a damage-prevention program.

Buried-facility operators noted that their objective is to get as many people as possible, whether they are farmers, property owners, big utilities, or contractors, to use the one-call system. They also favor involving contractors as partners rather than making them pay permit fees to spread the cost of operating a one-call center.

Most panelists thought that making contractors pay fees for the right to notify the center would reduce the participation of the contractors

Participation costs for excavators and contractors have to be kept minimal so that they do not try to get around the system by not calling the center. A panelist said that many centers now offer associate or sustaining memberships to contractors. Some centers have 100 to 150 contractor members. He said that the term *minimal cost* in the definition should be replaced with *maximum participation by contractors*. He said the director of the board of directors of his center is a contractor.

Panelists also discussed ways to encourage contractors to become active partners of the buried-facility operators in the operation of one-call systems.

Panelists representing buried-facility operators expressed their willingness to absorb a center's cost rather than to impose a charge on excavators. They said they need to receive locate requests to protect their facilities. They do not want to discourage excavators from using the system. By getting the maximum participation from excavators and all operators, they believe they can reduce their costs and improve the safety of their facilities.

*Education:* One-call systems need to include a well organized, orchestrated education program that reaches out to the entire digging community, including the general public, through the mass media. One panelist said that effective education is expensive. Others said that the program must include a variety of media to effectively communicate with all potential excavators.

A user's guide or handbook for contractors and other excavators is also considered essential. It should describe the responsibilities of each participant—the buried-facility operator, the center, the excavator, and the administering State agency—and discuss normal and emergency operations. A panelist said that Virginia now has a user's guide, *Professional Excavator's Manual*, that is free to anyone in the State. The guide has been most helpful in explaining the responsibilities of the center, the excavators, and the facility operators and in explaining statutory obligations and penalties.

Excavators need to be told that they must make their location requests at least 24 work hours before they begin excavating. The advance-notice requirement varies throughout the country and ranges from 24 hours to 3 full working days. The advance-
notice period should be statewide. For cross-country pipeline operations, many contractors need to be taught how to provide adequate location information, especially about rural areas. It is not sufficient for a contractor to give the center the names of the people for whom he is working; he needs to report the location of the planned excavation in terms of meets and bounds, map section, map townships and ranges, or other map coordinates so the owner can decide whether he has facilities that need to be marked.

Panelists said that member companies need to educate their employees. Today, many member-company employees are not aware of the damage-prevention program and of how the one-call notification system works or of the responsibilities of excavators and operators. A center employee said that about 3 years ago, his center had presented a program in its operating area just to make sure members understood what the program was about and the purpose it served.

A panelist emphasized the need to encourage operators and excavators to understand and accept their responsibilities. While such encouragement is considered a part of a center’s educational responsibilities, the panelist stated that experience has shown that this
issue must be treated separately. He said that excavators tend to be much more aware of their responsibilities and more willing to accept them than operators are. Others agreed.

Another panelist observed that the interests of the operators are the same as those of the excavators. It is in the best interests of both to work together, to make certain through education that all know what is at stake and how to best work with each other.

**Operating Hours:** Systems should be open 24 hours a day, 7 days a week, to be effective. In effect, they are public systems; and in a sense, they provide a public service.

Some areas in North America do not have enough calls to warrant a round-the-clock operation. A center in such an area should have some provision for handling after-hour requests. The operative phrase is that there should be 24-hour access to the notification system. Where the number of calls is high, some systems now provide 24-hour access; but where the number is low and 24-hour operation is not cost effective, access can still be provided through a range of possibilities. In Ohio, the center has a person who works at home and can take after-hour calls. Some centers that operate continuously also handle other centers’ after-hour calls. Another center accepts FAX notification on a 24-hour-per-day basis.

The panelists agreed that to be effective a center needs to offer 24-hour access. The manner of providing access should be left open to allow the center the flexibility necessary to meet this objective in a cost-effective manner consistent with local conditions.

The season may affect the number of demands made on a notice system. Some centers have minimal activity between the winter and the spring thaw. During that period the activity usually is of a maintenance or emergency nature, but when spring begins, there is an explosion of activity.

**Operations:** The panelists agreed that criteria need to be developed to assess the effectiveness of notice-center operations. Among the items panelists suggested that should be addressed by operating criteria are the following:

- the types of notification requests that are to be taken,
- the type of documentation to be obtained for each request,
- the amount of time allowed for transmitting the notifications to operators,
- the scale to be used for mapping notification-service areas to minimize the numbers of locate requests received by operators whose facilities are located only in a small portion of the coverage area,
- the identification of and boundary overlaps among centers,
the use of toll-free telephone numbers,
the retention of records,
and the procedures for disaster-backup operations, such as on-site emergency power, use of latitude and longitude on maps, and remote imaging services.

Management of the center must be proactive, not just in education programs, but also in helping to influence legislation or other proposed changes in the State damage-prevention programs.

Also, criteria should be developed to specify the type and extent of information an excavator must give when he is making a notification.

The center should tell the caller the ticket number for each locate request and the names of the owners who will be notified.

A panelist pointed out that all notice centers do not have the same capabilities. He noted that of the 26 centers in the Northwest, 24 are not one-call. He stated that they are answering services with no capabilities to do voice recording, no computer-operated systems, and no switching systems. He does not believe that the 24 centers can transfer an erroneously placed call to the correct center, even if they want to. He also said that in Wyoming, where centers claim to be countywide, some serve only within the city limits. He stated that in his experience, he does not receive information about planned excavations from centers that are outside the city limits, and no other center provides coverage.

To meet the varied demands on centers, it was suggested, service grades acceptable to the system users (excavators) need to be established. The grades should reflect the average time required for a user to reach a center representative. A center should be open during the hours that are compatible with the hours kept by the digging community.

The notice center must be user friendly. In other words, the excavator must be able to reach the notice center without charge. He should not be likely to get a busy signal, and he should not be put on hold. It was noted that excavators, like other people, become turned-off when they experience delays in completing phone calls; thus, a basic requirement must be that the center be able to handle peak numbers of call with a minimum delay.

Centers need to verify the accuracy of the data they get from facility operators. Panelists said facility operators need to know what information the center has about them so that they can correct it. Some center operators indicated that they already supply the facility operators with the information.

The center should advise callers of any limitations of the notification service or system coverage. It must accept and process short-notice priority and emergency locate requests. It must establish and maintain an acceptable quality of telephone service, and it must regularly communicate, through newsletters or other media, with customers to describe service factors acceptable to users of the system.
The center should develop cooperative working relationships with agencies and associations, such as the One Call System International (OCSI) that have mutual areas of interest and concern.

There also should be a database about abandoned facilities.

Documentation of work performed is also viewed as being most important. Location marks are often immediately destroyed, perhaps because of other activities in the area or because of people not wanting the work to be conducted. When the contractor arrives, there are no markings; thus a method of documentation becomes essential. However, many centers have no means of documenting that a locate request has been fulfilled.

When a center has special knowledge, for example, knowledge that municipalities will not locate sewer and water services on residential property, the center is dutybound to give the information to any caller. However, some State laws, such as those of West Virginia, Hawaii, Puerto Rico, and Texas, do not address such responsibilities.

The center needs to tell the notifier the name of each operator that will be alerted. The panelists were told that in Virginia, the caller is told which companies will be notified. If a caller is told that four different buried facilities are in the area, he knows before beginning to excavate that he has a problem if he sees only three different markings.

Virginia will change on January 1. The center will tell the caller who will be notified. Operators who have not marked their facilities within 48 hours of being notified must call the center and report their inability to mark their facilities. The operator will be given an additional 3 hours in which to mark the facilities. This provides both the contractor and the operator with a safety net in case something goes wrong and facilities are not marked in a timely fashion.

After January 1, in Virginia, the operator will have to call the center to clear the locate request. It will be like voice mail—press one if it is marked, press two if it is clear to dig. So an excavator can call the center before sending his crew out and learn who has responded to the request and who has not. He will know before he leaves for a job site whether all owners have responded to the locate request. A second failure by an operator to mark the location of his facilities in a timely fashion will mean that the operator will be in violation of the statute. There will not be any question about who has violated the statute either by not calling or by not marking in a timely fashion. The proof will be on the recorded tape.

Some centers accept batch ticket entries for location requests, and the practice has proven to be a tremendous aid in reducing hold times. North Carolina eliminated 15 operators by using batch mode ticket entry. This could reduce operating costs enough to pay for 24-hour coverage.

**Center Communications:** Panelists emphasized that centers must be able to transmit, as well as receive. There should
be no delay between the time a request is received and the time it is forwarded to a facility operator. Systems should have backup means, such as FAXes to transmit locate requests when the primary transmission system is not operable.

A backup system for transmitting notifications is also necessary. Those who do not have FAXes could provide voice notification and, as a follow up, mail a completed request form.

Each center should have a 1-800 number. Also, the center must obtain enough information to be able to tell the buried-facility operator the type of excavation to be performed, the extent of the area to be affected, and how to contact the excavator directly should more details be needed.

A pipeline-company representative noted that the group should not dwell on the number of notice centers in a State; rather, it should focus on excavators being provided 1-800 access within a State. She pointed out that as long as there is one number within the State or area that serves multiple systems, the needs of excavators can be satisfied. The key point is accessibility for excavators from any place they wish to make the call; referral can take place as long as each system's service area is well defined.

One panelist suggested using the terms toll free or free phone call instead of the term 1-800 number. After all, he pointed out, the intent is free phone access to the notice center. In Atlanta, Georgia, which has a huge toll-free area, a local seven-digit telephone number can be used within the local-call area, and a 1-800 number when long-distance charges would otherwise apply.

It was questioned whether free phone call means toll-free access within the service area or within the State. Responses from others indicated that it should be construed to mean free access from any location. It was noted that in the Northwest, contractors in one State cross over to work in other States. For example, those from Washington work in Oregon, Idaho, and even as far away as Wyoming.

A panelist described a contractor's system for improving communications with the center and stated that the system also improves the contractor's accountability for use of the system. Before an excavator calls the notice center, he records on a form all the necessary information in the same sequence that it will be requested by the notice-center operator. The call to the center then becomes no more than reading the information from the form. On completing the call, the contractor records the center-assigned verification number, and the form is filed with the project records.

Centers need to standardize the terms they use in communicating with others. The terms need to be fully understood by all center users throughout the country, especially by excavators who cross jurisdictional boundaries. Having flexibility in center operations is of no greater importance than making certain that centers use standard terms that can be recognized by all excavators. For example, some center operators use the term a dig,
to mean a call that comes in from an excavator, while others consider it to mean the message that goes out to the facility operator. Perhaps One Call Systems International can consider the problem.

The facilitator observed that the same is true in State legislation: similar terms have different legal meanings in each State. He observed that the Federal guidelines could perhaps incorporate some of the major definitions.

Centers receive and transmit "who, what, where, why, and when" information. This work can be accomplished more effectively and efficiently if there is a protocol for communications, one that allows excavators and operators throughout the country to communicate in common terms.

Computer and communication systems in centers should be flexible enough to accommodate growth and change. There was no discussion on this item about which the group agreed.

A center should provide caller access through a cellular star number so that cellular-phone users can make free calls. This suggestion was viewed as another way to encourage excavators to use notice centers.

A panelist from Georgia said that its center advertises only its 1-800 number, which is its primary telephone number for use by excavators. The center encourages its largest users, primarily members of the center, to use the local Atlanta-area notification number simply because it is cheaper.

**Mapping:** Because of the GIS location system, the reduced cost of mapping, and the lower cost and greater capability of computer systems, there is no excuse for not having a state-of-the-art mapping system for all the one calls today. By making use of these increased capabilities, it will be easier for owners to determine whether they need to mark the location of their facilities.

The U.S.A. North notice center began using the Global Positioning System (GPS) last year. It now includes latitude and longitude information with its notifications when they are available. A unit small enough to fit in a pocket and to cost less than $500 is being developed. An excavator will be able to take it to a job site. All he has to do is press a button to give the center very precise location information. In northern California and Nevada, centers are developing their own maps based on longitude and latitude quarter-minute grids. In the future, the caller will be able to give the center either a GPS or the page number in his grid atlas to identify where he is working. Center members can automate their records to allow them to look up the information very quickly and determine whether they have facilities in the area of the proposed excavations, thus saving themselves quite a bit of money.

**Records:** Concerning records of telephone calls, it was noted that the Illinois notice center does not voice-record messages. The State legislature recognizes the message itself as a legitimate transaction because the center operators allow the caller to change the information, and when
the notification is complete, it is read back to the caller at least once. An example of the number of calls that would have to be recorded is JULIE (the Illinois, excluding Chicago, center), which took 603,000 calls last year. It is going to approach 700,000 this year. In the 20 years of its existence, the need to record voice messages has never been a legal issue. The Illinois system believes that the decision on recording locate messages should be left to each State.

Others favored the recording of messages because, they believe, a responsible notice center cannot afford to not voice record telephone calls in this day and age. There is too much liability, and there are too many things that could be called into question, especially should something should go wrong. Most panelists contended that a voice record is a must for effective center operations.

An example from Georgia's Utilities Protection Service's operations was used to demonstrate the usefulness of voice-record messages. That system never had an occasion in which a voice recording was important until mid 1994, when the center took a location request from an excavator. During the conversation, the excavator was asked whether the request involved facilities that were underground, overhead, or both; the center also provides a service for overhead facilities. The excavator was also asked if he would be working within 10 feet of overhead lines. He said no. His ensuing work resulted in the deaths of two of his employees when they came into contact with overhead electric power lines. Afterward, the excavator stated that he had no knowledge he was suppose to call when working near overhead facilities, but the center's voice-record was used to prove him wrong.

The facilitator said that he believed most centers that have voice records could present similar stories in which a voice-record has been used to resolve a disagreement.

Another panelist observed that a few years earlier, the expense associated with voice recording could have been prohibitive. Recorders cost $80,000 to $100,000, and tapes were $100 each. However today, digital recorders are inexpensive and record the voice message right along with the ticket. The use of voice-recorded messages can all but eliminate other record keeping because the information is on data tape. Most centers can save several weeks of data on one tape. The cost of voice recording should not be a deterrent anymore.

The facilitator said that, the Illinois' situation notwithstanding, the consensus of the panelists is that voice recording is a must.

Concerning the retention of notice-center records, it was suggested that a record of all incoming calls is a fundamental record that a notice center should keep, be it voice or printed. In order to maintain the sovereignty of each State or geopolitical area, the records should be retained for the time period specified by State statutes.

A center operator said that his center does not maintain paper copies; rather the records are kept on microfiche, from which
a paper copy can be produced. He also said that others plan to keep their records on optical disks. He suggested that the wording of this requirement provide for keeping records on mediums other than paper. It was also pointed out that incoming and outgoing records need to be addressed separately because most often they are documented differently.

The panelist from Illinois again objected to requiring notice centers to voice-record incoming notification. He said that the Illinois Underground Facilities Act calls for a record to be made, but it does not specify the type of record. He argued that the group recommendation should include both voice records and hard copy records, but leave the choice of type to the State. He agreed that there needs to be a record of all incoming calls, but argued that there are numerous ways of making the record, including voice, computer and written.

Another panelist said that, whether or not required by State law to do so, most notice centers did not arbitrarily decide to voice record phone calls is not arbitrary; rather, the decision is well thought out and its value proven over time. Voice recording creates a real-time record of what is reported during a conversation: a written or computer-generated report does not. Having a voice record of notifications solves a lot of problems. Also, the Underground Location Coordination Council (ULCC) guidelines have for many years recommended that centers keep a voice record of incoming calls. Furthermore, a few years ago, the OCSI developed minimum requirements or recommendations for notice centers, including the requirement that centers voice record all incoming telephone calls.

A panelist questioned the frequency of using center voice records in litigation. The response from a panelist from California was that their centers are subpoenaed to produce both hard copy and voice records. He further questioned whether the hard copy record alone is adequate to properly litigate a case. He was told that the hard copy record alone is considered to be hearsay and that use of the voice record helps to avoid costly, time consuming litigation.

It was suggested that notice centers periodically provide statistical, financial, and administrative reports. The panelists discussed the availability and audiences of such reports. The facilitator stated that his center provides statistical reports and also manages statistical information for committees. However, much information is extracted from those reports and can be provided to anyone. It was agreed that the center should be able to develop and provide reports on its operations, but should be allowed flexibility in deciding to whom to give the reports.

It also was pointed out that criteria need to be developed on uses of electronic data storage. They should address the time interval that data must be maintained, the types of database searches that can be performed, and the types of uses that can be made of the stored data. It was pointed out that often the data is needed to assist in settling claims and in responding to litigation.
Some panelists advocated notice-center records being machine readable so others can use the data. No one objected.

The center should be able to track the origin of locate requests by various criteria, such as by center member, contractor, home owner, municipality, etc.

**Marking Facilities:** A State panelist asked who is responsible for locating buried facilities of home owners. He noted that his State has a mix of customer-owned and company-owned service lines. When an excavator is working on private property, it is still important to call the notice center because other buried facilities are still likely to be in the area of the planned excavation, and their locations need to be marked.

A panelist said that Kansas had recently asked utility operators to voluntarily mark the location of customer-owned buried facilities; the alternative, according to the State, is to modify the statutes to require that buried-facility owners mark service lines between the meter at the property line and the buildings served by the line. Other panelists asked how a utility operator can accurately mark the location of buried lines that he does not own and about which he has no records.

Notice centers should develop and analyze a damage incident database to help identify factors, such as damage causes, that can be useful in promoting corrective actions. A panelist noted that some facility operators consider damage information as proprietary and may not want to cooperate with a center in developing a database.

Another noted that it is essential to define as specifically as possible what excavators and operators are responsible for causing damage or which are most prone to cause damage for the center to most effectively tailor its public-awareness and damage-prevention program. However, the provision is worded as something a center could do rather than must do because facility operators may be reluctant to share damage information. Another panelist said that his State recognized the problem of sharing such information. To overcome the reluctance, the operators are developing a program in which information can be shared on an anonymous basis by the type of buried facility.

**Positive Response to Locate Requests:**

Opening panelist comments were against considering the issue because they believe it is not a responsibility of the notice center. A center operator said that the agreement with the members requires the center to provide a positive response about whether the buried facilities have been marked after a request is made. Some panelists noted that some State laws require a positive response, while others questioned whether the response is a responsibility of the notice center or of the operator.

A positive response can be achieved with a telephone call, and some panelists believed that the notice center is obligated to do what it can to ensure that its members actually respond to each notice. The center could assume a clearinghouse responsibility for completion of the necessary location work, or as is done in
California, the buried-facility operator could notify the center by telephone.

It was recommended that the group acknowledge that the notice center can facilitate positive response and/or it can act as a clearinghouse. Either way, the decision should be one of policy and decided by each notice center.

A panelist asked whether an excavator will bother to notify the center if he is not certain that the operator will respond in a positive manner. The excavator needs a positive response—the operator must either mark the facilities in the area or tell him that no facilities are in the area of planned work. Such a response is an absolute necessity, and it is a part of the notice center’s responsibilities.

Some panelists agreed that the excavator needs a positive response, but they were uncertain about whether the notice center or the operator should be responsible for ensuring that a positive response is provided.

One notice-center representative said that if the center does not take responsibility for ensuring that operators respond to every notification, he does not believe that the system can be considered a one-call center because a center has to be effective to both excavators and operators. Another center operator stated that under its operating procedures, the operator must sign an agreement saying that he will either mark the facilities or notify the excavator that there is no conflict.

Much additional discussion ensued about whether the notice center should be responsible for or actively promote positive responses. Then a panelist said that the Virginia notice center is trying out a new communication technology in which the ticket number assigned to a notice is automatically used by a computer program to set up an interactive voice communication system. Operators, using the ticket number and a security code, will be able to say by phone that their facilities have been marked or that they have no facilities in the area. The excavator, by using the ticket number, can access the information by phone and receive an update on the status of his notice. This type of system is a natural for a notice center because the ticket number flows right into the interactive voice system, allowing information to be updated by a phone call.

A panelist noted that a lot of small excavators are not equipped to handle responses from the operator. Such an excavator notifies the center right before he goes to the work location. In many instances, there is no way for the operator to reach him. The panelist stated that he is not opposed to providing positive responses after buried facilities have been checked and marked, but that there has to be a mechanism for accomplishing a positive response. Either the response has to go back through the notice center so the excavator can receive conformation, or the excavator has to have a means of receiving the conformation. The operator cannot be held solely responsible.

A center operator commented that a "positive nonresponse" provision had been
enacted in Illinois just 3 weeks earlier. It is a compromise worked out by excavators, operators, and unions in recognition of the fact that excavators do not always provide telephone numbers at which they can be reached. The new law specifically requires that operators provide a positive response and that excavators provide a means, phone, FAX, pager, etc., by which they can be reached. The law also provides that if the excavator cannot be reached by the means he has provided, the operator is no longer responsible for providing a positive response.

A panelist asked who should enforce the positive-response requirement. Should the notice center be responsible for enforcing compliance, for dictating to its members that they have to respond, or for incorporating the provision in its membership agreements? He stated that even though a notice center may want its members to do something, the membership controls the board of directors, which controls the notice-center policy.

Ensuing discussions favored requiring the facility operator to provide positive responses to excavation notices. Some favored incorporating the requirement in the membership agreement and having notice centers handle complaints of noncompliance, while others favored having it required and enforced by the State.

A communications panelist told the group that his company sends employees to mark only about 6 of 17,000 notifications it receives monthly in the summer from the notice center. For the company to be required to provide a positive response to the 94 percent of notices that involve locations where the company has no facilities would be, he said, an administrative nightmare unless the notice center processes the calls. While positive notice is a good idea, he said, a cost-effective means must be found to comply with such a requirement.

A panelist representing a local government questioned how a center can prevent excavation damage if it cannot provide excavators with a positive response. He said that if the center cannot provide a positive response, the excavator might as well not provide notice. Others concurred.

In Virginia, the State Corporation Commission enforces all the regulations, and it requires a response and enforces the requirement. The panelist said he agrees it should be in the operators’ category. He added that the one-call center can facilitate and monitor the positive response, but is not in the enforcement business.

A notice-center panelist stated that when U.S.A. North began operations, about 20 years ago, positive response was one idea about which all facility-operator members strongly agreed. They agreed that the excavator must get a positive response, and they required it through the participating membership agreement. Any new organization joining the system had to agree with this provision because the members believed that if the excavator is not given a positive response, he will excavate without calling the center because he will feel that he is not getting cooperation from the facility operators. U.S.A. North members did not want a State
law to tell them what should be done. They voluntarily included the provision in their agreement, made all members fully aware of the provision, and monitored compliance. Now both U.S.A. North and South have the provision in their agreements, and State legislation also requires it. The panelist said that they are now working to have the provision included in Nevada’s laws. He stated that if a contractor reports that one of the center members has not responded, the center calls the member and states that both the law and the center’s contractual agreement require positive response to all notifications. If the member continues to violate the provision, the center is prepared to act; however, in the 15 years that he has operated the center, it has never been necessary to go beyond explaining the law to any member.

Other panelists responded, one explaining that the notice center needs to encourage positive response from operators and help facilitate the communication between operators and excavators. Another voiced his opinion that the notice centers have a responsibility to facilitate operators in providing a positive response. Therefore, he said, it is appropriate to require notice centers to facilitate operators in providing a positive response, but inappropriate to require their members to provide positive responses. Other panelists and the audience agreed.

A local-government panelist observed that the purpose of the group’s deliberations is to obtain agreement on the essential elements of an effective one-call notification system. The purpose is to define what should be practiced, not what is being practiced by Minnesota or Ohio. Further, he stated, it is the responsibility of the State, not the center, to enforce the positive-response requirement. It is the responsibility of the State to first provide the legislation to enforce that kind of requirement and then to enforce it. Further, he stressed, communication is not complete without feedback. If you want to produce an effective system, then you have to complete the loop.

A center-operator panelist supported that position and said 25 percent of the notifications to his system are from operators, while 75 percent are from contractors or homeowners. He noted that his center has to satisfy the expectations of both operators and excavators and that it is his opinion that a center will not be effective without positive response.

Another panelist agreed that positive response is needed, but he noted that the group was having difficulty with the concept that the center should require its members to comply. He questioned how a center can enforce the provision. All it can do is to forbid the noncomplying operator to participate in the center, but excluding an operator only prevents full participation by all operators—another essential for an effective notice center.

Panelists concluded that positive responses are essential, that centers cannot force operators to provide such responses, and that the panelists should encourage the group considering operator responsibilities to consider the issue. Lastly, the panelists concluded that centers should help
operators in communicating their responses to excavators.

**Operating Area:** A panelist suggested that a center should have a unique service area, one that does not overlap the operating area of any other center. The center should have a 1-800 number.

A Texas-based pipeline representative told the panelists that her State has the problem of having multiple centers. The use of the term geographic service area does not help because it is possible to have a large company develop its own notification system or for each metropolitan area to have its own 1-800 number to service operations with the area. She believed it necessary to have a single, statewide notification system that preferably should be run by the State or a nonprofit organization. She said that it was necessary to put some kind of an overview board or nonprofit group over the entire State to solve the problem they have in Texas.

Other panelists noted that several States have multiple notification systems and that they seem to work well. New York has several notification systems operated by several different nonprofit boards.

The pipeline representative questioned how, from a contractor's point of view, the notification problem is solved when there are multiple systems in one State. Other panelists observed that the specific problem has been solved in most States by having excavators call a single 1-800 number and then by having the telephone company define the geographic area within which the call is forwarded to a specific center. As far as the excavator is concerned, he dials the same telephone number from any location within the State, and through the communications system, the call is switched to the correct geographic area for the location of the excavation work.

Another panelist noted that using the term statewide would create problems for the systems now in about 15 of the States, including California, New York, and Virginia. It was noted that the Texas problem is not that of having statewide notification coverage, but of having coverage overlap by having two statewide systems and one local-area system.

Local option and the needs of the local area can determine the coverage of multiple centers so long as the contractor has to call one to notify all facility owners that may be affected by his excavation.

That point was emphasized by the U.S.A. North representative. He said that on last January 6, one number was adopted for all of California and Nevada. The calls are directed by the area code and the telephone prefix. Years ago, that same coverage area was handled by U.S.A. North and U.S.A. South. Basically, the nine counties in southern California created a center for southern California and the 49 countries of northern California, and Nevada created a center for itself and northern California. Defining the notice-center coverage area as a geographic service area is not meaningful to the contractor—it is very confusing to him when
his work goes over a county line because geographic definitions do not necessarily follow county lines. Contractors in California never have any problems in knowing where to call to provide notification because the systems define the service areas by the counties they serve.

After much discussion about the different political boundaries that exist in the States and in Canada, it was suggested that the term geopolitical area be used to define notice-center coverage areas. Panelists observed that there can be any number of notification centers in a State so long as their service areas are defined by geopolitical boundaries.

The proposal elicited about as much objection as did the term geographic area. Some believed the use of geopolitical might encourage the development of small, regional centers in some States, resulting perhaps in a large number of one-call systems within a State. Panelists emphasized their preference for notice centers that provide statewide coverage. Others pointed out that the physical size or population density of some States might preclude statewide service. Others opted to maintain local flexibility so excavators and facility owners are able to design the system according to what works for them.

The U.S.A. North panelist stated that one of the primary reasons for beginning service with two notification centers is that one can back the other up during an earthquake or other emergency. Just by calling the telephone long-distance carrier, U.S.A. North can have the calls for one center directed to the other. The two California centers work effectively because they are working together in a partnership.

Arizona is also split up into two centers, but the arrangement apparently is working. The U.S. A. North panelist cautioned against so many centers that contractors might be discouraged from calling. A contractor should not have to go over a list of numbers and try to figure out which one-call system he has to call. Also, the more centers a State has, the more difficult it may be for the centers to work as a team.

The facilitator stated that many notice centers in major urban centers have more than one telephone number. Even though he believes there needs to be full, statewide toll-free access, there should also be local flexibility for such practices. Toll-free access from outside the notice-center area is also a good idea.

Enforcement: State laws enacted to establish excavation-damage prevention programs must include effective penalties, and the laws must be enforced.

Nationwide Notification Number: Another reason contractors do not have problems using the centers in California is they have access through a national 1-800 number. A contractor can call one of the centers from anywhere in the country and be directed to the center that handles notifications for the area in which he is planning to work. After all, a center serves buried-facility owners as well as excavators. Why not allow a State to have more than one center as long as the centers have a 1-800 number.
Another panelist said a center should not be limited to only one telephone number because there may be logistical reasons for having more than one. The proposed Federal legislation addresses having a nationwide referral number, not limiting the use of other notification numbers.

Concerning the use of the nationwide 1-800 referral telephone number, a question was raised about when that number should be used rather than a center’s local or 1-800 number. It was noted that it would be easier for contractors to use the nationwide referral number, as contractors have to keep up only with one number, rather than having to remember when to use one of two or three center numbers.

The concept of the 1-800 referral notification number was explained. For example, if a contractor in New Jersey calls the referral number, he is prompted to select the area of the country in which he will be excavating. His call then is routed to the notice center in the selected area.

According to one panelist, the draft Federal proposal requires that within a year of enactment the Secretary of Transportation must provide for the establishment of a nationwide toll-free number system to be used by one-call notification systems. The Secretary must consult with the FCC, the facility operators, the excavators, and the operators of one-call notification systems. The number must be toll free, not a 1-800 nationwide telephone number. The number will be a referral number and will not necessarily connect a caller with a center. Panelists were told that there is no assurance that the bill will be enacted, so they need to consider what they believe to be best from their perspective.

A communications-company representative said there should be toll-free access nationwide or many who need to notify a center will not have easy access to it. If the potential notifier lives outside the center’s area and does not have an area telephone directory in which to look up a nontoll-free number for the center, he will not make the call because all he has is a 1-800 number that does not work. A panelist agreeing with the need for nationwide access reported that the Ohio notice center receives about 20 percent of its calls from outside the State.

The need for nationwide access to notice-center numbers was questioned by pointing out that contracts for work to be performed include information on the one-call center serving the area in which the work is to be performed. Consequently, contractors do not have a problem knowing which center to notify and how to do so.

Another panelist noted that there might not be a problem for excavators on large work projects for which contracts include terms and conditions, but it does nothing to motivate excavators to provide notice when they are from a different State and are working for a homeowner who wants a backyard fence constructed.

Facilitate Location Appointments: The center communications could be used to arrange appointments between excavators and facility operators. This concept allows an excavator to notify the center of planned
excavations and of his desire to meet with facility-operator representatives at the site at a designated time and date. The center sends the request to applicable operators, just as it does other notifications.

A contractor panelist indicated that the appointment system is now being used in Virginia. He said that if it is desirable to have a preconstruction meeting with operators, the caller so indicates when providing notice. All facility-operator representatives do not always meet at the appointment time, but that is expected as some have other appointments at the same time.

This does not relieve the operators from having to mark the location of their facilities within 48 hours of the notice, but it is an alternative procedure that can be used when excavators believe they may need more information than that provided by marking the horizontal location of buried facilities. A notice-center operator said that this process was devised not by the notice centers, but through cooperation between facility operators and excavators. A facility-operator panelist noted that highway departments arrange their preconstruction meetings using this procedure.

Another panelist said that the Colorado center schedules location times using a computer program that contains preselected time slots approved by the facility operators. Once the time slots are filled, no additional appointments can be made. A panelist from South Carolina stated that his State has implemented a scheduling program to facilitate joint meetings between excavators and facility operators and that the program is effective for preexcavation planning. The panelists agreed that effective notice centers could facilitate the use of appointment planning when joint meetings would help to prevent damage.

**Government’s Role in Notice Centers:**
Panelists began the discussion by stating that government should have no role in notice-center operations. They were reminded that in Virginia and several other States the statutes that define the damage-prevention program, including the notice centers, have vested with a State agency the authority to enforce the requirements of the damage-prevention law.

A government-agency panelist stated his belief that there should be oversight of the damage-prevention program, but that penalties assessed by the State should not be a source of government revenue.

A facility-operator panelist stated his belief that the center board of directors is charged with regulating the organization in the best interests of the members and that consequently he could see no need for government interaction. A contractor panelist agreed that the center's board of directors is responsible for the operations, but he believes that both the government and the directors are also responsible.

The session concluded without the panelists reaching a consensus about the government’s role, if any.
GROUP 2

What Responsibilities Should Buried-Facility Operators Have?

**Facilitator**
PAUL DEVANEY, Bell Communications Research

**Panelists**
Harold Anderson, One-Call System
Louis Hurlbut, Southern California Gas Company
William R. Fields, City of Phoenix, Arizona
Richard E. Johnson, Consumers Power Company
Richard W. Lee, New York State Department of Transportation
Daniel A. Flores, International Right-of-Way Association
Michael K. McDonald, Arizona Public Service Company
Elizabeth Ford, MCI
Stephen G. Rieben, Call Before You Dig
Kathleen A. Fournier, MISS DIG
Craig Sewell, Association of Contract Locators
Terry Fronterhouse, Arizona Corporation Commission
George E. Speakmann, Henkels & McCoy, Inc.
William R. Glass, Alabama Power Company
Edward M. Steele, Nat'l Assoc of Pipeline Safety Representatives
Michael T. Hagan, Washington Gas
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Dennis M. Henry, Bellcore
Sherri T. West, Media General Cable
William A. Hunt, Gulf-Atlantic Constructors
Ivan A. Huntoon, OPS Central Region

*Paul Devaney*: Approximately 20 million miles of pipes, cables, and wire make up this country's utility infrastructure. These facilities, found both above and below the ground, help to provide the excellent standard of living that can be found in most areas of the United States. Like many things, people have a tendency to take this standard for granted and rarely are aware of this sometimes invisible support system that makes our standard of living possible.
We all rely on this infrastructure to support and improve the quality of our lives and to underpin our economy. This infrastructure, by and large, has been built through subsidy. The investment may have been through the use of public funds by Federal, State, or local government or financed through the sale of stocks or bonds by privately owned utilities.

At issue today is the protection of both the private and public utility systems. Construction and maintenance excavations have made damage to facilities a much too familiar occurrence. The most severe or dramatic damage will draw attention, while the majority will just be repaired or replaced. Additionally, some damage is not immediately apparent, and the full impact of the damage can extend far beyond the sudden facility failure.

Damage to a facility can affect a worker, as well as public safety, and can pose potential safety problems to other operations, as we heard this morning; aviation, vehicular traffic, and emergency services.

Damage can also result in time-consuming and costly disruption of the public and the business community, as well as cause long-term damage to underground facilities. The cost of this damage and destruction is ultimately borne by the taxpayer/ratepayer, and many times these payers are from a different geographic area that is not the same one as the one in which the actual destruction happened.

There is an ever increasing need for protection of our infrastructure for critical services. Future systems, such as monitoring or transmitting medical information over communication facilities, and technology advances, such as the intelligent vehicle highway system, which will require its own infrastructure of sensors and computer links, are becoming a reality.

The operation and maintenance of a utility system today is considerably more complex. Some of the major factors contributing to the increased complexity are expanded environmental issues, involvement with public and private groups and agencies, fluctuation in financial resources and budget constraints, as well as the oscillation of staffing levels.

The Buried-Facility Panel has an opportunity to consider the essential elements of excavation-damage prevention and the associated responsibilities of buried-facility operators. I encourage your cooperation and participation in this undertaking to develop new strategies and initiatives for the prevention of excavation damage and accidents. Our goal is to reach consensus on issues, as well as to investigate alternatives or enhancements to present procedures.

As facility owners or operators, we employ or contract a great majority of the actual excavators. Recent studies have indicated that considerable damage to one type of facility has been the direct result of another utility’s activity through a subcontractor or an employee. This issue should be addressed by our panel and meaningful solutions identified.
I have with me today a list of at least the opening items. I have also brought with me some of the regulations which, as utility owners, we live under, such as the National Electric Safety Code. We have standards; we have the pipeline regulations. So in case anyone wants to review anything in there, they are available. We also have information published by the Federal Government on subsurface utility engineering, along with a recent study from Network Protection Practices of subsurface facilities. There is a publication that will come from the American Association of Highway and Transportation officials, I believe, in a week or two, that will help and has information concerning utilities and the accommodation of those utilities on public rights-of-way.

Summary of Panelists' Discussions

**Marking:** The facilitator noted that the American Public Works Association (APWA) has published guidelines for temporarily marking buried facilities. The guidelines explain how to show the location of the facilities, and they describe the most recognized color code for identifying the type of facility. Some States have changed the code; however, there are limited numbers of colors that fall under the American National Standard of colors that are visible to most people. He stated that there are some additional color codes under consideration to better define some facilities, such as CATV or water systems that do not meet the Clean Water Act standards, but the question for the panel is, "Should this group continue to support the APWA standard?"

A panelist recounted the history of establishing the APWA color code and described how upset segments of the industry had become when colors were allowed to vary. He noted that since then, the code has become universally accepted for temporary marking and has been expanded to include permanent markings. He stated that the code has been in effect for more than 10 years. He suggested that changing the color code would create chaos. This view was also supported by a contractor panelist.

A panelist from Michigan said that they had had unpleasant reactions from parts of the industry when the State modified the color code and that now they have returned to the standard code. However the State now not only requires the industry to mark the surface of facility locations with paint, it requires the industry to use color-coded flags, about 18 inches high, that either display a company logo or describe the type of facility the flag marks. She concluded that the Michigan experience proves that the APWA color-code standard is best and urged that it not be changed.

In response to comments on situations involving the incorrect marking of facilities, the facilitator said that the Utilities Location Coordination Council has been asked to develop a manual on how to mark buried facilities so that there is greater uniformity in the practices nationwide. One reason for uniformity is that the public is getting very tired of what people call utility graffiti, which occurs in neighborhoods when a limited excavation is to be performed, such as one for installing a new pole. The result of the
excavation notification often is 75 different paint lines that are 6 blocks long.

A panelist from California said that California operators are developing industry standards about what each company will use to mark the location of its buried facilities. That way, an excavator can identify each line, not only by color code, but also by logo. Some companies already use the standards and find them an asset for the excavator.

The facilitator asked the panelists whether a national standard for marking the locations of buried facilities is necessary. He noted that the telecommunications industry already has developed such a standard for fiber optic cables, and he believed it would be possible to do something similar for all buried facilities. Responses to his question were positive. Panelists also indicated a need to standardize the auxiliary markings used by some facility operators, such as the HP used by some gas operators to indicate high pressure, so that the auxiliary marking would have meaning to both the facility operator and the excavator.

Concerning the problems of facility-location markings, a panelist quoted from Stop Digs, a book published about 3 years ago.

Current signage lacks consistency. Current signage has no priorities of how message information is organized. Sizes, symbols, colors, shapes, and messages vary from utility to utility, State to State. In the absence of a uniform criteria, a misleading potpourri of signs and symbols is currently being used. Instant comprehension is the goal. Utilities must develop a sign criteria that will establish a communication link with the excavation contractor and have instant recognition and comprehension.

He then stated that, depending on the area of the country, many in the excavating community cannot understand English; consequently, he believes, there is a need to use international symbols. He endorsed the need to standardize and said that the same benefits that have come from the color standardization can be obtained by standardizing the content of the messages used in combination with the color codes.

A State-agency panelist said excavators need to be told which operators have facilities in the area so that they can tell whether all the operators have marked their buried facilities. He added that there have been some very close calls because an excavator had incorrectly believed that the markings in place represented all the buried facilities. The excavator had no way of telling which markings belonged to which operators

A panelist from Alabama supported the need to use facility-operator identifications along with color coding. He said that in some parts of Alabama, three CATV companies or two water companies serve the same area.

The facilitator read American National Standard EIA/TIA 590:
Owners shall clearly ground mark their facilities, location, and route, if the facility is within 10 feet of the excavation site. The utility uniform color code temporary marking color should be used to mark the centerline of the facility. Marking should include the name, initial, or logo of the owner and width of the facility where the width is greater than 2 inches.

He stated that the standard could solve some of the problems being raised, but that the comments from some of the participants showed that many excavators and buried-facility operators did not know of its existence. He asked the panelists whether they could accept the standard.

A panelist noted that almost everyone in the room agreed on the use of the APWA color code. He added that gaining consensus on how to mark is a much tougher task. He gave examples of inconsistencies among buried-facility operators on marking conduits and multiple cables in the same trench, on marking buried-facility corridors that include all types of facilities, on using company initials, on using auxiliary industry markings for high-pressure or multiple cables, and on providing offset markings. He said that there is a need to address all those issues to really have universal coverage throughout the country.

Another panelist pointed out that the standard in question addresses only one of the many means used to mark buried facilities. He explained that there is marking on the facility itself, on permanent above-ground markers for surface and aerial identification, on below-ground ribbons or tape buried above the facility, and on temporary markers. He said that if the group is going to address the issue of temporary markings, it also should recommend using for all facility markings whatever standard was agreed to for temporary marking.

A facility-owner panelist said the group should also consider the graffiti problem in developing any marking standard. He stated that although he understands the need for operator identification and other information to be a part of the facility marking, he is concerned about his customers and their property.

A contractor panelist said that the excavator needs to be able to tell from the markings what the facility looks like. The excavator who is digging test holes to verify the placement of the marked facility needs to know whether it a 16-inch-diameter, high-pressure pipe or a 20-pair communication cable encased in a concrete duct.

**Common Locators:** A panelist said that the current practice of having each facility operator locate its own facilities wastes resources. While acknowledging that he did not know whether it was possible, he expressed his belief that there should be a way to have an independent locator mark all facilities in an area of planned excavation activity. He stated that a single locator would be in a better position to know what was there, could identify all facilities with one marking, and could save
manpower, the cost of operating equipment, and confusion. A facility-operator panelist stated that it is absolute crazy to spend the kind of money operators are spending to send six to nine people out to one location. Operators need to have one person do all the locating, but this is going to have to be part of a future law if it is to be accomplished. This will cause problems about labor situations, contracts, and other areas that will have to be worked through. But to build a partnership with the excavating community, the operators will need to loosen up a little bit and work with the excavating industry.

Training: A CATV panelist said that the new damage-prevention law in Virginia requires that contractors be informed about the subject. To meet this requirement, an excavator's manual has been developed to assist contractors in understanding what they can expect to see at the excavation site and what actions facility operators are required to take to mark the locations of their facilities. Comments from excavators were used in determining what the manual should include. It includes the color code and shows how each type of facility operator marks the facility using symbols and auxiliary markings, such as dead-end facilities or high-pressure. The manual helps the excavator understand what he should expect to see before excavation begins.

A facility operator said it does not matter how good a locator is, he is not always going to be able to accurately mark the location of facilities installed using random lay techniques or of facilities in joint trenches. Consequently the industry needs a consensus on the term tolerance zone. Current standards provide for a 24-inch tolerance zone on either side of a facility. When an excavator gets within that zone, it is up him to determine the exact location. No one standard about the placement of electric cables and other facilities is used in every industry. So it is necessary to have a tolerance zone.

The facilitator asked whether everyone thought that the Utility Location Coordination Council's uniform color code should be used for temporarily marking the location of facilities. Panelists responded by citing many problems associated with using only a color code, and they promoted the concept that the facility-operator identification is of equal importance. Questions also were raised about how to deal with States that vary from the standard color code, with highway departments that use similar colors to indicate appurtenances and instructions to excavators, and with survey companies that vary from standard survey colors to colors similar to those in the marking code. Additional discussion ensued on the need to include other information, such as the facility size and type of material, such as steel or plastic. After modifying the wording to include with the color markings the identification of the facility operator, the group concurred.

Working Hours: A facility-operator representative commented that much had been said about the need to develop a partnership with excavators, but that doing so requires operators to change a lot of
their habits. He noted that excavators work during summer hours from dawn to dusk, while most operators are used to working from 8:00 to 5:00. It appears that the operators need to make some changes to adjust to the work hours of some facility employees and to better communicate with and meet the needs of excavators.

Use of New Technologies: An operator panelist observed that everyone agrees that much new technology is becoming available that can improve communications and capabilities for preventing excavation damage to buried facilities and that using the technology should be considered. He expressed concern that the use of some new technologies is being mandated by law. This is being done without considering the financial condition of the facility operators and the potential adverse affect on the operators. This also may be requiring operators to spend money to do something that is not necessary in some parts of the country. For example, the northern States do not have the year-long needs of the southern States; thus, what may be practical in one part of the county may not be practical in another. Two years ago contractors were being persuaded to use cellular phones from the excavation site so that the location of a contractor could be pinpointed even if he had provided an incorrect location. While this may be good, it has to be looked at from a cost as well as a safety-improvement perspective because it is not possible to establish strict guidelines or standards on using this procedure because such guidelines would prevent the use of the better technology that may be available next year.

Positive Response to Location Requests: The facilitator next questioned whether the buried-facility operator should be required to tell excavators when the marking cannot be done quickly or when the operator has no facility in the area.

A facility-operator panelist stated that he believes that having to warn excavators when the markings cannot be made quickly should be a requirement. He also acknowledged that many excavators do not make it easy for operators to achieve this objective because excavators often cannot be reached by phone during the day. They make their location requests early in the morning and cannot be reached during the rest of the day.

A contractor panelist suggested that the excavator making the location request be required to provide a means of communication, either an answering service, a home phone with a machine on it, or one of his partners. He said such a requirement would not be onerous even for small excavators or contractors. An excavator needs to receive a positive response that facilities have been marked or that none are in the area of excavation. Otherwise he will have to unexpectedly delay the start of the work.

A State-agency panelist said that in Arizona facility operators are required to provide positive responses to location requests either by communicating with the excavator or by marking at the site that no facilities are present. He stated that there is another problem though; excavators sometimes call for facility locations in areas large enough that it is not possible to mark all facilities in
the 2 days provided by law. For either circumstance, positive location feedback or large projects, the notice center requires excavators to provide a telephone number by which they can be reached. That is the way these problems have been solved.

A second facility-operator panelist stated that his company also believes that it should provide the excavator with positive feedback on the status of its location activities. Without positive feedback from each facility operator, the excavator does not know whether there is no marking because the operator has been unable to get to the request or because there are no facilities there. He stated that his company believes that positive feedback enhances the whole excavation-damage prevention program. He noted that sometimes, however, the number of requests overwhelm an operator's ability to respond in a timely way. His company handles about 340,000 locate requests a year, and there are high-volume times when the company cannot handle all the requests and cannot reach all the excavators whose jobs will not be marked quickly. He agreed that positive response should be required, but only as a recommended guide. The facilitator said that the group is attempting to develop the basis for a model program and that the group can help decide what should be done without having to turn the requirement into a law. He stated that it is recognized that Alaska will never be able to achieve everything that is agreed to here because the discussions here are about suburban situations.

A notice-center operator panelist pointed out that often the excavator is a facility operator also and that such an excavator also needs to receive a positive response to his requests. She said that the notice center can help do this job for the excavators, as well as for the facility operators. Almost all notice centers ask for a call-back phone number when location requests are made, and they usually get it. But sometimes the center cannot reach an operator after 3:00. The facility operators can help by providing the information to the notice center and supplying the computer dial systems to leave a clearance or a comment. The excavator then can call the notice center if he has not received a response from the facility operator.

A communications-systems panelist stated that her company has experienced problems in trying to contact excavators, especially small ones. She cited the latest statistics her company has, from 2 years ago, indicating that it had responded to about 840,000 locate requests and found that only 75,000 required filed location actions. About 17 of the States that her company operates in require either a positive response or a reasonable attempt to advise the excavator of actions taken. The company has made a reasonable attempt to notify the excavators when there is no conflict; but when there is a conflict, the company is out there marking and monitoring the excavation activity. It is an extremely difficult and expensive task.

She said her company has a question: what constitutes a reasonable attempt? Is it two calls? Is it 20 calls? Is it calling 24 hours a day until the company finally reaches the excavator? The company would like the notice center to provide a service through
which the company can advise the center, by FAX or other electronic communication, of what it has done. Then the excavator can call the center to find out the status of his locate request. All the information from the excavator and from the operator could go into the ticket record and be available to the excavator. The excavator then has only one telephone number to call to place his request and to determine its status.

verification number to initiate the system, and operators use the verification number to access the excavator's location request. All the operator has to do then is enter his identification number and make a brief statement, such as "cleared." Once the location request is entered into the system, a computer monitors the messages to determine whether all operators have cleared the request within the required 48-hour period. If not, the computer sends a

Other panelists said that notice centers in two States now are implementing systems to provide call-back and feedback information and should be operational before the end of the year. The Virginia law requires the notice center to have an excavator-operator information exchange system. This system is currently working in the Richmond Center and it is being installed in the Northern Virginia Center. The system is interactive and requires no personnel to handle the calls. When the excavator calls, he keys in his center notice to the operator who has not cleared the request and reissues it.

The facilitator said that contractors should be notified when there will be a delay or when there are no facilities. Operators now have to do that with their customers because with new customers, it is one strike and you are out. The customer has plenty of other places to go to get his services. The three-strikes-you-are-out routine is over. Today, operators, elected officials, municipalities, and the Federal
Government have to be more responsible and accountable. They have to consider whether the money and resources are available to accomplish an objective and whether regulations are going to make it impossible for an industry to do the job. No one can afford to make it impossible to hire a contractor to excavate. But they also owe it to the excavator to determine whether they should provide him with a positive response about the status of his locate request. That is the key, and that is the issue on the table.

A municipal-water-department panelist said that his system tries to tell the excavator when there is no conflict. If his department has tried to make contact a number of times and the excavator does not have a cellular phone or a FAX machine and the department is unable to contact him by land line, the department notifies the call center and makes its response there. If a contractor goes to the job site and has not received a positive response and if there are no marks at the site, he is eventually going to call the notice center. The center then can inform him of the department’s call and message.

A gas-operator representative said that the group should keep in mind that with the marking or positive-response issue, there needs to be a partnership relationship between the excavators and the facility operators. The group needs to consider these items in combination with the minimum notification time before excavation can begin.

In Ohio, the gas-operator representative’s company is required to mark the location within 48 hours of the locate request. It is not reasonable for the excavator to expect a positive response if the excavator provides notice and says he is going to start excavating 30 minutes later. So, just to say out of hand that a positive response is required is insufficient.

An electric-company panelist stated that his company’s locating contractors are instructed to try to contact the contractor by phone if there are no conflicts. If that fails, the company mails a postcard providing that information. He said that is the best the company can do. If its facilities are in the area of the planned excavation, then the company marks their locations. If for some reason the company is unable to mark the facilities in a timely fashion, it attempts to notify the contractor by phone. The Pennsylvania notification center recognizes the need to provide a positive response and the operator’s inability sometimes to do so. To help resolve the problem, the State began a safe call system, an automated screening system that is particularly useful to operators of interstate pipelines and other systems that have facilities located in limited areas of the overall service area. If the planned excavation is outside of the operator’s right-of-way and the excavator has a FAX, the excavator will automatically be notified of this by FAX. The notice center is in the process of developing a voice mailbox for excavators that will allow an excavator to call, provide his notice, request a serial number, and receive the status of the actions of each operator.

A gas-transmission-system representative stated that in 1988, when Ohio passed its excavation-damage prevention
requirements, positive response was mandatory. He stated that his company was seriously concerned about the requirement when it learned that a number of buried-facility operators were not making any attempt to comply. Consequently, the company worked with others to change the statute so that it now states that if the facilities are not marked within 48 hours after the locate request is made, the excavator can assume that the system has no facilities in the area. This procedure appears to be working well.

A State-agency panelist took exception to the Ohio procedure, stating that it could present a safety hazard. He said that in major areas of new construction it would be reasonable to expect that a facility could be correctly marked and that the markings could be destroyed before the excavator arrived to begin work.

A center-operator panelist said that positive response is obviously a direction that needs to be worked toward. He said that at the heart of any planned protection program is increased communication between the excavator and the facility operator and that positive response is certainly one means of improving communications.

A CATV panelist questioned whether there is a need to specify how quickly a positive response must be made. Other people noted that there are considerable differences in current State marking requirements, some being within 48 hours and others as long as 72 hours. The Virginia requirements were cited as requiring a positive response if the facility operator cannot mark the location of its facilities within the first 24 hours after notice is given. The operator providing such a response then has an extension of up to 96 hours if there are extraordinary circumstances preventing compliance. Panelists began discussing the time frame that should be given for locating and marking facilities under normal and abnormal circumstances, the time requirements of various States, and the time by when an excavator should be notified that his request cannot be met in a timely fashion.

An attorney in the audience questioned whether the operators need to provide a positive response to the excavator both when they have no facilities in the area and when they have marked the facilities. A communications panelist stated that she believes that requiring a positive response in both situations should be considered. She reiterated the concern raised earlier about facility markings being destroyed before the excavator arrives and described an incident that had occurred on the previous day. She said that her company's cable was cut in northern California after its location was marked and that the company was investigating whether kids or vandals had removed the flags the company had placed over the route of the cable. She concluded that such events indicate that the group should consider providing a positive response to the excavator both when the location is marked and when there are no facilities in the area of planned excavation. She then stated that she would like to see the notice center developed as the communications conduit between the excavator and the facility operator so that
the excavator has information on the status of the location request.

An interstate-gas-pipeline panelist said that the Gas Research Institute has identified the need to inform excavators about what has been or is being done to respond to their locate requests, but has found that doing so is a real administrative headache. Providing positive responses to all locate requests will increase the number of calls that will have to be made, requiring some advanced technology to minimize the effect on the operator.

Several panelists agreed that all locate requests should receive a positive response, but cited as a major obstacle the increased workload that doing so would create. One panelist stated that it would be virtually impossible for his company to respond to all 340,000 requests received each year.

A panelist stated that in consideration of the magnitude of the safety issue, if he were going to get on an airplane, he would want to make sure that all of the preflight criteria had been met before the plane left the ground. An excavator should not dig a hole until he knows that everybody has checked off the preexcavation criteria. He stated that he was almost in agreement with the attorney's comments that there should always be a positive response. It should not be a matter of cost because there are small airlines that might not want to pay the price for performing essential safety checks. If that is the case, he does not want to be their passenger.

An operator panelist said to remember that safety on the job site is the excavator's responsibility except for the operator's duty to mark. In Arizona, the notice center lets the excavator know what facilities are buried in the area he is going to be digging in. When he is preparing to begin work, he knows which companies are to mark facilities; and by viewing the logos on markings in the area, he can tell whether everything has been marked.

Maximum Response Time for Marking:
What should be the maximum response time for marking facilities? A contractor panelist said that 72 hours is allowed in New Jersey, and it seems to work well. Excavators are able to receive responses by mail within that time, which would be impossible in States that provide only 48 hours for marking. A second contractor panelist agreed that 72 hours would work. In response to questions, the 72 hours was defined to mean business hours, not including Saturdays.

An operator panelist said that Alabama tied the maximum marking time to the proposed start of excavation. He explained that if the excavator is allowed to provide notice 10 days in advance, he can program his contract or own locator's work schedule to mark the facilities in a timely fashion. It is not a good idea for the operator to mark facilities within 2 days of receiving a notice when excavation is not schedule to begin until 10 days after the notice. There is too much chance that something will happen to damage or destroy the markings before the excavator begins work. It is better to mark
facilities the day before excavation is to begin.

A communications panelist said that she had difficulty in determining the meaning of the term *business day* because her company conducts business every day. Is it a normal business day? Is it Monday through Friday, 8:00 to 5:00? Is it Monday through Friday, 7:00 to 7:00 because that is when the notice center is open? She noted that in California, where laws define time limits by the number of business days, there has been considerable controversy about the meaning of this term, and she suggested that the group clarify its intent or, instead, use the term *calendar day*.

There was considerable discussion about the meaning of the term *business day*, with various panelists describing their operating hours. A notice-center panelist said that her center has a policy of not accepting locate calls for the current day after 4:00 p.m. Calls after that time are considered as having been entered during the next business day; therefore if the excavator calls after 4:00 p.m., he should not expect the facilities to be marked until the third day. She further said that her center also has problems with facility owners in the summer, when they work 4-day 10-hour schedules and do not consider Friday a business day. Neither the center nor the excavator can work around such schedules. She suggested that the operating periods of the notice center become the standard time measure for meeting statutory requirements.

An operator panelist noted that the time requirements are spelled out by the Alabama legislation, which describes what constitutes a day. The legislation excludes Saturdays, Sundays, and holidays, and it identifies the days considered holidays. It does not matter whether one is working that day; it is up to the operator and the excavator to meet the provisions of the law. He suggested that is useless for the group to try defining *business day* if the goal is minimum response time. As described in the law, Alabama grants 48 hours, which really is 2 working days starting at midnight and going to midnight. Most States have either 48 or 72 hours, but Alabama has been living with 48 hours for almost 20 years now and knows it can be done. Seventy-two hours would be nicer from an operator's standpoint, but Alabama also understands the excavators who would like to have only 24 hours.

A notice-center panelist said that in looking through the notice-center directory, he found that most calls for locate requests are made not less than 2 business days and not more than 5 and/or 10 business days. A few use not less than 3 business days for notifications. He suggested that the group use similar wording. Additionally, he suggested, the group should establish the length of time for which the markings are considered valid, for example 10 days. The group should also consider whether an excavator must again call the notice center if he still is working in the marked area after a specified period of time, such as 10 or 30 days after the locations of the facilities have been marked.

A member of the audience commented that since the longest time in use is 72 hours, the group should accept this; and if some States want to stay with 48 hours, they can.
He stated that in the northern portion of the country, workloads are 15 times greater in the spring than in the winter, so it is a problem to maintain throughout the year sufficient numbers of trained locators to accomplish the spring workload. Inexperienced locators can damage buried facilities. If the response time were to be reduced to 48 hours, it would require hiring about 50 percent more people to perform the location work in the spring because the same volume of work done in 72 hours would have to be done in 48 hours. Furthermore, this reduction also would require more communications with excavators in this reduced time period.

A communications panelist suggested that if the excavator is to again notify the center if he is still working on a project 15 or 30 days after providing the initial notification, there also should be a requirement that the excavator notify the center should the location marks fade or otherwise become obliterated.

An operator panelist said that information obtained from the notice centers shows that 37 States specify that the facilities have to be marked within 2 days or 2 working days or 48 hours after receipt of the excavation notification and that 12 allow 3 days or 3 working days, which is 72 hours. The actual time allotted by a State should reflect the needs of the operators and the excavators, so it makes sense to leave the determination to the State.

An operator panelist observed that as an operator he would love to have about 100 or more hours, but that as an excavator, he would like to have 12 hours. However, he does not believe 48 hours will be adequate if his company has to provide positive responses to all notifications. A notice-center panelist agreed with the previous position and questioned why the panel was spending so much time on this issue since most States are living with a 48-hour rule and no one seems to be complaining or identifying problems. He stated he was more interested in discussing ways to mark abandoned facilities or in discussing how customer-owned facilities from the curb to the house are going to be marked.

**Marking of Customer-Owned Lines:** A member of the audience asked panelists to discuss the means to be used for marking customer-owned portions of service lines. He stated that his company marks up to the meter but that from the meter on is the customer’s responsibility, primarily because it is a question of liability. He stated that his company’s locators keep a list of licensed private locators to give to customers who own portions of service lines. He admitted that from a customer-service standpoint, he has told his company locators that if they feel comfortable with locating a customer’s line segment they can do so.

A notice-center panelist said that the Connecticut statute requires the operator to mark the location of customer-owned service lines using the same color as used for the operator lines, but that the line is to be a hash mark, as opposed to a solid line. This is to indicate that the company performing the marking is not responsible for the location of the marked facility and that the marks represent a best estimate of the location. Excavators are trained to have
the same understanding of the meaning of those markings.

An operator panelist said that 99 percent of his company's meters are at the structures they serve and that they do not have meters at the property line. However, there are customer-owned lines for gas resale, and they are in the second of a 3-year program to take full responsibility for those lines. The lines serve trailer parks, apartment buildings, mobile homes, etc. However, the company does not mark customer-owned fuel lines that serve pool hot-water heaters, outside lighting, and grills. It does not mark those lines because of the liability should it miss a line.

The facilitator added that similar problems exist at apartment complexes, universities, and commercial properties that own their own buried facilities. Such facilities cause great concern to operators about liability.

A contractor panelist said that his company performs directional drilling on private property and it often damages unmarked privately owned irrigation and sprinkler systems. The homeowner does not tell the company about these facilities and, in all honesty, probably does not know where the systems are. Yet, the homeowner's liability is absolutely zilch when it comes to the requirement for locating.

A panelist who operates water and sewer facilities said that his company does not mark the locations of sewer laterals to the house because that is the customer's responsibility. His city does mark the location of water services to the meter, which is usually right at the sidewalk. After the meter, all service lines are the responsibility of the customer. Contractors know that the company does not mark the location of customer facilities and that they have to use prudent digging techniques after the meter.

A contractor panelist observed that the contractors probably have an obligation to themselves to get a little bit smarter in such situations. He said they go around blindly signing the hold-harmless clauses enclosed in many of the owners' contracts, when in fact what they should be doing is specifically exempting themselves from some of the inclusions, proven or not.

An operator panelist said that he does not believe that the panel should impose on any operator the responsibility for locating facilities that he did not install. If he installed it, he probably installed it in a way that allows it to be located.

A State panelist said that in Ohio the customer owns a segment of the service line that is subject to the State's pipeline safety requirements; however, the State requires the operator of the gas system to ensure that the portion is operated and maintained safely. Should work have to be done on the customer-owned segment of the service line, the customer has to pay for it, but the gas-system operator must periodically check the condition of the line to ensure that it is safe for continued operation. A Federal panelist said that States other than Ohio have imposed responsibility on the gas operator for ensuring that customer-owned segments of service lines are maintained well enough to allow continued safe service.
A notice-center panelist said that in Connecticut a person who owns any buried facility that crosses into a public way has to participate in the notice-center system and be responsible for marking his own facilities. Because of this law, most universities and colleges are members, as are many industries, such as insurance companies. Aetna, for example, has its own fiber optic facility that connects several of the company’s buildings, and the optic fiber cable crosses a public way.

A contract locator said that his company assumes no liability when it locates customer-owned facilities; however, he stated, contract locating is not available in all areas of the country.

An electric-power panelist stated it sounds fairly easy to locate lines for homeowners, but that his company has many customers that own buried power cables that may run through woods a quarter to one-half mile from the road. He stated that the homeowners have no idea where the cable is installed, so they generally prefer to stop at the meter.

Another operator panelist questioned the moral obligation a facility operator has to help its customers locate customer-owned portions of service lines. He noted that customers might not be able to afford $150 an hour for a private locator.

A gas-operator panelist said that his company also recognizes some moral obligation to assist its customers, but that there is also the question of who really pays for that assistance. All of the customers of a regulated utility will ultimately end up paying for a locating service to benefit a few individuals.

A notice-center panelist pointed out that if the customer-owned service-line segment is not located and the line is ruptured during excavation, the ratepayer will end up paying for the product lost as a result of the rupture. He stated that if the damage can be prevented, it should be.

The facilitator summed up the discussion by saying the panel believes that the facility operator should mark the facilities up to a certain location beyond which work to be performed on the service line is done by an electrician, plumber, or other locally available trade person. The total damage that occurs on homeowner lines can hardly be seen on a statistical chart, so it is not the big problem. The big problem is operators damaging the facilities of other operators and road builders and municipalities working outside of the statewide damage-prevention program. Operators like to believe that if they have the ability to mark the location of the customer-owned segments of service lines that they would. Perhaps they should consider using a dashed line, which seems to be recognized as a means of limiting liability. No one objected.

**Marking of Abandoned Lines**: The facilitator said that some States now require records be kept on the location of abandoned facilities. It is no longer possible to beg off the responsibility of locating abandoned facilities by saying that they cannot be located because there are no records. Today, they can be located; it is
just a matter of deciding how much effort to apply, what type of equipment should be used, and how much money can be spent. A subsurface engineering company can find them, but it is going to be costly, and the public and the customers may not want to pay.

A State-agency panelist said Arizona requires that anything abandoned after December 31, 1988, be mapped and that any person exposing a buried facility whose purpose is not known must report the location of the facility to the notice center. Once reported, the facility is investigated to determine whether it is active.

An operator panelist said that his company in Michigan maintains records on its known abandoned facilities and investigates when told of a facility previously unknown to it. If the facility is identified as one that belonged or may have belonged to his company, it maps or removes it. It is not uncommon for a facility abandoned by one company to then be rented to another for an active purpose, for example fiber optic cables inserted through an abandoned gas main. Such facilities have to be shown on current records, and the records must explain how the facilities are being used and who the new operator is.

Another operator panelist stated that the Alabama law requires an excavator who encounters an unmarked buried facility to report it to the notice center. The excavator then has to give operators 4 hours to tell him that their records do or do not indicate the reported facility. If no one acknowledges ownership, the operators have to give the excavator as much information as possible about facilities that may have been abandoned.

An electric-system panelist stated that there is no provision in the California law for marking abandoned facilities. However, if somebody calls the notice center stating that he has found an unmarked line, he can request a re-mark, and that usually gets everybody out there a second time. These events occur basically because the mapping is so poor that the operator cannot always guarantee that he is marking accurately and because often the abandoned lines are chopped into many pieces, preventing the operator from making a continuous connection. There is a mass of abandoned buried facilities, which makes it difficult for the group to recommend that everybody mark his abandoned facilities.

An electric panelist said that his company is keeping records on all newly abandoned facilities, some of which may again be placed into use. In Arizona, when an excavator finds an unmarked line, he reports it to the notice center. All known operators are sent the notice, and they have 2 hours to go to the site to help identify the line. Should an operator not report within 2 hours, the State commission will be notified to take action against the operator.

A panelist informed the group that North Dakota has draft legislation requiring that records be maintained on the location of abandoned facilities. His company is now maintaining the records in anticipation of the requirement being made retroactive. A State panelist said that Arizona requires
operators to be able to locate facilities abandoned after December 31, 1988. This is to help excavators avoid confusing active facilities with abandoned ones; far too often an excavator uncovers an abandoned facility, believes it is the facility marked by the operator, and then begins excavating with machinery and damages the active facility.

An operator panelist said that when his company marks its active facilities, if it finds abandoned facilities in the area, they are usually close to the active facility. His company marks only the active facility, and then his company inspectors, who do nothing except work with excavators, stay on site until the excavator uncovers the facility. The facility is then checked to determine whether it is active.

Group discussion then focused on recommending that operators maintain records on facilities they abandon. The group considered adding that, as a best practice, operators should be encouraged to maintain records on the location of abandoned facilities. An operator panelist noted that while the group is concentrating on abandoned facilities, there are many active facilities about which operators do not now keep location records, including many laterals and service lines that have never been mapped. The group, after considerable additional discussion, agreed that today’s needs indicate that records should be kept of the location of facilities that are abandoned after a specified point in time and that location records must be made on all active facilities.

A panelist cited an article in Underground Focus Magazine that says Pittsburgh realized a six-figure dividend when it checked digging permits against notice-center requests. According to the executive director of the Pennsylvania One Call, the city had been getting $7,000 a year in revenue from excavation permits. After being a member of the notice center for 2 years, the revenue increased to about $300,000. Another panelist said that his company found that contractors, to avoid the cost and the scrutiny, were not applying for permits as required by law. So, there is a control mechanism that could be used to encourage cities to participate and also could be used to better control the do-it-yourself market that is actively involved in work on customer-owned service-line segments for installing gas lights, cooking grills, and other gas appliances. It is easy for the do it yourselfers to buy a spool of polyethylene with which to install the appliances and to do so without obtaining a permit.

An operator panelist stated that there is a need to address standardizing the permanent markings that are used to show the locations of buried facilities. He cited statistics indicating that when underground warning tape is used, a gas company will average between 20 and 28 excavation-caused damage incidents per 1,000 miles each year; if there is no warning tape, the company will average 57 to 75. In Connecticut, where the use of warning tape is required on all new installations, the average is only 28. The group needs to address the issue of permanently marking facilities during installation.
A communications-facility panelist said that his company is experiencing an increase in the number of excavators, primarily highway contractors, who find it cheaper to cut through cables and other buried facilities than to take the time to protect the facility. He attributes some of the increase to State transportation departments' contracts because they reward the excavator for completing the project ahead of schedule.

An operator panelist questioned what might be done to better control excavation damage caused by the smaller contractors. He acknowledged that large contractors most often do a great job of notifying and of protecting the marked facilities. Based on his experience, he said, there are a lot of small excavators constantly entering the work force, and it is the small excavator who is causing the most damage to marked facilities.

**Participation in Notice Center:** A panelist noted that as a contractor, he believes that everyone who operates buried facilities that are not permanently marked above ground should participate in the notice-center. This includes the private-property and home owners, as they place little burden on the system because they rarely use it. He said that most notice centers include minor or occasional participants for no cost.

An operator panelist disagreed. He stated that he sees no reason for a property owner to be a member when he does not benefit. (Another panelist noted that homeowner facilities account for less than 7 percent of all excavation damage.) The operator panelist stated that participation is necessary only from those who will benefit and those who have information to give. Another panelist said departments of transportation, city traffic signal systems, water districts, telecommunications, utilities, and anyone who has buried facilities, with no exclusions, should participate in the notice center. She stated that highway departments and railroads have said that they are unable to participate because some centers are unable to accept milepost numbers as locations, do not operate 24-hours a day, and for some other minor reasons, but that the computer technology and software is available to change things to reduce their excuses. While she agreed that private homeowners should be exempted, she said that major universities or big campus-type offices that have a lot of customer-owned facilities should be members.

An operator panelist agreed that all people who operate buried facilities should participate in the notice-center operations and should support and participate in the overall damage prevention, including the advertising and outreach programs.

The group of panelists accepted the position that all operators of buried facilities, except homeowners, should participate in the notice-center activities and in the overall damage-prevention program. One panelist explained that the intent is to include anyone who operates buried facilities that might threaten either public safety or the environment. Another noted that operators of sewer systems constructed of old clay pipes are unable to locate their facilities and often have no
knowledge about the locations. Consequently there is no benefit from their participating in the notice-center activities. The facilitator pointed out that even those operators should support the damage-prevention program through the education programs and by notifying of excavations because they do daily excavations to keep the old facilities in repair.

An operator panelist disagreed about not exempting anyone from participation in the notice-center activities. There has to be consideration for a ranch or a farm that has buried facilities, such as an irrigation system that extends for miles across the owner’s property. He argued that those systems cannot be included just as those that are providing a service to others or those that are on public thoroughfares.

Another operator panelist stated that all excavators must participate in the notice-center activities by calling to announce planned excavations, even when the excavator is a home owner or farmer excavating on his own land if the land covers buried facilities that are not operated by the land owner.

**Education:** What role should buried-facility operators have in educating excavators, contractors, and the public on the use of one call and on working safely next to buried facilities? In response to the question, an operator panelist said that an operator generally has a customer base to which he frequently mails bills and information. The panelist said the mailings provide a good opportunity to inexpensively include information to aid customers, who also may be excavators and operators of buried facilities, in understanding what excavators and operators should do to protect buried facilities. He said that because of a recent mailing to 4 1/2 million southern California residents, locate requests from homeowners increased by 50 percent. He stated that the hub of the educational effort should be the notice center, with individual operators implementing educational actions above and beyond what the center is doing. Some operators have initiated innovative means to get the attention of excavators. A communications operator installed signs over a buried cable that read, "You can't imagine how expensive it is to dig here. Fiber optic cable buried below." Others have entered into cooperative advertisements and shared the costs among participants. A question worthy of discussion by this group is, how much education should operators do on their own behalf and how much should be done by the notice center or through cooperative advertising?

A second operator panelist agreed that people need to be informed about using the notice center and that the employees or others who will be excavating need to be trained. He said that the gas industry accepts the responsibility of training police, fire, and other emergency-response personnel and he believes that operators have an obligation to train contractors. Another panelist stated that whether they are talking about internal or external education, the operators should take the lead as they, better than anyone else, know the consequences of excavation-caused
accidents and they have as much or more to lose than any other entity.

A notice-center panelist said that the education needs to be separated into two categories; how to use the notice center and how to work safely near buried facilities. She said that all participants, operators, excavators, and notice-center personnel, should promote the use of the notice center; but when it comes to working safely next to buried facilities, it is a job for operators and excavators.

A State-agency panelist stated that all operators should work to implement an effective means of enforcing the damage-prevention requirements. A statutory program that has teeth and an aggressive enforcement agency result in greater cooperation among operators and excavators, and the program is an effective tool for educating people on using the notice center.

A communications-systems panelist agreed that a good law and effective enforcement both are necessary parts of an effective damage-prevention program, but that more basic is the need to help people understand why and how to use the notice center before beginning excavation activities. She said that she has been told by excavators that "I don't have to obey the law," and "Well, there is no law to call the one call, so I don't even call." The latter comment was made by a contractor who had just cut both the gas and telephone lines that served two houses he was constructing. She contended that education about the injuries, deaths, and other losses that can occur from excavation damage, not a law, is going to change people's attitudes. Her company's field engineers patrol the rights-of-way and give educational material and promotional items to excavators, and each item has the local notice-center telephone number. Her company also works with the notice center to hold contractor awareness meetings where they present various educational programs and instruct locators on proper ways to locate and mark the facilities and on safety education programs available through the notice center.

An operator panelist suggested that to address both the internal and the external educational responsibilities of operators, the group should consider supporting two recommendations. First, the notice-center educational program should be statewide to promote the use and function of the center. Second, individual operators should support educational efforts, advocate the use of the notice center, and also provide facility-specific information or education to the extent required by existing law or mandates.

A Federal-agency panelist stated that both the OPS and OSHA have requirements about excavation-damage prevention. But what appears to work best in educating the excavator is to make him get a license that he cannot get unless he has passed a written examination that proves he is certified in a trade. His keeping the license should depend on his taking a specified number of classroom training hours every year, or possibly every 2 years, that are designed to keep him up to date in his trade. This is happening now in Florida with contractors who work near buried facilities,
and it has been happening with general contractors.

A pipeline-association panelist said that the API conducts a national public-education campaign for the liquids pipeline industry and is currently trying to form a partnership with the OPS for federally funding a national public-education program to further support the industry's educational programs. He questioned whether the group should consider working with a national council comprised of communications, pipelines, electric power, the construction industry, governments, and public-relations specialists to oversee a national public relations and education campaign.

A panelist stated that the group needs to define the objective of the educational efforts it thinks should be undertaken. He said that he believes the objective should be for everybody in America to know of the existence of the notice centers and to understand why they should notify the center before beginning excavation. He noted that every homeowner and do-it-yourselfer is able to rent a post hole auger, pneumatic jackhammer, skid loader, or backhoe from any tool rental company. He told the panelists to consider how many of the people who rent such tools know that there is a notice center, that a law requires them to notify it of their intent to excavate, and that they have to wait for facility operators to mark the locations of their buried facilities. He said that if the educational system is working, all will know; if the educational system is not working, an accident is going to occur due to that ignorance.

A panelist representing the International Right-of-Way Association (IRWA) stated that his association is actually attacking the excavation-damage issue before anyone gets ready to dig. The IRWA has a messenger out there talking to the property owners and the public agencies on a daily basis. If the association trains right-of-way personnel about the message it is promoting, the message will be promoted daily through them, and a constant reminder is being provided. Operators should be able to partner with the association to train these people, and they will be able to help the operators get their message out.

An operator panelist agreed and explained that the IRWA has in most other States a utility liaison committee to which most notice centers belong. The committee promotes safety from the beginning of projects, from preconstruction to project completion. The IRWA representative said that the door is open if notice-center operators want to make a partnership arrangement to work with the IRWA in the educational aspects of damage prevention. He said that the IRWA has an operating committee with representatives from facility operators, excavators, and others involved in the excavation-damage prevention efforts.

An operator panelist suggested contractors, contractor associations, and insurance companies share in the responsibility of educating and training excavators and their employees. He stated that this is important to his company because it is both an operator and an excavator and believes as an excavator it is obligated to train its
employees in proper excavation techniques so that they know what they have to do to safely perform their work. He stated that all contractors also have that responsibility and that this group should not leave an impression to the contrary. Also, the contractor’s insurance company should share in the responsibility, as it has direct access to the excavator’s management, something that operators do not generally have. The facilitator said that he agrees in concept, but that the issue probably should be considered by group 3, which is discussing the contractor’s responsibilities. The issue was forwarded to group 3 for deliberation.

A contractor panelist expressed his view that many times statistics tend to be reinforced by their negative aspect. He stated that it is unfortunate that more from the insurance industry are not participating in the workshop because, he is certain, the insurance industry keeps statistics on the liability cases it handles about buried-facility excavation damage. He said that many excavation contractors are self-insured, and yet contractors work through insurance companies. Collectively, contractors could come up with some statistics that would help augment and underscore the need for education in certain areas.

**Provide Depth of Facility to Excavators:** The facilitator asked whether the depth of the facility should be provided. An operator panelist, in response to the numerous negative responses, said that he believes it very important for the contractor to know the depth. He stated that if the contractor is working on a cost plus basis, it does not make any difference. But if the contractor is working on a bid-for-contract basis, he needs to have both the vertical location and the depth before he can make a reasonable bid.

Another operator panelist stated that the locating equipment currently available is not accurate enough about the depth of a facility to be meaningful. He believes that hand excavation is still the best way to determine depth. Hand excavation, historically, has been the responsibility of the excavator. From a safety standpoint, if operators begin providing depths to excavators, they will stop hand digging to determine the depth; and when the
estimates operators provide are significantly in error, someone will get hurt.

A third operator panelist stated that even when his company’s records indicate the depth of the facility when it was installed, the company has found that the surface elevation has often been changed by people removing or adding soil over the facility. Because the cover over the facility may have changed, his company does not even estimate the depth for excavators.

Another panelist added that no manufacturer of locating equipment will guarantee the accuracy of the depth indicated better than plus or minus 10 percent, and if the facility is more than 3 feet deep, all bets are off. Additionally, the fact that a facility has been measured to be 3 feet deep at one location does not tell anything about what its depth might be 6 feet away.

**Accuracy of Location Markings:** The facilitator noted that some States have established that the temporary markings must be within 24 inches of each side of a facility; others have established that the markings must be within 18 inches. He then asked what the marking standard should be.

An operator panelist stated that his company has to both install and protect buried facilities. Ideally, his company would like it if no one excavated within 4 feet of its facilities, but it recognizes its wish as not realistic. Alabama’s law states that the location marking must be within 18 inches of each side of the buried facility, and his company believes the requirement is a good compromise.

Another panelist observed that one might believe that the greater the tolerance zone the safer the facility will be, given the accuracy of existing locating equipment. However, that does not appear to be the case because facilities are not missed by 17 and 1/2 inches or 19 and 1/4 inches. Generally, the problems experienced when facilities are improperly marked are things such as "ghost" signals when the locator picks up an abandoned facility or the locator forgets to mark a line. The industry accuracy standard appears to be 18 inches, and from a locator’s viewpoint, it is acceptable. However, the deeper and larger the facilities, the more problems the excavator will experience because he will never know for sure if he is locating the center or the side of the facility. That is the reason why a tolerance zone is necessary.

Another operator panelist observed that his State has for 18 years used a 24-inch tolerance zone and that excavators in the State know that to be the maximum accuracy of the markings. If the group agrees to some lesser tolerance, then both the operators and the excavators will have to be re-educated and adjust to the new tolerance zone. He said that changing the standard means revising hundreds of company policies and re-educating more than 125,000 licensed contractors and all of the operator’s employees. He stated that the group needs to take into consideration the existing tolerance zones that are being used.
A notice-center panelist suggested that the group agree to a range of tolerance zones that are working now rather than exhaust their time trying to agree on one. A second notice-center panelist agreed, stating that the problem, more than anything, is not the inches specified but what the excavator understands the tolerance zone to be.

**Coordination Communication with Excavators:** The facilitator asked what coordination communications operators should have with excavators about excavation precautions and emergency notifications.

An operator panelist said that his company coordinates with emergency-response agencies, contractors, and public-works agencies to discuss with them the maximum expected response time to an emergency and the procedures to be followed. He said the coordination is a part of his company’s education process.

A second operator panelist said that as a result of recent damage, the contractor called the notice center and that the information was not relayed to him for a considerable time; consequently, his company began telling excavators to call the notice center only if they do not have his company’s phone number. The panelist said it is important for his company to know of trouble as soon as possible so it can dispatch a crew to the location.

A third operator panelist said that in his area several operators had discussed the actions they desired, and each wanted the excavator to first notify the operator of an emergency. They know that they have to dispatch a crew, and they believe that if the excavator follows correct procedures, he will know whose facilities have been damaged. Further, they believe, the employees of the operator of the damaged facility are better suited than the notice center is to tell the excavator what to do until help arrives. After those actions have been taken, the operator’s employees will instruct the excavator to call the notice center so that all other operators of facilities in the area will be notified. If the excavator calls the notice center first, the center will take the information, give the excavator the operator’s phone number, and tell the excavator to call the operator directly.

Another operator panelist stated that he agrees that the excavator should first call the operator of the damaged facility. However, the notice center also needs the information so it can be entered in its damage database.

The facilitator said that what he had gleaned from the discussion is that there should be an established procedure for responding to emergencies, that emergency-service agencies should be told the procedure for emergency preparedness planning, and that excavators need to be told what actions are expected of them.

An operator panelist stated that he believes that the group is not focusing on the question of what discussions or communications operators should have with excavators about excavation precautions. He said that the best time to solve a problem is before it happens. A critical facet of that is the ability to
communicate with excavators before there is an emergency or before there is an incident during routine construction. This does not encompass broken facilities. It does not encompass emergencies. It encompasses the 97 percent of the excavations that happen as a result of a plan. A critical component of this is the ability of operators, as well as of excavators, to identify potential conflicts and problems before they occur. One very important vehicle that some States have for doing that is pre-marking. By having excavators identify through pre-marks their areas of intended excavation, utilities can identify conflicts before the excavation begins. In other words, that whole communications component becomes very important. If someone has a transmission or major fiber optics facility in the area of intended excavation, extraordinary precautions can at that point be taken. He said that in his area it is not uncommon for operators to have employees stand by during excavations near critical facilities so they can prevent an incident before it occurs. In order to do that effectively, ongoing and strong communications between excavators and utilities are necessary. He stated that he does not view notice-center tickets, as they now exist, as being able to always convey the full scope, intent, or location of proposed excavations. Through pre-marking, an operator can immediately judge the impact of the proposed excavation. If there is not some component of pre-marking or early coordination between the utility and the excavator, operators simply are not being proactive in responding. Instead, they are waiting until there is damage or waiting until there is an incident with what may be a potentially critical facility.

An industry-association panelist stated that there is another entity out there that members of the public are quite aware of and that they use for emergencies: the 911 number. He said that he is aware that not all notice centers are 24-hour operations, but as the public reports some kinds of incidents to the police or fire department through the 911, the prompt dissemination of that information to the operator or to the notice center is essential.

A communications panelist said that when excavators damage a facility, they often have no way of knowing the type of facility that has been damaged. Today, cable TV operators are installing fiber optics, and telephone companies are installing coax cable. His company prefers that the excavator first call the notice center. When his company gets its notification from the center, it, like all other operators with facilities in the area, will respond.

The facilitator stated that the call-the-notice-center procedure works well when the center operates 24 hours a day. He then stated that there was a train accident in either Alabama or Louisiana where someone had the forethought to call the notice center before beginning to clear the train wreckage, which involved pulling the train and digging around it. Fortunately the caller learned before starting wreck clearing operations that a pipeline was right next to the derailed train.

Another communications-system panelist commented that since the group is to recommend the optimum way of preventing
or minimizing damage, it should consider that some notice centers do not operate 24 hours every day of the week. She said that she had recently reviewed some notice-center records and noted that a gas operator had called the center reporting that it had to repair a leak and that it had to excavate immediately. That call had been taken, distributed to all operators, and dispatched to one of her company's field personnel, all within 22 minutes. She commented that had the gas company had to call all the other operators individually, it could have taken hours, and her company would not have had opportunity to mark the location of its buried facilities before excavation was begun. She, therefore, recommended that the group advocate that the excavator's first call be to the notice center.

Another panelist recommended leaving the decision about where to place the first call up to an area's established procedures for emergency notifications because there are others who totally disagree with calling the notice center first. If there is a threat to public safety they do not want to waste any time, not even 2 to 3 minutes.

The issue of which telephone number an excavator should call first elicited numerous responses, each differing depending on whether the notice center operates round the clock, whether the operator's system involves communications or transportation of potentially hazardous energy, whether operators had more faith in the 911 system, the notice center, or themselves, and many other issues. Below is a listing of the major comments:

- Communications representatives generally favor having excavators communicate through the notice center because the centers are efficient and the operators do not view as important a few minutes delay in being notified of the damage. They acknowledge that it is important to immediately respond to emergencies, such as a gas leak, but they do not believe that the short time it takes to notify the notice center and have the center notify the operator is a problem. If the excavator calls the notice center before beginning work, he already knows what facility operators are in the area. It was noted that often when one calls a facility operator, the caller reaches a voice-activated system and then has to enter a code to reach the desired department. Such systems also slow down completion of emergency calls. Also, the operator's emergency telephone numbers are not as well advertised as are the notice-center numbers. The problems of using either communication system appear to be about equal. Others noted that excavators know the number for the notice center, but not for the facility operator. Because many telephone
cables support the 911 system, they consider damage to a cable as an emergency situation that requires immediate correction. They support using the notice center for reporting damage because they believe that it will more consistently help them respond promptly.

- Operators of pipelines and electric systems support first calling the operator so emergency-response crews can be more promptly dispatched to the site. They note that at times the notice-center lines are busy, and it may take 30 or more seconds for the excavator to reach someone to report the incident and another 30 seconds to provide the information. After that, 2 minutes may lapse before the notice can be transmitted and received by the facility operator. They contend that the actions they are able to take in the first 2 to 3 minutes after an incident can be critical, but with emergency calls going through the notice center, they have no opportunity to act during that time. If the damaged facility is cable TV or a telephone line, a few minutes delay is not a threat to public safety. Perhaps people cannot make a call to the hospital or something like that, but public safety is not going to be immediately affected as it is when there is a gas leak. Operators of pipeline systems are adamantly opposed to the notice center becoming the primary recipient of excavators' emergency calls because operators at those centers are not typically facility-specific experts and therefore are not qualified to handle all types of possible calls. They are unable to ask the types of questions about the emergency that the facility operator needs to have answered so he can determine remedial action. It is considered vital for the facility operator to be the first recipient of an emergency call so that the information will not be filtered, misinterpreted, mishandled, or delayed. Excavators and others know who to call when there is a gas emergency because gas-company emergency numbers are 24-hour systems and well publicized.

- It was suggested that since the operators are interconnected with the 911 system, excavators should first call 911 to report emergencies that threaten public safety. Then all operators will be able to use the system to be alerted to problems, giving the operators the opportunity to protect their
systems from damage or repair them. Some people may think that a cut telephone, power, or water line is not an emergency, but they need to consider the impact such damage has on someone on a kidney dialysis machine or someone who needs to call an ambulance. Even though the notice center does a good job of accommodating emergency situations, the use of existing emergency networks must be considered. Education programs can help excavators decide when the damage report should go to the notice center and when it should go to 911. Some do not favor using 911 because notifications about emergencies often do not include any details and because notifications have been delayed.

- Operators of gathering pipelines (lines that transport gas and/or liquids from producing fields to a common location for transportation to processing plants or to other pipelines) said that they do not have 24-hour staffed phone systems. A system may consist of 2,000 to 6,000 miles of pipe, but have only two employees. Consequently, it does them no good if a notice center receives a report on an emergency and then FAXes the pipeline. No one will be there to receive the notice, and it might not be seen for 3 days. The operator needs prompt notification so that he can respond immediately and, if necessary, send help out to the scene of the emergency. When asked if a gathering line operator should tell the notice center if he is going to excavate adjacent to the gathering line, the operator responded, "Hell no. We're going to get out there and fix it." Exception was taken to that operator's position, as most operators call the notice center before excavating next to their buried facilities. This is to provide them opportunity to mark and protect nearby facilities. Concerning the need to notify the operator of emergency situations, procedures of several notice centers were discussed, including centers requiring operators to provide 24-hour numbers or other means for contacting the operator or his representative. The purpose of the notice center was defined as taking and transmitting messages when somebody is going to excavate. Any excavator, including operators when they excavate, must notify other operators of buried facilities, and the easiest way to do this is through the notice center. All members of
notification centers must have someone who can be reached 24 hours a day. Some municipalities have arranged for their 24-hour police department to receive the notice and then locate the appropriate person. If a dangerous situation is reported to the notice center, the center will not FAX the notice to anyone in the middle of the night. It will notify each member by phone or other 24-hour pre-established contact method.

- One-call center operators recognized the subject as one of communication between excavators and operators in an emergency. Some acknowledged that the notice center cannot be a panacea for every situation that arises between an operator and an excavator and that this is one area where notice centers do not belong. A notice center receiving an emergency call from an excavator will do all it can to assist, such as taking the call, transmitting it to others, and providing an operator's emergency telephone number. However, it is not a function of the notice center to get in the middle of the emergency-response situation.

Afterward, a panelist suggested that the panel agree that there should be procedures established for emergency notifications and that they should be communicated to the operators and excavators in advance of excavations activities. Every State law has an emergency excavation section that defines the term \textit{emergency}. The definition controls to whom the excavator reports an emergency.

A pipeline operator stated that West Virginia has found it helpful to give excavators a manual that details the excavation precautions and emergency procedures the excavator should follow. The operator's company gives the manual to excavators at its liaison meetings with them, and the excavators have found it helpful to pass the manual on to their employees. The manual lists the members of the notice center so excavators know who is going to be notified of the excavation plans they report. In West Virginia, participation in the notice center is not mandatory, and about 70 facility operators do not participate. Therefore, it is necessary that excavators know who belongs and who does not. Excavators should call before beginning the excavation, and they should call if they damage a buried facility. Excavators should use the notice center for both types of notification. The center logs all of the locate notices and all damage notices. Consequently it is possible to tell which excavator has damaged a buried facility and which do not report damages. The manual includes a definition of \textit{emergency} because experience has shown that the word does not have the same meaning for
operators and excavators. The first thing the notice center operator asks a caller is whether the call is to report a condition that poses an immediate threat to human life or property. If the caller answers no, then the operator knows that he will be taking a nonemergency call and handles it according to general procedures.

**Operator Monitoring of Long-Term Excavations:** An operator panelist stated that long-term projects usually involve a preconstruction meeting in which the employees of his company are given a time frame for the project and told which areas will be excavated. The employees who perform the facility locations follow up every day by contacting someone at the site and asking, "Did you go as far as you planned? Where do you want me to stake today for tomorrow's work?" The company maintains ongoing communication with the excavator.

Another operator panelist stated that on long-term projects an excavator should be required to periodically update his initial notification by providing a status report of the work completed and work yet to be accomplished. She stated that a contractor in her area notified the center that he was going to install a sewer line. When he began work, he was excavating trenches on one side of a freeway, but 3 months later he was boring under the freeway.

When he updated his ticket as required, he just said, "renew the ticket." He did not report any changes to the initial work plan or in the type of work in which he was engaged, nor was he asked. Excavators must be told that they should report any changes in the work project so that all members are notified and have an opportunity to perform any necessary additional locations and markings.

Another panelist reported that in Alabama the law developed through cooperative agreement between operators and excavators states:

- When engaged in extensive and contiguous construction/excavation activity, working agreements may be established to accomplish the intent and purpose of the law between operators, public agencies, and contractors, after initial compliance with the notification provisions of this Act.

The intent is that if the operator and the excavator do not agree on a method for providing updates on a project's status, the excavator will have to give updates to the notice center. If the two parties agree on procedures to work together on a contiguous project, not a number of projects, they can establish mutually agreeable procedures and do not have to report to the notice center. Such an arrangement can be worked out only after the excavator initially notifies the notice center of the planned excavation.

**Pre-Marking:** The facilitator stated that the subject of pre-marking had come up in several previous discussions. Pre-marking is the use of the color white to mark the boundaries of planned excavations. It has been described as an action that helps both
the excavator and the operator. He asked for comments about the merits of pre-marking.

A panelist explained that pre-marking means that before an excavator provides notice of planned excavation, he marks the boundary of the proposed excavation with chalk or white paint. This then would be the area in which operators check to determine whether they have facilities. If they do, they mark the locations of the facilities.

An operator panelist supported pre-marking when possible because it does assist locators in making certain that they locate and mark facilities throughout the area of proposed excavation. However his company often has projects that involve an unknown amount of excavation. For example, his company may be trying to locate a leak so that it can be repaired, but when the company begins the project it does not have enough information about the location of the leak. The company does not know where it will be digging along the street so it cannot pre-mark the area of excavation. But where the extent of excavation is known, the company encourages pre-marking.

A notice-center panelist said that Connecticut requires pre-marking from all excavators. If the outer boundary of proposed excavation is less than 1,000 feet, it is to be marked using the color white. If it is more than that, the excavator has to submit a plan showing the extent of the proposed excavation. This would be a project such as a major sewer line installation. This procedure has been quite successful; however, there have been problems involving excavations, for example, when the excavation is being done to find and fix a leak and the extent of the excavation cannot be easily determined before work begins. These situations have been recognized and have been worked out without any problem. Most planned excavations are now being marked by excavators, using white paint, and the practice has been a great help to operators and excavators alike because the operator knows exactly where to concentrate his markings, the locator spends less time on a job and is able to mark more projects during the course of the day, and the excavator is given more markings in the area where he is going to excavate.

A contractor panelist stated that pre-marking helps him because it gives him a better idea of the location of the buried facilities. Consequently he can plan his work more accurately, especially if it is a deep excavation. He affirmed that the excavator supports pre-marking.

A State-agency panelist stated that pre-marking is important. He said that in Ohio pre-marking has reduced confusion between the excavator and the operators about the actual locations of proposed excavations. He said that in the past few years there had been at least two incidents caused by unclear directions about the location of proposed excavations. The buried facilities had been marked, but not where the excavator planned to work. Pre-marking could have prevented both incidents.

A panelist suggested that the group support the following statement: "To improve communications and efficiencies in facility
markings, we encourage the use of white lining of proposed excavations." He stated that there is absolutely no doubt that much more is being marked now than needs to be.

**Permanent Markers:** A panelist discussed the use of permanent markers to warn excavators of the existence of buried facilities. He said that there are so many different ways to mark, including the flexible delineator posts, aluminum and acrylic signs, decals, snap-around markers, and underground warning tapes. He cited an attorney's statement on how permanent markers can better protect operators against legal actions:

Notice is a hallowed concept in the law. Proper notice can restrict or eliminate punitive or compensatory damages by invoking such other legal concepts as the assumption of risk. Multiple notices are better than one. Having said this, I also need to observe that multiple is better than one notice. This is so because the law has great tolerance for fools and is quite protective of those whose actions in the abstract might be viewed as evidence of pure stupidity. The more you go out of your way to design systems which should be evident, the lower your risk. Physical markers which both tell people of the existence of the facility and refer them to a means of gathering more information about that facility should be considered good notice under normal circumstances.

He stated that the question is liability. He said the purpose of the operator panel is to agree on what operators are willing to do to prevent excavation-caused damage. There is another panel here that is addressing what contractors are willing to do. But there are still insurance companies and attorneys to consider. And the real question is, who is ultimately liable in any particular circumstance? Using permanent markings is the only way an operator can protect himself if questions develop about risk transference or liability. To use any single method is to leave open to interpretation the adequacy of that method. The most pragmatic approach is to define several different methods, so that there are line-of-sight type markings. Thus, there is a first and last line of defense type markings. And in that sense, the underground plant is bracketed in such a fashion that no one can consider the markings as inadequate or deficient.

The facilitator added that the use of permanent marking is not one of the areas the panel was asked to address, but that the information is important.

**Frequency of Re-Marking:** A panelist asked how many times an operator should be expected to re-mark facilities on the same excavation site. He explained that he had in mind the following example: An excavator calls the notice center, and the operators mark the locations of buried facilities in the area. A couple of days later the excavator again calls to say that the
markings are gone and the area need to be re-marked. This goes on several times, requiring all the operators to re-mark. How many times should operators re-mark? Where does the operator’s responsibility for marking end and the excavator’s responsibility for protecting the markings begin?

An operator panelist stated that re-marking is a large part of the workload. He suggested that those who request re-marking have a responsibility to protect the markers and should be charged after requesting, perhaps, the third re-mark. He said he realizes that excavators cannot protect against kids’ pranks or vandalism, but after a while, a line must be drawn somewhere. There has to be a partnership on protecting markers.

The panelist who raised the question said the question is causing considerable controversy in Connecticut. The State law does not address the issue, and municipalities are charging excavators after the third re-mark request. Of course, excavators disagree, but they are not getting much support. The panelist wanted to know how other States are handling the issue.

The operator panelist said that at present his company is not charging, but that it is being considered. He stated that his company responds to about 450,000 locate requests each year, primarily for the pipeline system. The workload has caused his company to bring in some contract companies to do the locates and markings. The increasing expense of re-marking is forcing the company to consider charging excavators for the service.

The facilitator stated that OSHA requires the excavator to make every effort to maintain the markers. Again, the larger contractors probably are not the causing the problem.

A State-agency panelist commented that the operators are just expressing concern about excavators who just plow through the lines because it is cheaper than protecting them. He said that charging for re-marking would discourage excavators from calling again and encourage them to excavate without knowing where the lines are.

A contractor panelist stated that normally once the contractor is given the locations of facilities, he does a lot of engineering and layout himself. But to be certain that he has the right references, he often has to move dirt, which may dislocate stakes and paint marks. He attempts to off-set them to protect the information on the facility locations. For the most part, a contractor tries to protect the markings. But vandalism gets to be a part of the problem, and it causes more damage to the markings than anything else.

A communication panelist stated that even though the excavator under OSHA requirements has a responsibility to maintain facility markings, her company prefers to do the re-marking itself. The company visits an excavation site daily or stays on site if the excavation is close enough to the company’s facilities. The company sees such service as part of its
damage-prevention program and a way of protecting its facility.

Before closing the group session, the facilitator offered each panelist an opportunity to comment on any additional issues. A contractor panelist stated that excavators do get involved with partnering. He said that excavators recognize that damage prevention is a team effort among operators, engineers, and contractors on any construction work, but especially so when the operators are buried-facility operators. Excavators try to make the task easier for operators, as well as for themselves. The better the information excavators can get, the better and more economical a job they can do. The facilitator said that after 2 days here, he does not see the task before them as a simple one, but thinks they need to make the solution as simple as possible so it can be understood at every level from top to bottom. He said the objective must be achieved among the players here rather than have another government agency get involved. Everyone would be a great deal better off by solving their difficulties themselves.

An operator panelist supported the contractor panelist’s comments and added that the group had to come together to solve these problems themselves. Where there are bad actors, be they contractors, operators, or notice centers, some teeth are needed to address the problem. There are many problems other than those addressed here. Some problems raised here have been brushed aside, and it would be good if they were addressed in one of the other groups because there are some real issues that need to be worked on. The main issues are improving the educational processes and learning to work better with one another.

Another operator panelist said that he had learned that there are many different viewpoints, some held by individuals, some by States, and some by industries. Even though he usually does not favor Federal mandates, he said that it appears there is a need for some Federal guidelines—guidelines that will encourage the individual States to adopt minimum requirements for standards on preventing excavation damage so as to improve public and employee safety. Again, it is essential that all buried-facility operators and all excavators participate to provide advance notification of planned excavations and that all buried-facility operators respond and mark the location of their buried facilities. The only exception should be for emergencies, and the term emergency needs to be defined so that all have the same definition. There should be sanctions to apply to those who do not work within the established system, and those sanctions must be easily enforced. Operators and excavators in States that now have excavation-damage prevention laws support them, but they also want the States to update the laws to make them workable and enforceable in the “real world.” Last, all buried-facility operators should be proactive in encouraging excavators to work in partnership with them so the operators and excavators can accomplish their common objective—prevent damage to buried facilities.

A third operator panelist stated that he was pleased to work with the group toward
some commonsense recommendations. He said that in his view they had reached consensus on quite a few items. He supports a view that all recognize that the concept of "call before you dig" benefits the public, the excavator, and the operator; but it needs to be a nationwide requirement that is enforceable, preferably at the State level. The States need some latitude to apply commonsense interpretation of the adopted standards. What needs to happen in Anchorage, Alaska, and Tampa, Florida, is probably two different things. The best interests of excavators, operators, and the public are not served by increasing costs or making life more difficult. There needs to be some form of nationally advertised program to support the damage-prevention programs, a program that will tell people such things as how to contact the notice center in the area in which the excavation is planned.

A State-agency panelist stated that every State needs to have a mandatory-participation damage-prevention program and needs to enforce the provisions effectively. One of the best ways to help the excavator and the operator work together is through the enforcement of the program.

An operator panelist expressed his view that one of the most important aspects of an effective damage-prevention program is its educational process to get all the buried-facility owners and excavators working together.

The representative of the IRWA stated that his organization is always ready to assist through training, education, or any other means it can. He believes that the notice center is an important aspect of any damage-prevention program, as it makes the right-of-way agent's job a lot easier.

A notice-center panelist supported the earlier comments and challenged the group and members of the audience to keep this type of communication going through other similar forums. He said that when they get back to their home States they should remind people that the One Call System International holds an annual symposium so people can discuss the types of topics they have been talking about for the past 2 days.

Another State-agency panelist said that this meeting had generated a very good exchange of information. From the perspective of enforcement, he said, they all have echoed the same thing, that all operators of buried facilities without exception should participate. Public and excavator education is essential, but most importantly, there has to be quick and good enforcement to make the program work most effectively.

Another panelist stated that he had learned more at this workshop than at any other forum he had attended because of the free exchange of different opinions. He said that the experience had given him a new appreciation of the magnitude of the problem. For damage-prevention programs to work, there must be notice centers, mandatory participation by all, and enforcement through insurance disincentives or legal action or both. He stated that there must be a more compelling reason than an honor system for making that notification phone call.
because the honor system does not work. He said that according to a recent 1-year study by Pacific Bell, 41 percent of its cable damage was caused by excavation damage. In more than half of those cases, no phone call was made to U.S.A. Alert. In 54 percent of all excavation-caused damage, the notice center was not called. Notice centers are but a part of the solution to the problem; it takes a concerted effort on many fronts, including better markings, better educational systems, and, probably, better certifications. But certainly the notice center can act as a cornerstone for a comprehensive damage-prevention program.

A pipeline-operator panelist stated that a major key to future success is getting effective, timely enforcement of the program requirements. Operators need to support the laws that already exist by helping excavators know what is required, what the facility markings mean, and what they should do when they hit lines.

A communication-system panelist stated that she wanted to emphasize that an effective notice center is one of the most important aspects in an effective damage-prevention program. She stated that her company received 846,000 locate requests in a recent 12-month period and marked buried facilities at 75,000 locations. In only one instance was there damage. She stated that during the same 12 months, her company's cables were damaged several times by excavators who did not notify the center of the excavation activity.

A contractor panelist supported the earlier comments of panelists and said that he believes in avoiding regulation when education can suffice. He stated that he believes that the workshop in general and this group in particular have been a model for him to take back to the grassroots level and encourage his people to step up the educational effort locally. He said that the more we know about each other's problems and concerns the better we will be at eliminating the damage that is out there waiting for all of us. He expressed his view that it has been nice at this workshop to be thought of and feel like a partner in the solution to the problem.

Another notice-center panelist commented that it was refreshing to see so many new faces throughout every part of the workshop working to improve the excavation-damage prevention efforts. She expressed her wish that efforts such as these will continue to raise the level of interest in preventing excavation damage and that the many new faces will continue to work in their States to pass on information learned here, to participate in efforts to improve programs, and to participate and freely exchange information to help resolve problems.

The facilitator thanked the panelists for their cooperation in reaching consensus about many items during the workshop. He stated that their work will help to produce a facility that is not left with all the ills that we have today. Buried facilities will be a part of the infrastructure for many years, and the problems will change 10 or 20 times in the centuries ahead. But, he said, we want to leave the next generation with a better infrastructure than we have today. He also thanked those in the audience because
their participation made the panelists very active and also spurred questions that still need answers. He said he knew that there were people from research groups, GRI, for one, who are working actively as are some of the other major research foundations in the United States, trying to come up with new and innovative ways to protect facilities. They are working to advance the identification of facilities, to advance the technologies, and to come up with some new and exciting products to help with the job. We serve the public, whether we are a operator of buried facilities, an excavator, or a notice center. The excavation community is not our enemy. We work with them, and we probably provide them a large amount of their work. We need to continue working together on this important issue.
GROUP 3

What Responsibilities Should the Excavator Have?

Facilitator
BRIAN DEERY, Director of the Municipal Utilities Division, Associated General Contractors of America,

Panelists
Raymond J. Boss, AT&T
Jeff Brown, Southwest Bell
Bernie Czarmecki, Cablemasters Corporation
Norman Fitzgerald, Fairfax County, Virginia, Water Authority
Albert Richardson, Tenneco Gas
William Rearden, Consolidated Edison Co. of New York
George Taylor, Alabama Gas Corporation
Walter Gainer, W.F. Wilson & Sons, Inc.
Brad Barringer, B.R.S. Inc.
Paul Scott, Federal Highway Administration
James C. Thomas, Office of Pipeline Safety, U.S. DOT
Richard D. Huriaux, District of Columbia Public Service Commission
Lee Marrs, Texas Excavation Safety System
Clausduette Campbell, Utilities Protection Center, Inc. (GA)
Jim Hill, Oklahoma One-Call
Robert Froczak, Association of American Railroads
Mark F. Palma, Popham, Halk, Schnobrich & Kauman, LTD.
Don Smith International Right-of-Way Association
Mike Capparelli, Tampa Electric Company
Jim Hotinger, Virginia State Corporation Commission

Brian Deery: I am with the National Office of the Associated General Contractors of America, a national trade association representing construction contractors for everything except home building. So our contractors build highways, bridges, buildings, you name it.

I specifically am the director of the Municipal Utilities Division, the contractors that put in water and waste water, build waste-water treatment facilities, do other kinds of municipal work--site development. So these are the contractors that are probably most affected by excavation-damage prevention programs and by unknown underground conditions.

I was asked to give a few opening remarks, and I am really not sure what to say
because I think most of what we want to address was already stated this morning at the opening session. We are all in this together. The aim of these workshops is for us to try to develop a consensus position on a number of issues, and I put before you an agenda that I drafted in conjunction with the Safety Board staff.

The discussions are open to the audience as well. We would like to involve those in the audience in the discussions, but it is the panelists that are to come up with a consensus position. The panel is a reasonably balanced representation of the different industry groups involved with excavation-damage prevention programs. We have a wide variety of interests represented around the table, all coming, I think, from different points of view, but hopefully all aimed toward the same ultimate end, which is protecting underground utilities.

Summary of Panelists' Discussions

Who Is an Excavator? A contractor panelist began the discussion by saying that Maryland requires all operators of buried facilities to participate in the notice-center operations and requires anyone who plans to excavate anywhere in the State to notify the notice center. The law does not discriminate—if someone plans to plant a tree in the front yard, he must notify the center. It is not a matter of who, rather it is a matter of what. If you do not advise the notice center of the excavation and you damage a buried facility, you are responsible for all damages. The State has the right to enforce the law and can levy a $1,000 fine for not providing notice.

Generally, when a facility is damaged, a fine is not levied; rather, the parties decide who is at fault and agree on a settlement. Additionally, the law allows a contractor to be compensated for any lost time or additional expense should an operator erroneously mark the location of a buried facility.

A notice-center panelist stated that one of the major controversies involves who must notify. As soon as the question is asked, the State department of transportation, railroads, farmers, home owners, and others all want to be exempted. Every exception granted is of grave concern. In Georgia, the last death due to an excavation involved farming operations. She said that the majority of deaths caused by pipeline accidents occur in areas where, supposedly, there are no facilities. Exemptions are dangerous. Some laws have been very creative about exempting the home owner by stating that he can be exempted from providing notice of excavations if he can ascertain through other methods that there are no underground facilities in the area. That is just another loophole. She said that from her perspective, there should be no exemptions because the potential for an accident is always present.

An operator panelist stated that in Alabama, the program is voluntary. A new law will become effective on January 1, 1995; it is a very weak law as it exempts many potential excavators, primarily the public-works departments, railroads, and municipal water authorities. Those entities are the cause of a lot of accidents. The panelist said it would be better if there were no exemptions. Because over 99 percent of
residential homeowners and farmers if they were tilling the soil 18 inches or less. The residential-homeowner exemption is ambiguous because it states that the homeowner can work on his property provided that he does not encroach on any utility easement or right-of-way. In 1994, the law was amended to exempt railroads and large logging companies. The logging industry stated that it could not notify every time it did a logging operation just because the operation disturbed the earth, thus falling within the definition of excavation. The railroads were exempted because they successfully argued that replacing ties and doing normal maintenance work does not disturb anything and that they know where the facilities are that are buried on their rights-of-way.

Who Is an Operator? An excavator panelist stated that the damage-prevention system has to include everyone who is an operator of buried facilities. The system has to be simple so that an excavator can make one phone call a few days ahead of time and then call back to learn the status of the notification. Everybody has to be working in the same system, and there cannot be any exemptions. No one in Maryland is exempted; even the municipalities are included. A plumber with a large amount of work may have 40 units going out every day; he has to plan 3 days ahead of time for those 40 units. And they may be in 40 different places—but coping with all of that is part of doing business and part of being safe. Railroads want an exemption when they are working on their own rights-of-ways, but if one operator gets an exemption, then Fairfax County is going to want an exemption. The following week the

Another panelist said that his company deals with a lot of railroads in the western part of the United States. Because the company has a fiber cable running parallel to the railroad tracks (a longitudinal encroachment), most of the railroads with which it deals have their own notification system. Consequently, when the company excavates in the right-of-way, it does not call a notice center; rather, it notifies the railroad, which in turn notifies any other buried-facility operators that have facilities in the right-of-way. He stated that the railroads are getting very, very good and are quite adamant about safety precautions within 20 feet of the railroad track.

A electric-power panelist said that Florida passed a law in 1993 that exempted...
District will want an exemption, and then somebody else. All operators have to be in the program.

A notice-center panelist said that the Oklahoma statute has been in effect since early 1981. The statute exempts routine maintenance done by the State department of transportation and the county governments. As a consequence, in the last 10 years two out of the three deaths in Oklahoma were those of county-road grader operators who were incinerated in the cabs of their units. The third death was that of a private excavator who had a sand and gravel company. On the July 4th weekend, he hit a high-pressure line with a front end loader. He lost his life because he wanted to excavate on the weekend and did not give notice. Although routine maintenance has been exempt from most State damage-prevention programs, there have been as many, if not more, deaths involving the exempted work as the non-exempted work. If routine maintenance that involves excavation, including the activities of home owners and others, continues to be exempted, more people will be injured. While the initial advertisements were targeted only to commercial operations, more recently, Oklahoma has been using quarterly television advertising to tell homeowners and other people not traditionally thought of as excavators about the necessity of notifying the center. Many homeowners throughout the State have expressed their appreciation for being told about the damage-prevention program and that they too can use it. People using the system are just as concerned about their husbands, themselves, or a family member severing an electric or gas line and getting hurt while excavating in the back yard to install a new fence, plant a tree, or build a pool or an aquarium. There should be no exemptions.

A pipeline representative in the audience stated that he administers the rights-of-way his company leases from the railroads and recognizes that the railroads theoretically control what enters their properties. He said, however, that he is also aware that there are many public crossings of railroad property that the railroads do not know about and that buried facilities have been installed across railroad property without the railroad owner's knowledge. He cited instances in which Conrail employees have told facility owners to install facilities across the rights-of-way without notifying the railroad. He pointed out that a railroad's theoretical control does not ensure that it knows where facilities cross its right-of-way. He stated that his company agrees that there should be no exemptions.

An excavator panelist said he lives on a 20-acre tract of land and there is nothing buried in that ground except what he has installed. He said that he has problems with someone taking away his right to excavate on his property, especially when he knows about everything buried in it. Further, he questions whether the notice-centers would be able to handle the increased number of calls that would be generated if everyone had to call and whether the law could be enforced if private homeowners, especially in rural areas, were not exempted.

A pipeline panelist said that his company operates cross-country high-pressure pipelines, most of which do not follow roads but, instead, follow the shortest route between two locations. In doing so, the
pipelines are very likely to cross farmland and other private property. Much of the land his company’s pipelines cross was once farmland but is now are under housing developments. He stated that he lives on a small farm that is crossed by a pipeline. He agreed that it would be a pain to have to call every time he goes out to plow; but, he added, pipelines are occasionally damaged by plows. He stated that some of his company’s pipelines operate with only 40 psig pressure, but others have 1,200. A plow or an other piece of mechanized excavation equipment striking a high-pressure pipeline can rupture it, causing a disaster and endangering the safety of anyone nearby. He stated that he understands why some people do not want to have to call before excavating, but said that such a call can save a life.

A State-agency panelist commented that in an urban environment, there are no problems with farmers wanting exemptions; rather, it is homeowners, cemeteries, and State road departments that want the exemptions. The road department wants to be exempted because its crews do not have enough time to notify before performing maintenance work. However, they have time to plan the work and dispatch a crew. The only additional thing being asked of the department is that it call the notice center. Homeowners are not innocent bystanders either. They rent power equipment to drill their post holes and perform other excavations. Even people digging by hand might think they have hit a root, when actually they have struck a plastic gas service line. They can create some very dangerous situations. Exempting is a bad idea. Notice-center education programs should be clearly aimed at the responsibilities of homeowners and other nontraditional excavators. Then there has to be enforcement.

The lumber industry also should be required to provide notice. It, like the road department, has to plan what it is going to cut. It has to get permits and dispatch crews and heavy equipment. It can also call the notice center with little effort and just a little foresight. The District of Columbia now has before its council legislation similar to that recently passed in Maryland. The legislation will end the exemptions for the municipal agencies and the road department. In the District, most buried facilities are operated by the city. When it comes to excavation, there are no innocent bystanders, except possibly the railroads when they are performing gauge and ballast maintenance work, which is not excavating in the earth. However, there are lots of buried facilities that cross railroads; and when the railroads are excavating, they too should be required to notify.

Another pipeline representative in the audience questioned how continuous excavation operations, such as mining, sanitary land fills, or quarries, would be handled in so far as notification goes.

An attorney panelist responded that he was sensitive to this and the railroad issue and recognized a need for some flexibility in the process. He stated that it may very well be that the notice centers need a completely different system from the traditional ticket one for handling such operations so that there is a way that the railroad can communicate what it is doing to the notice center. It may be that the center can deal
with such operations as railroads, land fill, and cemeteries by not mandating that the same level of information be given. For example, Minnesota allows the State road department to use a streamlined process when it notifies. Excavators will not call unless the process works for them.

A notice-center panelist emphasized that the industry has to work with people, such as the continuous excavator, who have extenuating circumstances. Notice centers throughout the country have created programs for such excavators so that they have access to the notice-center computer. All they do is plan the work, format the information, and download it to the notice-center computer. The notification automatically is sent to the member companies. It requires far less time than would be necessary using the normal notification process. She stated that her center has been performing batch, remote ticket entry for 3 years and that the excavators who use it estimate that they save about 40 percent of the time required to use the traditional notification process. Both the excavator and the notice center save time and money.

A railroad panelist stated that the railroad industry does not believe that it should have to notify the center when it is maintaining tracks, even when the maintenance work disturbs the track ballast that supports the tracks. He maintained that the railroads own the land on which the work is being done and that the work is a continuous operation.

The facilitator stated that although he had questioned several people, he did not find anyone who knew of a case in which routine track maintenance had damaged a buried facility. He was told of instances in which homeowners had damaged electric and gas lines when they were installing posts in their yards. He said there should be some exemption for people who own the land on which they intend to excavate.

A notice-center panelist said that there are many departments of transportation in this country that feel that the rights-of-way belong to them instead of to the taxpayers.

The facilitator said that if there are to be exemptions, the panel needs to state the conditions under which the exemptions are allowed. He questioned whether an exemption should be tied to a depth restriction, such as excavation less than 18 inches. He also questioned whether excavators using hand tools, as opposed to mechanized equipment, should be exempted.

A pipeline panelist stated that he favored making such decisions on a risk-based determination of the excavation operation. He said many people have an intuitive fear of laws that may be too broadly based. The requirement should not be so broad that it interferes with activities that pose no threat to buried facilities. However, he said, there are risks associated with exempting activities according to the depth of excavation. In his area, farmers present some unique problems when they reduce the soil cover above buried facilities by performing what they call land leveling operations. The problem comes later when a new owner of the land, who knows nothing of the land leveling operation, wants to excavate to a depth or 18 inches or less. The depth may be sufficient to
damage the buried facility because its cover was reduced by the previous owner without the knowledge of the facility owner. Any exemption must be dealt with very carefully and must be based on the potential risk.

A pipeline representative in the audience asked the panelists to set aside their personal issues when discussing exemptions and to consider the interests of the public. Consider the integrity of your systems and the improvement in public safety, she said, so that anyone dealing with you as an excavator or facility operator will know that he is going to be safe, that your system is safe, and that your method of operation is safe. She suggested that rather than exempt railroads, cemeteries, and other continuous excavators, it might be better to award the right on an annual basis to excavate without having to give notice of individual events. Such authority should be tied to a requirement that the holder must annually review with the operators of buried facilities the locations of the facilities and which of the operator's employees to call for additional information. She further implored the panelists to continue with the development of guidance rather than getting hung up with the details of what might be put in any legislation.

An electric-company representative in the audience stated that he had concerns about exempting people on the basis of risk without specifying whose analysis or whose figures are to be used. Rather, he supported the idea that everybody be required to participate unless there are exceptional or extraordinary circumstances that allow the excavator and the operator to agree that notification is not needed.

An attorney panelist suggested that the majority of the panelists believe there should be no exemptions. But, he said, a minority believes that some exemptions should be allowed for specific activities as determined by a particular State.

A communications representative in the audience commented that the group has a responsibility to make its decisions in the interests of public safety and welfare. If the group opens the door for exemptions, there will be exemptions because opening the door encourages people to think they are special. He stated his belief that the group should recommend that there be no exemptions, so as to set the tone for actions by the States.

A notice-center panelist urged that the group make a declarative statement of fact that the majority of the group believes that all people planning to excavate should notify the center before beginning. The States will debate whether there should be any exemptions, but this group in its recommendation should not leave the door open to any exemption.

An excavator panelist stated that if the group does not allow some exemptions, property owners will oppose the legislation and nothing will be approved. He said that the public will not agree to a no-exemption policy.

The notice-center panelist explained that most State laws already have provisions for more exemptions than they have requirements for participants. He said the States will take care of exempting the entities they believe should be exempted, but the group needs to make a positive
statement about disallowing exemptions so that exemptions are less likely at the State level.

A State-agency panelist questioned the purpose of the panel, saying that if the purpose is making a recommendation as a national body, then everything it recommends has to be considered in the light that there is room for interpretation by each State or locality so that it can determine what is right for its area. He stated that Virginia recently passed a new law that includes exemptions, for example, for mining. And the reason mining is exempted is that State law requires miners to have permits before they start operations. A part of the permit process is identifying all buried facilities.

**What Is Excavation?** An attorney panelist said that the first thing the group has to do is decide whether excavating with hand tools should be considered excavation. He stated that his experience suggests that one of the best tools for locating buried facilities is the shovel. Consequently, there is a catch-22 if the law says putting a shovel in the ground requires locating first, because locating cannot be done without putting a shovel in the ground.

An excavator panelist said that once the facilities have been located and marked, the law requires that the excavator use hand tools to do the excavating needed to expose the facility. He said that hand tools have damaged facilities, so he does not believe that the definition of excavation should distinguish between hand and mechanized tools. He explained that he is involved in a project in which it is not possible to use mechanized equipment and that he has 20 employees hand digging to 8-foot depths. He stated that once there is a notice center, it should be used by everyone. It may not be possible to get everyone to call, but the majority of people performing excavations will.

A pipeline panelist said that because of the plastic piping in gas systems, one of the biggest problems is homeowners who are planting shrubbery or trees. Perhaps the group should say that disturbing the earth to a depth of 12 inches or more is defined as excavating.

A railroad-association panelist suggested that routine track maintenance should not be considered excavation. He defined routine track maintenance as work on a track and the ballast structure, which is a man-made structure above ground level. The term *maintenance* includes replacing cross ties, cleaning the ballast, and similar operations that involve mechanized equipment. Such operations disturb the earth up to 18 inches beneath a cross tie.

An excavator panelist suggested that the group should let the States determine the depth of digging defined as *excavation* for notification purposes. He said that his neighbor had dug through his cable TV five times while planting trees. In response to a question about the outcome if the line cut by his neighbor had been a high-voltage electric one, he said that his neighbor probably would have been burned to a crisp. He then said that the States should debate the issue and that the group should say that everyone should call the notice center before excavating.
The facilitator attempted to obtain a consensus about whether the group should define *excavation*. Some then questioned if it is possible to do so.

**Pre-Marking of Planned Excavations:** A State-agency panelist said that Virginia’s recently enacted statute was drafted by a panel consisting of operators, excavators, locators, municipalities, and State agencies and that they had agreed that pre-marking is a good idea. However, he said, what happens when a developer buys a large land tract that he plans to develop? What does he do, outline the total land tract? He stated that there will always be extenuating circumstances that will justify some exemptions to participation. In recognition of such problems, the Virginia law requires pre-marking only if practical.

An electric-system panelist suggested that if the proposed excavation is complex or complicated, it should be clearly described when the developer notifies the notice center. Then such excavations should be pre-marked.

An excavator panelist explained that in Maryland the excavator can FAX a diagram of the proposed area of excavation and a request that operators have their facilities marked by a specific date. The operators can then call the excavator, saying that they can meet the date or that they need to meet with the excavator. This allows both the excavator and the operator greater flexibility in scheduling work.

Another excavator panelist said that he could envision many problems with having to pre-mark proposed excavations, especially in rural areas. For a new sewer line, the trench might be 12 to 20 feet wide at the top on a hillside, but much more narrow on level land. Suppose the excavator pre-marks an excavation area that is 2 feet wide along 500 to 5,000 feet of roadway. Once the operators mark their facilities, the excavator may find that he has to move to the other side of the road. Now he has to start all over on pre-marking and notifying. The excavator panelist said that it is not practical to outline the proposed excavation ahead of time.

A notice-center panelist agreed that pre-marking in rural areas is difficult. He cited as an example a 1982 project having to do with trees. Ten thousand were to be planted along a road right-of-way. He said that when the number was increased to 30,000, the operators were at a loss about how to keep up with the location and marking requirements. The solution was to have the excavator pre-mark the locations where trees were to be planted. Then the operators had to mark only the locations of their facilities in those limited areas. The pre-marking procedure was adopted only after the excavator damaged buried telephone cables, causing everyone to lose phone service.

Afterward, the notice-center panelist said, everyone who was involved met. They decided that pre-marking had worked well and that it would be a good procedure to use in the future so the operators could better determine where the excavation would be performed and then could be more specific about the locations of affected facilities.
A facility operator in the audience said that about 2 years ago, Maine had instituted mandatory pre-marking. The wording, while requiring pre-marking, allows the excavator and the operator to forego pre-marking if both agree that the location to be pre-marked is too large for or not conducive to the process. The law simply allows for face-to-face meetings between the operator and the excavator where they decide together whether pre-marking should be done. Both operators and excavators find that the system works for them.

Over 60,000 notifications have been made under this system, and it has helped to reduce excavation-caused damage by 50 percent. Contractors like it because they are not responsible for damage inside the pre-marked area as long as they have pre-marked accurately and called the notice center. If damage occurs and if the damage was not caused by an error on their part, they get to bill for lost time. Facility operators find the requirement acceptable because it saves them from having to locate and mark facilities well beyond the area of proposed excavation and because they can more quickly determine whether there are buried facilities within the pre-
marked area. What used to be a 30-minute location and marking task now often takes no more than 5 minutes.

The operator went on to say that when his company sends its employees to visit sites to determine whether marking is required, the company saves money by not having to send crews to many areas and by being able to determine before sending a crew the extent of the work to be performed. The company knows now exactly what to expect when the crew gets there, what size crew is needed to do the work, and what equipment needs to be on site. His company believes that pre-marking provides advantages to everyone, and he urged the panelists to seriously consider requiring it.

In response to a question, the facility operator said that the notice center receives exactly the same information as it did before the pre-marking provision went into effect. The notice center for Maine covers other New England States, but Maine is the only State that requires pre-marking. Contractors have become very sophisticated in the use of the notice center and tend to better define the area of proposed excavation, saving operators from having to mark large areas to provide the information needed by the excavator. But pre-marking really identifies the area of proposed excavation for the person doing the locating and marking. So the problem is not like it was 15 years ago, when people simply did not provide notification. Now the problems are issues of coordinating and communicating and ensuring an exact understanding of what the excavator is going to do and what the operator expects.

Pre-marking yields a level of detail that a call to the notice center cannot.

A gas-pipeline representative in the audience stated that his company is supporting passage of a pre-marking requirement in Massachusetts because pre-marking can substantially reduce his company's cost for locating and marking buried facilities. He stated that his company does about 50,000 locates a year, which costs about $1,000,000.

But, he said, more important than the potential savings is the fact that pre-marking increases safety. He stated that the States that now require pre-marking have shown that the practice allows the facility owner to concentrate his efforts on the area to be excavated. He stated that the group should recommend that pre-marking be required.

A pipeline representative in the audience stated that he favors requiring pre-marking. He mentioned the problem posed by companies that do geophysical surveys in oil and gas producing States. The companies call the notice centers but provide only the township section of their work. Their work involves placing a small explosive charge in the ground, detonating it, and collecting information about the vibrations the explosion produces. They use the information in locating potential oil and gas reservoirs.

The operators need much more precise information about when and where the work will be done. On one occasion, for example, a geophysical team blew a hole the size of a basketball in a 16-inch-diameter pipeline. The need for mandatory marking is not just
a time and money saving issue, it is also a safety issue. The operator needs to know exactly where the excavation is going to be so that he can implement adequate safety precautions.

An excavator panelist asked if pre-marking is required, would it be acceptable for the excavator to mark the center line and then state that buried facilities be located if they are within 20 feet of the markings. An operator responded that the law in his area simply calls for pre-marking to be done to clearly identify the site to be disturbed. He said that a smart person doing the pre-marking, whether he is an operator or someone else, will mark an area large enough to accommodate all of his activities. The requirement is not meant to be restrictive or exclusive.

An operator who also had worked with the Gas Research Institute's project on developing improved buried-facility location technologies stated that throughout the many discussions about ways to reduce excavation-caused damage, there is a constant theme: Notice centers need to pursue ways of facilitating communications between operators and excavators. This should be done beginning at the design level by facilitating joint meetings, pre-marking, and on-site discussions; and it should continue through completion of a work project. Whether pre-marking is mandatory or not is not necessarily the question; rather, the question is whether pre-marking will facilitate communication. He stated that his company tries to respond to every type of request it receives from the notice center, whether it be for plans of an area, joint meetings, short notifications, or routine notifications. His company believes in trying to do everything possible to facilitate improved communication between itself and all excavators, whether they be other facility operators or contractors. He suggested that the group issue the following positive statement: "Pre-marking the site for proposed excavation has been demonstrated to enhance the safety of proposed excavations."

Certification of Machine Operators: A contractor panelist said he does not like using a term such as qualified to operate machinery. He pointed out that only the union halls have a place where an operator can obtain a license, and he does not believe that the panel should suggest that all machine operators belong to a union. He stated that he could agree with a provision on education or with a statement that all operators must meet a specified standard to be qualified. He explained that his employees all must meet specific training requirements to operate equipment.

A representative of a machine operator's union in the audience agreed that the group should not advocate that machine operators be certified from the union hall. He said it is just that the operators must be qualified to correctly operate the equipment. A statement that says operators must be qualified is not saying that the operator must be certified. A lot of accidents happen because of operator error, and they injure not only the operator, but the public as well. There also are accidents that occur even though the best operator is in the seat, and it is not his fault. But the panel needs to recognize that many problems can be eliminated by having qualified machine operators."
means an operator who has training and has somehow proved his competence.

A State-agency panelist said that the people who revised the Virginia statute considered operator qualifications. They also considered licensing equipment operators the way vehicle drivers are. If a licensed operator damaged a facility due to negligence, his license could be revoked for a set period of time, depending on the degree of negligence. The approved statute, however, did not include any reference to licensing machine operators.

A contractor panelist expressed his strong opposition to any requirement that a machine operator be licensed.

A pipeline representative in the audience stated that he believes the group should not address machine operator qualifications; rather, it should address what the mandatory training or education should be for machine operators. He stated that education has been overlooked, particularly about safety practices and the use of the notice center. Although belonging to the notice center, calling before excavating, and pre-marking are mandatory in Nevada, training machine operators is not.

A communications-company representative in the audience stated that he is a claims agent and has investigated hundreds of cases of damage involving telephone cables. He stated that he also advocates that the group address the training and education of machine operators. He stated that machine operators know much less than excavation-company owners and managers. The machine operators need to be flooded with information to help them understand how to prevent damage and the danger such damage poses to them. He urged the group to develop outreach programs for those who actually operate the equipment.

An excavator panelist stated that there already are Federal laws and regulations under OSHA that require excavators or whoever qualifies as an excavator to have specific safety programs for machine operators. He stated that he does not see how the notice-center operations, outside of educating the owners of excavating companies, would be able to add more than his company already does. He stated his belief that there already are enough requirements under OSHA.

A notice-center panelist advised that while machine operator training may not come under the purview of the notice center, it is definitely a damage-prevention issue. She reminded panelists and the audience that the notice-center operation is but one facet of an effective damage-prevention program. It is one tool to work with. From her experience, she said, of going into the field and having to give daily safety presentations to the machinery operators and others because they do not know anything about the notice center or the damage-prevention program, she is convinced that there is a need to do something to improve the knowledge of machine operators. She does not know, she added, whether licensing machine operators is the answer, but something definitely needs to be done, because this is a problem.
To demonstrate that machine operators need training to better understand the consequences of their actions, a pipeline representative in the audience related a recent incident. He said that an operator of a backhoe excavating above a gas pipeline under 1,000 psig pressure had hit the line but it did not rupture. When his supervisor asked if he was aware that a high-pressure pipeline was buried in the area, he said that he was. The contractor had called the notice center, and the pipeline company had marked the location of the pipeline. The machine operator then proceeded to bounce the backhoe bucket on top of the pipeline to demonstrate to his supervisor that he knew a line was there. In this case, the education issue has little to do with the operation of the notice center; it has to do with machine operators understanding that 1,000 psig pressure pipelines can blow them about 2 miles away.

A notice-center panelist indicated that the group should not address the certification issue, but it definitely should address the education issue; that, he said, is definitely our business. He said that he is well aware that there is a problem with the machine operator's understanding of the need to protect buried facilities, if for no other reason than employee turnover. While the group can talk about the turnover problem, there is nothing it can do about it; it is going to occur. That is why there have to be continuing educational programs.

**Reporting Damage:** An excavator panelist stated that when one of his company's machine operators damages a facility, the company immediately reports the fact directly to the appropriate facility owner; there is no reason to call the notice center. The company has the phone numbers of everybody in Maryland. If it is a gas pipeline, the company notifies the appropriate company, tells it what has been damaged and where, and asks when help will arrive.

An electric-company panelist said the damage should be reported directly to the operator. He stated that the operator needs to know as soon as possible so it can get repair crews on scene. There is no reason for the notice to go through the notice center, as this just delays the operator's response.

A notice-center panelist stated that centers spend millions of dollars each year to promote a number to call for excavation safety and to promote the idea of calling before digging. It is not in the best interests of the operators to tell notice centers that they cannot take a damage request because that may be the last call that excavator can make. He said that a notice center, when faced with an excavator reporting damage, should take the request and walk it through. The center should not just send the request over the machine; it should call the utility involved and make sure the information is passed on as efficiently as if the excavator had called the facility owner directly. He said he knows that the issue has come up time and time again. He knows that different States have different procedures, and maybe it is something that should be left up to each State and each notice center individually. But, he said, he would hate to know that he had someone on the phone that had gas blowing and that he had told
the caller that he was not going to take the damage report, and that the gas would ignite because the caller has used his last quarter, so to speak.

A pipeline panelist stated his agreement with the notice-center panelist. He said he would suggest that where to notify of damage be an either or situation. In some circumstances, the excavator may know who the operator is and how to get in touch with him very quickly so that a response crew can be promptly dispatched. In other circumstances, the excavator may not have any idea about the identity of the operator. The excavator may not have provided notice initially and may have a situation that demands immediate attention. The notice center may be the only number to which the excavator has access, and it may offer its best opportunity for getting someone on scene quickly.

An attorney panelist stated that he believes that any contact with a buried facility by excavation equipment should be reported, regardless of whether the facility has been damaged. The concept of there having to be damage before a report is necessary allows a certain judgment as to whether or not some injury has occurred. Unfortunately, a nick or a tug can cause a coupling down the line to separate, which may not be immediately apparent to the excavator.

The attorney said that he agreed it is important that damage be reported, but he does not believe it is that important whether the report is made to the operator or to the notice center. If it is a life threatening situation, it could be reported to 911, so long as it is reported. Obviously if the report is not made to the operator, there needs to be an expedited call procedure to get those calls to the operator.

A notice-center panelist stated that her center goes as far as knowing which member operators want to be notified directly. If the operator wants direct notification, she tells the caller that the center will record the call, but that he must call the operator anyway. She added that there is no point in the group suggesting that a center not take a call, because that is not going to happen.

Another notice-center panelist said a notice center cannot turn those reports down. He said that there have been situations in which a buried facility was reported as being damaged, and the center notified all member operators. On investigation, other facilities were found to have been damaged too. Any time one facility has been damaged, it is possible that others have also been damaged; and it is important that all operators check their facilities. When the center is notified of damage, it contacts all members, a feat that no one else can accomplish as quickly as the center can. The center uses both automated and voice notifications, and it handles the situation as an emergency.

The facilitator expressed his agreement with the need to report any damage, but raised a question about the liability of calling to report damages. The notice-center operator panelist stated that liability is always possible but that the way to limit liability after damaging a facility is to take all necessary steps to prevent someone from being injured or the property of others from being destroyed. He stated that if he
had a crew that had damaged a buried facility, the first thing he would want the crew to do would be notify him so he could report to the appropriate places, including the notice center.

A pipeline operator said that his company does not support using the notice center as the first contact. Each incident is specific, and the needs of each operator to promptly know of the damage are specific. From his company's perspective, should the group recommend that the notice center be the point of first contact, then the group should also recommend that the operator be called immediately thereafter.

A communications-company representative in the audience said that he had seen many instances in which the excavator made the first report to the notice center and the center performed an excellent service in promptly transmitting the information on an emergency basis to the various operators.

A notice-center panelist said that the center's operators have received the same training as the emergency-call operators at the gas company. They know what information the gas company needs, and they ask the same questions.

The pipeline-company representative responded that each gas company facility and also each buried facility has unique characteristics. It would require a lot of training to cover each unique pipeline system that exists. Each caller can be asked generic questions; but in the case of an incident, very specific questions must be asked; and that is why some pipeline companies want the excavator to call the operator of the damaged facility first and speak directly to the operator.

A Federal-agency representative questioned whether the operator should be notified when the soil support for a facility has been undermined even though the excavation machinery has not touched the buried facility. After hearing several comments on the issue, the facilitator suggested that it is the excavator's responsibility to notify the operator when excavation activities undermine the facility's support.

An excavator panelist stated that he does not have enough people to check everything that is being done in the field. If an excavator bumps the gas line, he stated, he should call the gas company or repair the thing himself. The excavator has to do something about the problem because he does not want to come back a year later when something blows up and everybody is being sued.

A Federal-agency panelist questioned whether the excavator should call the pipeline operator if he exposes a pipeline. He noted that the excavator does not know how the pipe lengths are joined and, therefore, does not know whether the exposure creates a hazardous condition.

In response, the excavator panelist said that he has exposed pipelines daily without incident. He said that he is currently working on a project in Maryland. He has four crews working there in ten different locations. They have exposed pipelines there on several occasions, but they have yet to see anyone from the gas company. He said that he and the gas company met
on the job site before beginning excavation and went over the work plans.

Another excavator panelist said that any activity that might affect the integrity of the facility or any incident in which the excavation equipment has touched the facility should be reported. Reporting it gives the operator the chance to come out and inspect. He can decide what action to take by asking questions about what has been done. It is up to him to come out if he thinks there is a break. Most likely the operator will not come out, but by reporting the incident the excavator has given him the option.

A panelist suggested that the excavator should report any damage directly to the operator or to the notice center, especially if the excavator is from another location and does not know the area's operators. A second panelist suggested that, depending on the seriousness of the damage, the excavator call 911. Both panelists and members of the audience objected to the latter suggestion.

**Determining Facility Depth:** An excavator panelist stated that he would like some operators other than gas or electric ones to explain how to determine the depth of a facility. He said that he knows that it is a difficult situation, but that the gas and electric operators were the greatest impediment to getting a provision on depth in the bill passed in Maryland a few years ago.

A second excavator panelist said that he had previously worked for an operator and that he could confirm that it is next to impossible to provide the depth of a facility with reasonable accuracy. He said that the depth of a facility may vary significantly within the space of just a few feet. Operators really do not know the locations of their facilities, and they cannot tell how deeply they are buried, particularly in the case of older facilities. The instruments they use to locate the facilities sometimes can measure the depth exactly, but under other conditions, they may be 4 to 5 feet off.

A State-agency panelist said that when facilities are constructed, they are buried as little as possible, but that after they are installed, the operator has no way of preventing the road department or some other entity from lowering or raising the road surface. The operator cannot be certain of the depth from one year to the next. Consequently, most damage-prevention laws require that hand digging or a similar means be used to initially locate a buried facility.

An attorney panelist stated that it is necessary to know the depth of a facility only if the excavation is within the boundaries of the facility. If the excavation is outside the buffer zone, the depth of the facility becomes irrelevant. If the excavation is within the buffer zone, why, he asked, does the excavator need to know the depth? Is it because if he knows, for example, that the facility is 36 inches deep, he will be using mechanized equipment to excavate to a depth of 30 inches?

An excavator panelist said that if the excavation will cross the buried facility, he would like the operator to mark the facility location, to tell him what the line looks like,
and to tell him the depth at which the line is buried. On some occasions when he has not known the location of the facility, his employees have had to waste entire days looking for the facility by hand digging. Wasted days cost a lot of money and delay the project unnecessarily.

But, said the excavator panelist, if an employee from the facility is on the scene, he can tell the excavating crew that the pipe is about 5 feet deep and that the crew should use the backhoe to take the asphalt paving off first. He can also tell the crew anything else it needs to know to do the job.

An operator in the audience suggested that when an excavator has made a reasonable attempt to locate a marked facility by hand digging but has found nothing, he should call the operator to again come out to locate the facility. If the operator does not want to provide an approximate depth, then the least he can do is verify that the markings are correct before the excavator has to hand dig to extraordinary depths. Such burdens need to be shared, so let the operator verify that the facility has not been marked in error. Also, he said, the industry needs to continue looking at technology for improving the capability to determine the depth of buried facilities.

An attorney panelist stated that the group should not suggest that an excavator make a reasonable attempt to locate a marked buried facility. *Reasonable* is a judgment call, and the perception of what is reasonable differs greatly among people. For some, taking a shovel off the truck and putting it next to the wall may be a reasonable attempt. Then, there are contractors like those here today who seem to go to great lengths to locate a marked facility. If every excavator were like that, this meeting would not be necessary.

An excavator panelist stated that a standard should be established for the location of buried facilities in every new subdivision. The standard should specify the location and depth for telephone, cable TV, gas, electric, and every other kind of buried facility. There should be a requirement that location tape be placed over every buried facility before it is backfilled. Taking these steps would make conditions better for the business, and everybody ought to think about the improvement it would make in public safety. If a backhoe pulls up a piece of the tape, operations should stop right away. If the tape is placed a foot above the facility, the excavator has at least a shot at finding something before he damages it. It will never be possible to address the problem of facility depth until something is done to document new facilities.

A member of the audience said that she thought the purpose of this group is to help contractors, excavators, and operators work together. Again, she sees the group attempting to write laws, which is not the same thing as working together. She stated that she hopes the group will develop some type of recommendation that will help everyone do a better job of working together. She stated that in her State, excavators want better information about the depth of buried facilities. Their concern is, how far do they have to dig when they cannot find anything. Can this group make a recommendation that lets them know clearly whether they have made a
reasonable attempt to expose the facility and, if they cannot locate it, whether the operator has to come back and help them find the facility? The best recommendation is, if the excavator exposes the area without a power tool and cannot, after a reasonable effort, find the facility, he should call the operator back to help.

The attorney panelist said that the comment just made is most important. Perhaps the group should recommend that something be done between the excavator and the utility industry to develop a better system for determining the depth of facilities. The only alternative is the present system, which is, no one knows. Determining the depth of facilities is the next big problem that has to be confronted. Perhaps it can be solved only by having the industries come together to develop a solution.

A notice-center panelist said that her State has been looking to the future by encouraging the development of county standards about the placement of utilities. The group needs to recommend that the operator and the excavator work together to help develop standards so that in the future the depths will be known.

The IRWA panelist said that the idea of standard locations for all buried facilities is a good one, but that it seems to be a losing cause. There are more than 50 jurisdictions nationwide that will have to agree to a standard, and there are so many companies that will have to agree. Often, for economic reasons companies do not want to agree on a standard depth. A company that is the first to construct in an area does not want to pay for installing its facilities 48 inches deep when all it needs is 24 inches of cover.

The notice-center panelist stated that she is not advocating a standard for the country. What her center is doing is working with counties within the State to develop standard locations that operators now use and to establish them as a practice so they will not be violated by the various operators. It produces a working relationship so that people can agree that in new installations the utilities are going to go in a certain way.

A facility-operator panelist said that the operators of facilities have the same problems about the depth of facilities. Operators would dearly love to know the exact depth of every piece of pipe they have in the ground, because they probably expose facilities more than excavator do. The problem is, operators lay plastic lines in new subdivisions. The lines are usually in dirt. When it rains, the ditch becomes a quagmire. Construction vehicles drive over the ditch, causing the pipe to rise from a depth of 36 inches to one of 24 inches. Occasionally, the pipe floats right out of the ground. Even just 2 days after the pipe has been put in the ground, the operator cannot guarantee its depth. So 15 years later, although the operator has records showing the depth of the facility, there is no guarantee that the facility is still at the recorded depth. The digging community has to have technologic methods to determine the depth with accuracy.

A State-agency panelist said that the theme of this meeting should be the need for excavators and operators to work together. When they work together, damage is
minimized. Damage-prevention programs have to be a partnership. The responsibility is not something that belongs to one group; it belongs to all of them.

A notice-center panelist stated that changes in a facility's depth over time is not an exception, nor is it due just to development or road modifications. There are all kinds of natural phenomenon, such as erosion, sitting, flooding, and earth movements, that can alter the depth of a facility. The point is that establishing installation depth standards will not necessarily ensure knowledge about the depth of a facility. However, working together to develop the new technologies for determining the depth of buried facilities is a worthwhile undertaking.

**Operation of Excavation Machinery within Marked Areas:** An excavator panelist suggested that machinery should be allowed as required and as necessary once the buried facility is physically exposed and protected.

An pipeline-operator panelist objected to the proposal because it would allow the operation of excavation machinery within inches of a pipeline. Under Ohio law, any excavating within 18 inches of any facility must be done by hand. In other words, if the utility installs flags or paints the ground, then any digging within 18 inches of either side of the markings has to be by hand. He said that his company's policy is that there should be nothing but hand digging within 3 feet of any of its pipelines.

An excavator panelist took exception to the pipeline panelist's interpretation of the group's proposal, saying that once the marked facility has been located, meaning that it has been exposed by hand digging for 18 inches on each side, and once measures have been taken to protect the pipe, the excavator can begin to use machinery.

A lengthy debate ensued. Some said using mechanized excavation equipment within 18 inches of a facility is asking for an accident, and some said that it is safe to operate mechanized equipment so long as the facility can be seen.

A pipeline representative in the audience said that his experience with excavation equipment shows it is dangerous to use mechanized equipment near pipelines. He gave an example of an excavator using equipment to push dirt from beneath a pipeline in order to install another facility crossing the pipeline at a greater depth. He explained that the hydraulic systems on equipment do fail, causing loss of control, that rocks hampering the progress of the equipment suddenly give way, allowing the equipment to jump, and that other unexpected events can occur. Then the equipment damages the pipeline. He said that in Nevada, an excavator cannot operate mechanized equipment within 30 inches of a marked buried facility. He explained that the restriction does not apply only when the facility is being initially exposed, it applies whenever the excavator is working around the facility.

The attorney panelist said that the group is discussing a fundamental public safety issue and that there is real tension around the table. Excavators are saying that once they have exposed the facility and know its
location, they should be able to use mechanized equipment within the tolerance zone as long as they are careful. Facility owners are saying that all excavation in the tolerance zone must be done without mechanized equipment. He said his opinion is that the control of most mechanized excavation equipment is not sufficiently precise to guarantee that the machinery will not touch the exposed facility when the excavator is operating within the tolerance zone.

A notice-center operator observed that many years ago the problem was that lines were damaged because excavators did not provide notice; now the problem is that facilities are damaged after lines are marked because excavation within the tolerance zone is being done with mechanized equipment. Some laws have addressed the problem by saying that the excavator must hand dig within the tolerance zone; others have not.

A pipeline-operator panelist suggested that the group consider recommending that power excavation equipment be used within the tolerance zone only if the excavator has the consent of the operator.

An excavator panelist noted that disallowing the use of mechanized equipment within the tolerance zone means excavators have to hand dig large areas. He used as an example a facility that is 16 feet below the surface and crosses a 18-inch-diameter pipeline in a State that requires a 24 inch tolerance zone. He pointed out that the excavator would have to hand dig an 8-foot-wide trench crossing the pipeline 16 feet deep for a distance of 8 feet. It would also mean that the excavator could not use a boring machine anywhere within 8 feet of the pipeline, even if he were going straight down to China.

An excavator panelist stated that generally a pipeline-operator employee is present when the excavator crosses the pipeline. He stated that once the pipeline is exposed by hand digging, the pipeline employee reviews the work to be done. He observes the excavation, and he allows the excavator to use mechanized equipment within a foot or two of the facility. The panelist said that passing a law demanding that excavators do even more hand digging will make things ridiculous.

A pipeline panelist stated that the group appears to have gotten away from what it is supposed to be accomplishing. The group’s proposal seems to say that the excavator can use anything that is necessary so long as he determines where the line is. Maybe the group should add that the line has to be "adequately protected." But it is not a good idea to let the excavator determine whether the line is adequately protected. Also, the proposal is not addressed to the excavator. It is addressed to the people that are going to write the State laws. And it is questionable whether it is possible to adequately protect a facility that has been exposed. If it cannot be adequately protected, the excavator should not use mechanized equipment around it.

**Education Programs:** A communications-systems panelist stated that programs for educating others affect not only excavators but also operators, public-works departments, and many others. He said that the group has heard already from a
representative of the Union of Operating Engineers about a program it has for its members called Call Before You Dig. He also exhibited educational brochures, one of which is a part of the National Utility Contractors Association education program. He said that the Underground Utilities Protection Organization in upstate New York holds seminars that are open to contractors, railroads, and others. The seminars include videos and demonstrations. He said that proactive programs such as this are needed to get the message on protecting buried facilities to everyone.

A notice-center panelist said that it is her understanding that each work group is to address the educational needs of the profession that it is discussing, and that this group is responsible for looking at what the contractors can do to better educate their members. She stated that there needs to be a better connection between the groups. For example, if there is a program within a contractor organization, that group could allow the notice centers to present the Call Before You Dig materials. The contractor groups could share with the excavators the applicable parts of their training program.

The facilitator stated that the Association of General Contractors is a national organization that has 8,000 contractor members and a variety of associate members. It has 100 chapters; some give competency training on a variety of subjects, including trench safety.

An operator in the audience said that Consolidated Edison requires that any of its employees who engage in excavation have competent-person training and proof that they have attended the required classes and understand their responsibilities. He encouraged contractors to impose similar requirements on their employees. He stated that from an operator's perspective, contractors need to train their employees before they hire them, as does his company. Contractors should also re-train their employees each year so that they clearly understand the consequences of ignoring safety requirements.

A State-agency panelist stated that the way Virginia has tried to aim public education is through the statute. Virginia has established an advisory committee composed of operators, excavators, and various others involved with the damage-prevention program. The committee helps to combine the efforts of all in developing a unified public-education and awareness program. This helps the excavators, operators, and the notice center produce a standardized education program so that all are operating under the same ground rules.

A contractor panelist suggested that a company that allows others to train its employees might encumber itself with added liability should one of the employees become involved in a liability suit arising from a damaged facility. He also questioned having a notice-center employee provide the training because such training would cover only a small portion of the requirements and would represent them as the notice center views them, not as the contractor views them.

The notice-center panelist explained that the question of liability is always there. The training she is proposing is a much expanded program that covers using the
notice center and other areas, such as how to read and interpret the markings at job sites. The training would definitely benefit the contractor because he could prove that his employees had attended the required type of training. For example, a part of the training teaches excavators how to read the markings. Some people who excavate near buried facilities do not know the meaning of what they see or do not understand what the colors mean relative to their own safety. She stated that the contractor organizations with which she has worked have been very receptive to such a program, but that both the excavators, the operators, and the other people who are affected by buried-facility damage will have to come together to make it work.

She said that a three-pronged approach is necessary to really reach into the excavator community. First, help the owners of an excavating firm understand the benefits of providing notice. Convince them that it is to their advantage to not interrupt the services provided by the facilities. Second, to get the information to the owner’s foreman, give him training to help him understand how to make the best use of the notice center in accordance with the owner’s policies and with the State requirements. Third, to get to the grass roots, the people operating the excavation machinery, give them training on how to work under the program, on who is responsible if something happens, and on the necessity of reporting any damage to buried facilities.

Protecting Marked Buried Facilities: An operator in the audience stated that the group should not dwell on the specific actions that should be taken. Rather, he proposed, the group should consider recommending that contractors and excavators recognize the need to work with care around buried facilities and be willing to work together in developing proper techniques for safely performing the work.

An excavator panelist asked what excavators have to do to protect underground facilities. Do they have to take any and all measures necessary, including using the notice center, taking safety training, using competent personnel, and respecting the facility owners’ protective programs?

An electric-power representative in the audience recommended that excavators be responsible for taking reasonable steps to protect buried facilities: an excavator should be sure that he has left the facility with proper support and that it is not damaged during backfilling. Improper backfilling is one of the greatest problems, and the electric company does not always have a representative on site when the backfilling is done.

An excavator panelist stated that he hopes the members of the group recognize that they are making a recommendation not only to legislators, but also to themselves and the groups that they represent. He said he hopes that the members of the group take the stand that the recommendation for the excavators also applies to them when they excavate and that they need to work in close partnership with each other. The operators recognize there is a need to work together, and, for the most part, contractors and excavators know there is a need for a close working partnership. Yet, there is the element out there that is not working as it
should, and any word that comes from the contractor group will be beneficial.

A member of the audience pointed out that in the materials given to them at the workshop is a special study, *Prevention of Damage to Pipelines*, that was written 21 years ago. She said that the panel is going over basically the same items that are in the study. The panel is again offering unspecified solutions. Either the panel develops some convictions about and methods and vehicles for reducing damage and takes a stand on making improvements, or some other panel is going to be sitting here 22 years from now, and damages will have continued to increase or, perhaps, will have stayed the same.

A pipeline-company panelist replied that a tremendous amount of progress has been made in the last 23 years. He said that he is aware of the progress because he was at that meeting 23 years ago. The damage statistics make the progress evident. What the panel is doing here is trying to nail down the progress that has been made and set the direction for new progress to be made. Some people, however, believe that perhaps progress was too slow in the last 23 years, while others believe that the improvers were rather rash in their zeal for improvement; but overall, a great deal of progress has been made, and, the pipeline-company representative said, I think a great deal more will be made in the next 23 years.

Another notice-center panelist stated that the more information gathered on any type of project, the more information the notice center can give the operator. The operator wants to know if somebody is going to be there for a month, as opposed to a couple of days, so he can plan on having his employee there as well. The operator wants to know the type of project and how long it will last so that he can plan how to have his people work with the excavator.

An excavator panelist agreed that the projected time for completing a project should be given as long the statement is not used against the contractor. Weather can delay completion for 2 weeks or more.

The facilitator questioned whether providing the expected completion date has any bearing on the length of time the location markings are valid. He was assured that the two are not connected.
A State-agency panelist stated that regardless of the excavator's estimate of the duration of the project, in Virginia the excavator is required to call the notice center every 10 days to renew his notification. As a result, operators are made aware every 8 or 10 days that the excavator is still working in the area. Also, he said, his agency hopes that that the excavator and the operators work together on large projects to ensure that the buried facilities are not damaged.

A notice-center panelist stated that the State law should address the time frame within which a notification is valid—whether it is good for 2 to 10 days, 2 to 14 days, or whatever. Then the excavator will have to call the notice center again if the work lasts beyond the specified time. She stated that many of the State laws now specify a window in which the excavator must call before work is to begin. For example, the law might state that the excavator must notify no less than 3 days and no more than 10 days before the work begins. Such a law implies that the notification is good for no more than 10 days.

An excavator panelist agreed that the law should specify the time interval because it now is implied instead of specifically stated. He said that from an excavator's viewpoint, a definite time interval would simplify things. In North Carolina, the notification is good for 10 days. Actually the excavator must re-notify 8 days after he has notified the center the first time because he must notify 48 hours before he begins work. But that is not what the law says. According to the law, the location marks are good indefinitely, as long as they are protected, but the law says that they are good only for 10 days. This area needs to be specifically addressed.

Another notice-center panelist mentioned a State law that says notification must be given not more than 10 days nor less than 48 hours before the beginning of the excavation. Therefore, if the excavator begins the project after the 48 hours, 2 days have already lapsed. Then he has the other 8 days to complete the project. However, if the project cannot be completed within those 8 days, he has to again call the notice center within 8 days of the initial notification to meet the minimum 48-hour notification time because he can do no work legally after the tenth day.

An electric-company panelist said that the Florida law does not say for how long the notification is valid. Consequently an excavator does not have to provide periodic notices about long-term projects, so he can damage a line and tell the operator that he gave notice 2 months earlier.

A railroad panelist questioned whether the concept of a notice being valid only for a specified length of time can or should be applied to continuous excavation. He noted that railroads may be involved in continuous excavation because of their track maintenance or because they are dealing with mining operations.

A notice-center panelist said that the uncertainty created by various State laws is the reason the issue needs to be specifically addressed. Then the laws could provide for an annual location when there is continuous excavation on railroads or excavation in mines. She stated that she has seen the controversy generated when
the law is not specific. She said that it is really important from a safety standpoint to define the time interval within which a notification is valid.

An operator panelist stated that he would recommend also that the State law recognize the differences in types of projects. There is a significant difference between somebody placing a mailbox post and someone completing a sewer project, which affects entire neighborhoods. He stated that he does not have wording to recommend, but that State law ought to recognize that there are many different levels of activity and that they truly require different solutions.

A State-agency panelist stated that it is not a big problem to have a statute specify that the operator must be told how long a project is expected to last, require an annual notification in the case of a continuous excavation project, and define the length of time a notification is valid. However having the statute explain how specific types of excavation projects are to be handled will unnecessarily complicate the statute because everyone will want to include projects unique to his operations.

**Notification When Work Is Not Continuous:** A pipeline panelist talked about an incident that occurred weeks after his company had observed the excavator finishing a project and leave. The excavator had come back to the area to do other work and, because of his previous experience in the area, thought he knew where the pipeline was located. The panelist stated that this occurs way too often. He suggested that it might be a good idea to require an excavator to provide a new notification each time he reestablishes himself at a location rather than to allow him to provide an estimated time for a project and to then not have to again provide notice during the time of the estimate. Also, that way, the operator will provide fresh markings.

An operator panelist said that it is imperative that he keep his lines marked in the field. Therefore, it is imperative that he know that a notification has been updated. He said that when he receives an updated notification, he returns to the site to make sure that the markings are visible, that his stakes have not been moved, and that his flags have not been pulled out of the ground.

**Types of Location Requests:** An excavator panelist said that he has had a problem when the project gets moved to the other side of the road after he has provided notification. He stated that he cannot afford to shut down operations for 48 hours to wait for operators to locate their facilities in the new spot. He said that some provision needs to be made that will allow for a prompt response to a nonemergency request for location. He said that it is very, very costly, $2,000 to $4,000 a day, to have a crew and equipment not working. He would be willing to pay a reasonable fee for such an arrangement. Another excavator panelist agreed with the comment.

A State-agency panelist said that the Virginia statute provides for work-in-progress changes, but that the provisions will be eliminated when the new law takes effect on January 1, 1995. They will be
eliminated because too many excavators made their initial calls from the site stating that they had work-in-progress and needed a re-mark. Honest contractors made legitimate requests when a mistake was made or a change occurred. However, the less honest excavators were costing the operators millions of dollars each year because they would not plan ahead and made false claims with their notifications. Their dishonesty has hurt everybody.

A pipeline panelist said that he believes that something can be negotiated between the excavator and the operators when facilities need to be marked in less time than specified by State law, but it would have to be a subject of negotiation because the operator already has a large workload of location requests, and having to respond more quickly than the law specifies puts the operator in a situation much like that of the excavator who needs prompt location information on a nonemergency basis. The operator also has personnel problems, and his payroll is going on too.

A notice-center panelist said that according to Florida law, the notice must be given at least 48 hours ahead, but if the excavator gets clearance from the different operators in less than 48 hours, he can start the work.

A State-agency panelist said that Virginia has an operator information exchange system that is an interactive voice telephone system. After making the notification call, the excavator can call back as soon as he wants. If the center tells him that the operators have cleared the excavation, he can start work immediately. Under the law, the operators have 48 hours to mark their facilities. The excavator can call an operator, who will probably try to mark the facility more quickly. But the law does guarantee the operator 48 hours, which was the only way the legislators felt they could prevent the abuse experienced earlier with the work-in-progress calls.

A pipeline-company representative in the audience said that Arizona’s legislation provides for emergency locates. It does specify what constitutes an emergency, such as a condition that is dangerous to life, health, and property. The representative said, the law mandates that we have 2 working days to respond, but it does not mandate that we have to take the whole 2 days to respond. In practice, it is quite common for operators to work much faster to meet the needs of an excavator for prompt nonemergency markings. If the contractor has a legitimate reason to need an expedited locate, the operators do everything they can. The operators do this to maintain good relationships with the contractor, with the permanent entity that is running the job, and with the developer.

A notice-center panelist said she does not believe the group should be recommending that this issue be resolved by legislation. She said it can be resolved through the working relationship of the contractor and the operator. What makes it difficult is that there are some contractors who make emergencies a way of life. She said she has 16,000 contractors in her records, and she can report what their average notice time is and which ones would be most likely to abuse such a provision.

A second notice-center panelist said these types of requests are identified in his system; they are short notices and
emergency short notices, priority notices, and normal notices. He said that about 3 percent of each month's notifications are short notices about which an excavator has said he has a crew not working and he has to have the facilities marked in less than 48 or even less than 4 hours. Ten to 15 percent are priority notices.

The panelist said that many of the expedite calls are a tactic used by some excavators to jump in line in front of the honest excavator, and he knows it because the numbers are so constant. This dishonestly is built into the operators' schedules so that they can provide timely service to the honest excavators. However, he would hate to see a law establishing how short-notice requests have to be handled.

An operator in the audience stated that the group is, possibly, hung up on trying to make a recommendation for a State law. The group's task is to identify model programs. Perhaps all the panel needs to do is to agree about recommending that contractors, excavators, operators, and notice centers should work together to facilitate the needs of both excavators and operators in handling short-notice, emergency, design, and other types of requests. He said it is in the best interests of all organizations to be cooperative, and cooperation does not require a law, assuming that everybody wants to work more efficiently and economically.

A railroad panelist asked whether there is an established system for emergency location requests. He mentioned that the railroads need prompt locations after a derailment.

A notice-center panelist responded that the centers take requests for emergency locates when they involve an immediate threat to life, health, property, or the environment.

A pipeline representative in the audience stated that when his company is working an emergency gas leak on one side of the street and really does not know where the leak is, it notifies its sister operators in the city, and they FAX his company a copy of their maps of the area in question. Using these maps, his company marks the locations of the facilities of all the operators.

A pipeline panelist said the group should recommend that the State laws provide for a shorter notice time if agreed to by the excavator and the operators.

**Contractor Markings:** An operator in the audience asked the panel to consider recommending that excavators adhere to the standard color code for marking. He said that his company often sees excavators using orange, red, and blue, which makes things very confusing, especially when their markings intermingle with the operators' markings.

Another operator agreed and added that he has seen the public-works department using orange and white to mark items. A third representative mentioned that survey crews also use colors that add to the confusion.

The panelists and members of the audience then participated in lengthy discussions about the use of the APWA standard color code for all markings, about
whether the APWA should expand its color
codes to include other uses, about what
other colors or color patterns might be
used, and about many additional issues.
The panelists did not reach a consensus.
GROUP 4

Program and Administration

Facilitator
THOMAS BRACE: Minnesota State Fire Marshal

Panelists:
Phillip Becker, Utilities Consolidated, Inc.
Steve Blaney, New York State Department of Public Service
Glynn Blanton, Pipeline Safety Division, Tennessee Public Service Commission
David Bull, Loss Control Engineer, Aegis Insurance Services
Dr. Scott Gin, U.S. Department of Labor, Occupational, Safety, and Health Administration.
W. Wayne Jensen, S&E Contractors
Sam Johnson, Administrator for the Mississippi One-Call System.
Fred Joyner, Southern Region Director, Office of Pipeline Safety
William Kiger, Director of Pennsylvania One Call
Robert Legato, Staff Manager for Bell Atlantic
Kim Moody, Director of Blue Stake One Call
Pat Mullins, Director of Regulatory Affairs for Phillips Petroleum Company
Edward Ondak, Western Region Director, Office of Pipeline Safety
Gail Soares, Massachusetts Department of Public Utilities
Douglas Swaser, Northern States Power Co.
Tilford Vik, Enron Corporation
Robert Woodward, Safety Environmental Engineering, Inc.

RSPA’s Role in Preventing Excavation Damage: A Federal representative stated that the Office of Pipeline Safety (OPS) of the Research and Special Programs Administration (RSPA) is working on developing a national one-call system. Through its requirements in 49 CFR 198, the OPS is attempting to get the States to enact excavation-damage prevention laws that include a statewide excavation notification system. Section 37 establishes minimum requirements that a State program has to meet. He added that the operation of a one-call center must meet minimum standards as well. He said that his region is using a telephonic database to review the accident reports. Even though the greatest cause of pipeline damage is excavation damage, often there is a notice center, and it has been called. The question is, why did the accident occur even though the excavator provided notice? What
failed? What went wrong? Why did it go wrong? What can be done to keep this from happening again?

A second Federal representative added that 49 CFR 192.614 requires operators of gas pipelines to have written procedures on preventing excavation damage, including provision for educating the public and excavators about the procedures. Those operators must be able to receive notifications about proposed excavations and other associated tasks, much of which could be accomplished by participating in available excavation-notice centers. He stated that the OPS, along with the Safety Board, the American Public Works Association, and others, has been promoting damage-prevention activities for some years. He said that 9 of the 10 States in his region have underground-facility damage-prevention laws. Additionally, the OPS has promoted uniformity in the State laws and has encouraged States to incorporate aspects of laws from Massachusetts, Michigan, and Arizona that have been shown to increase program effectiveness. The OPS's role is one of setting minimum guidelines and encouraging State regulation and creation of one-call systems, rather than trying to tell each State how to run its program.

A notice-center operator said that the OPS does not need to encourage the creation of new notice centers because almost every State already has them. What is needed are minimum standards that all States can embrace to keep all parties working together. This will assist the excavators in knowing the ground rules for every State in which he works. The OPS should encourage the States to develop standards that meet agreed-on national guidelines.

A State representative stated that the OPS's focus is on protecting natural gas and liquids pipelines, leaving out a whole list of other operators that have certainly been reluctant to join—like water systems and sewer systems. So it will be helpful for RSPA to come up with ways to encourage facility operators other than pipelines to participate in a one-call system so that they are really and truly one-call systems.

A Federal representative stated that a couple of years ago Congress tried to give the OPS authority over excavators. The OPS felt overwhelmed by the proposal because it believed that it already had more responsibility than it was able to handle with the resources available to it. Because the OPS is about to be given more resources, it needs to again look at this issue. Additionally, the OPS needs to work more closely with OHSA and some other people and encourage them to enforce rules already on the books. OSHA already requires excavators to notify facility operators before beginning excavations.

The facilitator agreed, stating that the group's task right now is to identify what role RSPA should have. He stated that later the group would be asked to identify the role of the States. If the group understands the roles of these agencies, it can begin to understand what the solutions are and who is responsible for implementing them.

A representative of the Gas Research Institute (GRI) stated that his agency develops technologies and products and
that he believes the role RSPA might play is one of providing financial support to notice centers for experimenting with new technologies and products to learn how well they work and their applicability to a broad range of operating circumstances. Additionally, RSPA should have a role in providing financial support to excavators who use new technologies. He said that the GRI believes there are a number of actions that could be taken to increase the safety of excavating near buried facilities and to reduce the facility operator's operating cost—whether the facility is a telecommunications cable or a gas pipeline. He stated that RSPA has a legitimate role in encouraging technology transfer.

A communications representative said that it is important to determine why excavation-caused accidents occur so that industry can benefit from the lessons learned. However this task is important for all buried facilities, not just for pipelines that are regulated by RSPA. This role should be expanded to all of the areas in which Federal intervention or Federal participation could be utilized properly. Investigations should be done similar to those the Safety Board does of aviation incidents. Who is investigating the excavation damage that occurs on nonpipeline facilities?

A contractor agreed that the Federal Government's investigation of excavation-caused accidents should be expanded to include damage to all buried facilities.

A pipeline representative said that Virginia will soon be implementing an excellent, well-rounded new excavation-damage prevention law. It is directed toward the more global Federal involvement because the State legislature is apprehensive about giving one State entity, specifically a municipality, jurisdictional oversight of another State entity. At the very least there needs to be Federal oversight of State agencies where the State will not mandate participation for all operators of buried facilities and all excavators. The Federal Government must develop guidelines that, at the very least, provide leverage for State regulatory agencies in going to their legislature for modifications of the State program to comply with the guidelines. No State agencies should be exempt from the program.

A pipeline representative stated that his company has been following the progress of proposed excavation-damage prevention legislation in 26 States. One problem being observed is that the State, in many cases, does not have the authority to force local government to do certain things. Even though the States may agree that no local agencies should be exempt from the program, the constitution of a State may prevent it from imposing its will on local governments.

Consequently, such States are hoping that the Federal Government will take them off the hook by imposing some sort of mandate. Thus the success of the excavation-damage prevention legislation will not depend on a State's ability to force local governments to comply.

A notice-center representative asked what the group is trying to achieve. Should there be oversight of a program—a State program; and if so, can it be effective? She
said that if this is the question for the group, then the group should also address how the oversight program can be effectively administered.

The facilitator agreed with the comment and added that he thought that the group needs to identify the level of government being addressed and to determine whether Federal oversight will empower the States. He said that the group should try to distinguish the Federal role from the role of a State or other type of government.

The notice-center representative asked about the roles each of the players have if a notice center is effective. What role does the local government play? What role does the State government play? What role can the Federal Government play in helping to prevent damage?

A State representative stated that when RSPA comes into a State to review the its program, RSPA is evaluating what the State is doing to comply with 49 CFR 198. If the State is not moving toward adopting the standards, the Federal Government penalizes it by allocating less money to the State's fire-code safety program. The real problem is the lack of a program that encompasses all contractors and all utilities. The municipal and the water and sewer systems are dragging their feet on participating in the program—not just gas operators but telephone and water system operators, as well. Participation and program enforcement seem to be the real issues. The group needs to discuss how a State should enforce the existing laws.

A Federal representative stated that if the States were able on their own to have the types of programs that the group has defined, there would not be a need for a Federal role. But the problem seems to be that many States, and there are exceptions, are unable to mandate participation. They do not have the power to enforce participation in the program. Every State but one now has a program. There probably are more good features in all of those programs than there are bad. But the problem is that that every State legislature has a list of exemptions, whether it is the ranchers in Texas or the State departments of transportation in Alabama and Kentucky, or the water companies in another State. The States want help with this problem. They are saying, give us a Federal law that mandates participation from all and provides broad general minimum criteria for us to meet, but give us the flexibility to run programs that meet specific needs in our State.

The Federal Government should provide some funding for education, particularly in the start-up phase, and, maybe, manage a national education program. The Federal Government should also review State plans for damage prevention to ensure that they conform to the Federal guidelines.

State-Agency Role in Preventing Excavation Damage: A State representative said that a State's role is to monitor the damage-prevention program to ensure that it is effective in protecting buried facilities. The problem with most of the one-call legislation that is on the books today is that it does not apply to all of the
buried-facility operators. His State’s laws apply only to the gas-distribution companies and the transmission companies. They do not apply to electric, water, or cable TV systems. The participation of those companies is voluntary. This is the real issue, because a one-call program will not work if companies do not participate.

A notice-center operator agreed that State oversight is important and stressed that there are some comprehensive programs that now are reducing damage through both oversight and enforcement. She said that effective oversight at various levels helps prevent damage.

A Federal representative stated that most States do not require all excavators to provide notice. Also they do not require that all buried-facility operators participate. Most States require participation only from the operators of gas pipelines, and that is because of OPS regulations. All operators of buried facilities and all excavators should participate in the State excavation-damage prevention program—and not just by calling when they excavate, but by being members.

Another notice-center operator said that the group has to develop a list of items that are essential for a State program to be effective. He said the group has touched on a few of them, and it has talked about comprehensive participation. Universal participation from the buried-facility community, as well as from the excavator community, is necessary. The group is talking about preventing damage to the infrastructure, whether it is telephone, subway, whatever. It is not just a gas pipeline. It is not just a liquid pipeline that can hurt a lot of people. Even disruption of service to the property owner is an important component that needs to be considered. The group is charged with developing a program; one that it believes, based on its experience and knowledge, will be effective. So the basics have got to be, what is an effective program? There must be a piece of legislation on a State level that solves the problem. In order to get that, the Federal Government must legislate that the States have the responsibility. The effective one-call notice centers—which is probably 80 percent of them—can all be approved to continue functioning as they are. The centers need to standardize, to bring universal participation to both sides of the fence. If the centers cannot do that, then it is time to get out the stick and say, okay, it is time to follow the guidelines, folks.

Many of the problems that are occurring, such as the accident at Allentown, Pennsylvania, are happening because people are not following requirements. The contractor did notify before beginning excavation, but he left the job site. Under Pennsylvania law, if a contractor leaves the job site and comes back, he has to call again. This contractor left for 19 days. Before he left he had exposed the gas line and dangerously left it dangling in midair. When he resumed excavating, more than 2 weeks later, he hit the line. It separated, and 82 people were injured. Clearly, excavators need to be trained. There are effective tools—contractor associations and utility associations—and that is where the training needs to take place.
The Federal Government should then consider funding the development of programs that these associations implement in their normal run of business. It is the natural way to do it. It is a network that is already there. You do not have to recreate the wheel. You start with what you have, and you move forward with standards and universal participation. The mandatory participation, which Pennsylvania has had since 1987, only works for those that are included. It is crazy to exempt the State department of transportation, municipal entities, railroads, and people looking for natural resources.

A consultant said that the group that is crafting the Virginia law supports mandatory participation on the part of all buried-facility operators, but that the provision had met with strong opposition. The net result is that there are only two exemptions: the State department of transportation and the city of Tidewater. Had the legislative session been longer, it is likely that many others would have been

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exempted. The item that sold participation by all is a provision that buried-facility operators that do not participate have no liability recourse should an excavator damage the operator’s facilities. The consultant stated that he, as the States’ rights advocate, has a problem with calling for Federal oversight because that means Federal control.

An insurance representative stated that from his company’s standpoint it is not the excavation community or the buried-facility community that should be required to participate in excavation-damage prevention programs. Rather, the community as a whole needs to be involved from the State level. He stated that Federal oversight is needed to force all the States to have an effective damage-prevention program and to develop an education program—a training program much like the one he uses to teach his kids about seatbelts. The pervasive seatbelt laws and programs are effective. No one with a 3-year-old can get in a car these days without having his child tell him to put on his seatbelt. We have to educate people in our age group, and we are the hardest group to educate and to get to participate in this program.

A pipeline representative said that the operators of interstate pipelines look at this workshop as an opportunity to develop national guidelines. The companies assume that there is going to be some sort of Federal minimum standard, that Congress will enact the standard, and that RSPA will be assigned to oversee it. The companies recognize that the States are going to run their own programs based on some minimum standards. Each State with which his company does business has a different way of doing things. In Texas, the people have a problem with permitting administrative penalties. So, the group needs to find a way in Texas to meet all the general requirements by amending the law so that there can be administrative penalties. Some States have certain exemptions that need to be overcome by helping the municipality fund their participation. Texas has been anticipating Federal legislation, and a legislator in Austin put together a group of buried-facility operators that has been meeting to study the Federal minimum requirements to determine how they will be dealt with in Texas. People in Texas are talking about how Texas law may have to be changed in order to get mandatory participation. They are talking about what works best in terms of bringing the excavators in. They are talking about requiring educational programs to suit all the needs of the public. The pipeline representative asked the members of the workshop to think in terms of guidelines that can be promoted after the workshop.

The group needs to develop guidance to help those in Wyoming and South Carolina with working on their one-call bill. The group needs to produce what this national forum thinks are the best general guidelines that should be implemented, guidelines that will influence State legislatures in developing their programs. The group should not just think about the Congressional bill because the one-call bill is separate from running the program. If the program is not well run, it will not matter how well written the one-call bill is.
A communications representative stated that the most crucial role the States can play is that of enforcing penalties. A State agency needs to be induced to enforce the penalties by allowing that agency to recover at least the majority of the money collected in penalties.

A State representative suggested that a portion of the penalties collected by an enforcing State agency should be given to the notice center to use for publicity.

Another State representative talked about a problem with allowing the enforcing agency to keep the penalty money. If the program works, the penalty money will decrease. Soon the agency will lose its funding source and, ultimately, the ability to monitor the program. Legislatures are not prone to saying because you are doing such a fine job we are going to provide additional funds to make up for your loss in penalty money. It does not work that way. So the better an agency is at making the program effective, the less money it receives; and it becomes counter-productive to an agency that keeps the penalty money.

An insurance representative stated that the group needs to develop programs that can get everybody in them. Then it is necessary to find ways to get the small plumber and the small master-meter facility operator into the excavation-damage prevention program at a minimal cost to them and at a great benefit to them and to the rest of the community. The group should be working on how to get all of these entities into the program. A minimum standard sets a very low level of acceptance, so the group should think in terms of a minimum standard that is so high that it will be very difficult to do more than the standard.

A notice-center operator stated that she believes that the Federal role should be limited to establishing programs and mandating participation from all. The oversight and enforcement, however, is better managed at the local level. Once comprehensive guidelines and mandatory participation have been established, the oversight activities will take care of the remaining needs. This is better managed at the State level. Each State needs to have the freedom to select the oversight agency that is going to best meet its needs. In one State, it may be an OPS; and in another, it may be the fire marshal. Deciding according to the needs of the State rather than accepting a dictated decision from the Federal Government encourages the community to get involved in the programs. The Federal level may dictate a guideline that says there should be oversight, but it is up to the State to determine where that oversight is best managed. And at that point, things become complicated because the constitutions of some States disqualify some agencies from overseeing. So Federal involvement should be limited to mandating participation and to proposing guidelines for a model damage-prevention system. Federal involvement should not include designating oversight.

Program Participation: A notice-center operator stated that there has to be mandatory participation from all. The question is, what is it going to take to achieve mandatory participation? There are two elements: buried-facility owners and
excavators. The only way to get total participation is to have the Federal, State, and local levels require it. The group has not talked much about the local level, which is as important to the program as the other two levels are. She said that Arizona has a comprehensive program that has mandatory participation, excluding Federal agencies, because the State law does not apply to Federal activities. Consequently, 90 percent of the State is exempt from the program because of the Indian reservations and military installations and other Federal properties. Pipelines go through those exempted areas. The local level is very important, because mandatory participation affects such activities as car dealerships that plan to bury a fuel tank and rental car agencies that have fuel lines at the airport. Such businesses do not know anything about this law. And the only way they are going to find out is if the local government enacts ordinances that inform them when they go in for permits.

Likewise, excavators need to go to the local government to get some type of permit, and they too learn of the necessity to notify of planned excavations at the time they get their permits. Those three levels of government represent our community. In some way or another, they have to work as a partnership for representing us as citizens.

One of the most effective ways of enforcing the program requirements is education. The penalty needs to be sufficient to capture the attention of somebody who is not willing to cooperate with the program. But education has to go along with it. And quite often in these programs, the agency that is enforcing the penalty will waive the penalty if the individual or company goes through an educational program. So quite often, although an agency might be able to collect $2,000, it waives the money in order to foster cooperation and long-term relationships. The agency will say, "Okay, you seem very reasonable, willing to incorporate some good damage-prevention techniques into your safety program or your ongoing work program. We will waive those penalties if you go through an educational program." So penalties may not generate as much money as might be expected.

The facilitator asked whether it is the Federal Government that causes everybody to participate.

The notice-center representative responded that she thinks the States have already done or are doing everything they can to encourage participation. But a true mandatory participation program is impossible without the help of the Federal Government. Otherwise, Federal facility operators and facilitators do not have to participate.

A Federal representative said that one of OPS's frustrations is that for years it has been required by the Pipeline Safety Act to make the States promote underground utility damage prevention. Even so, very often the entities that either oppose the State law or lobby to be exempt are the State departments of transportation, Federal agencies, and municipalities that operate buried facilities. He said that in a conversation with the Secretary of Transportation, he told him that it is inconsistent for the Federal Department of
Transportation to be encouraging and promoting excavation-damage prevention programs when most of the opposition comes from State departments of transportation. Our Associate Administrator has met with the Federal Highway Administrator (FHWA) to discuss this problem, but the FHWA Administrator expressed concern about altering the FHWA's relationships with the State departments of transportation. The Federal representative said he was being candid about the problem, not trying to air any dirty laundry. But it is a problem that has got to be recognized. If you keep exempting people, it will never be effective. So, we need somehow to say, "mandatory participation without exemptions."

A State representative talked about the need for mandatory and comprehensive participation—not just participation on the part of the local governments. In Oregon, he said, it was necessary to actually use the State attorney general to enforce the excavation laws against the capital, Salem. Salem had two near misses and was fortunate that the State capital was not blown up. The Commission sent a bulletin to all Oregon municipalities saying that the State would bring the full authority of the attorney general to bear to force them to conform with the excavation laws. The Oregon program excludes lines that are completely on private property on the theory that the State is not able to effectively impose its excavation laws on private property. Oregon uses education programs funded from penalty money. The speaker said that he appreciates the catch-22: that a successful program means less penalty money and, therefore, less ability to enforce the program. But the State thinks a lot of these funds could go toward an education program. Additionally, Oregon favors requiring excavators to attend education programs in lieu of paying penalties, particularly if the excavator community pays for the education program. Oregon strongly urges that tracer tape always be installed with nonconductive piping and that its color be consistent with the national color coding standards.

A notice-center operator said that it is very easy to exempt a facility that is providing service only to the facility operator. But if the facility leaves the operator's property, as gathering pipelines do, it seems reasonable for the operator to know when somebody plans to excavate near the facility. Sometimes one department of a pipeline company on the refinery property digs into its own line because it did not tell the other department of the planned excavation. He stated that he has three notice-center members from one refinery because the telephone-related, electric-related, and pipeline-related employees do not talk to each other.

A water-and-waste-services company representative stated that his company belongs to a notice center. Even though the company participates, which is quite costly, its buried facilities are still damaged by excavation four to six times a day. He stated that his agency deals with several small municipalities that operate their own water and waste-water programs, which are on a shoestring budget. It is his opinion that with the new Clean Water Act regulations and the EPA regulations on waste-water discharge, these small entities are already
strapped for operating money and cannot afford paying into a one-call system. He stated that he believes that is why a lot of municipalities will not support the excavation-damage prevention program. It is cheaper for them to let somebody hit their structures and have the contractor pay for the repairs. He stated that with water and waste-water systems, there is not the same concern about safety as there is with pipelines. Unless there is a cave-in, not a lot of people will be hurt. Consequently, the participation of water and waste-water systems is not a front-burner safety-related item; rather it is a money issue. But if the Federal Government forces them to participate, they will be even more tightly strapped for money.

A State representative stated that he has seen many ways notice centers adjust their fee schedule to make participation less costly for municipalities, even though they generally do not incur much cost to start with. Additionally, it is cheaper for the municipalities to pay membership fees for many years than to replace a major water or sewer line, even without considering the valve of the service loss to citizens or the environmental damage that may be caused by rupturing a sanitary sewer line. A cost-benefit analysis will justify the participation of municipalities if the analysis includes the cost of disrupting the community. If a city recovers the costs of damages from the excavator, his future rates are going to reflect what he has to pay for damages.

The facilitator stated that the reading he did to prepare for the workshop indicates a seven to one ratio in terms of the cost of belonging to a one-call system versus a philosophy of just let them hit my facilities and I will repair them.

An insurance representative stated that exempting some operators because they are too small or because all the facilities are on the operator's property weakens the program. An example is the use of seatbelts. If people are allowed not to wear their seatbelts at work, soon they do not wear them when they are not at work. So coverage must be universal. As an example, should a rancher be exempt? Ten years ago a Texas rancher was installing a new barbed-wire fence on his own property, using a gasoline-powered auger. He ruptured a 1,100-pound-per-square-inch propane line that lay between two visible pipeline facility markers and incinerated himself and all the workers in about a 100-square-yard area. According to the news last night, a water line just down the road from here was damaged by a third party, and water service for thousands of people was disrupted. It is not possible to justify exempting people from the damage-prevention program.

A gas- and electric-system representative stated that her company keeps statistics on the damage its contractors do. The company bills the contractors for damaging its gas lines while excavating. If there are recurrences, the company warns the contractors to be more prudent or risk losing it as a customer. The municipalities are the excavators that cause the most damage. When they are excavating or when they repairing their system, water can get into the company's gas lines because it operates low-pressure systems. When water gets in, it can interrupt gas service to...
the company's customers, in additional to stopping service to water customers. Even so, the city will not do anything about the problem because it is a mandatory participant in the one-call. Although Ohio law includes penalty provisions for those who do not notify, the provisions have never been enforced.

A notice-center representative said that a conservative statistic that notice centers have developed is that 65 percent of the excavation notifications are generated by buried-facility operators and their excavators. For the most part, notification centers are self-serving systems. They are for facility operators to conduct their work. Although there are people involved that are not facility operators, it is a self-policing system.

**Statistical Database:** An excavator representative stated that he was becoming concerned that the group was focusing on disasters, rather than focusing on comprehensive damage information or the relationship of damage cost to participation benefits. He questioned whether data is being collected that really shows where the problems are. He stated that he is not sure that anybody has a strong basis of historical data to help focus the group’s energies on what needs to be done.

A State representative stated that many buried-facility operators collect excavation-damage and cost data on their facilities. Tennessee is encouraging those operators to begin to record the damage by the excavator who caused it so that all damage-prevention program participates can know which excavators are repeat offenders.

Another State representative stated that in Massachusetts, all buried-facility operators must report within 30 days to the State commission any excavation damage that occurs. Each and every break gets reported into a data base. The records show the damage done to all electric, gas, telephone, and cable TV facilities. The gas pipeline statistics are the most reliable because Massachusetts can levy a fine against a gas pipeline operator for not reporting.

Another notice-center operator stated that Connecticut collects excavation-damage statistics, as does the American Gas Association. None are all-encompassing. The Pennsylvania notice center receives damage notifications, so there is some information, but much damage is not reported. The Connecticut notice-center members are supposed to report the damage on a form, but only one company out of 1,300 actually uses the form on a regular basis. However, there is no requirement to report excavation damage to any central location. Everybody should report this data. Excavators report to their insurance companies, and that data is certainly available from the insurance companies if they are willing to provide it.

An insurance representative stated that his company has both types of information—information about damage below the deductible limit and information about damage above the deductible limit. Many of the excavators the company insures regularly call with information about damage just to put the insurance company
on notice. The cost of the damage may be within the deductible, but the insurance company still has on file that damage has been done. The company is trying to clean up some 20 years of claims, some 20,000 claims; and maybe next year, the information will be available.

A State representative stated that some notice-centers keep statistics. In Northern Virginia there are monthly meetings at which participants submit lists of excavation damage.

A contractor representative stated that the reason data is needed is to help program management focus on the areas of greatest need. The notice centers know who is properly using the one-call systems. They know, in most cases, who the five greatest misusers of the system are for any regional area. But they do not know whether the same five misusers are the excavators that are causing the most damage. What data support the statement that people not calling the system is still the biggest problem? It would be well advised to base programs on data rather than drama.

A notice-center operator stated that according to AT&T reports, 88 percent of its excavation damage results from the excavator not providing notice. The Miss Utility program has been studying the causes of damage on an ongoing basis, and it has found that 60 to 70 percent of the damage occurs when notice is not given.

An excavator representative said that perhaps damage control is easier than it seems. If buried-facility operators demand that their contractors use the notice centers, 60 percent of the problem might disappear.

A notice-center operator stated that he believes that a detailed look at damage statistics would show that the damagers are the "mom-and-pop" entities that have a backhoe and excavate as a part-time job.

The excavator representative stated that it is definitely true for the nonutilities that the mom-and-pop excavators are the primary cause of damage. He said that reports justify that conclusion and that the reports could be given to the workshop participants.

Another excavator representative said that a really informal study of who cuts lines indicates that plumbers installing service lines are the biggest culprit. The plumbers are mom-and-pop operations who have no education or training. They do not know what a notice center is and who does or does not notify. But what can be done to fix the situation?

An insurance representative stated that damage reporting is important. As shown over the last 20 years, the Department of Transportation has looked at incidents that are in a disaster category and found that 50 percent or more are caused by third-party damage. He said the workshop is being held because that number has not decreased in the last 20 years. It has stayed at about 50 percent. Edison and Green River, Wyoming, are just two very visible examples in recent months, but they are all part of that 50-percent number that nothing seems to lower. He said, therefore, data must be collected.
A pipeline representative stated that he believes that facility operators will police that part of the activity independently. When operators join notice centers, there is an incentive to keep track of what is going on. And when those problems continue, there are mechanisms in place to bring the problems to the forefront and cause an action to take place.

Another pipeline representative stated that the State needs damage statistics to monitor the effectiveness of the damage-prevention program. However, the group should talk about whether a Federal agency should establish the data to be reported so that there will be uniformity and the data from one State can be compared to data from other States. The group needs to define the program and decide at what level the monitoring will occur.

A pipeline representative said there are two problems: Until now the only real data is on the pipeline side, and even that is limited to reportable incidents under Part 191; the nonreportable incidents are monitored by the pipeline companies themselves. As for other buried facilities, it is possible that they are not monitored anywhere.

Another pipeline representative stated that his company does keep data, and it shares it with other utilities. It gives the company an opportunity to take a look at its in-house people and to educate its contractors. The company knows that it has to clean up its own doorstep before it can expect others to clean up theirs. The problem is not really that excavators are not calling. The problem is what they are doing on the company's facilities while they have them unearthed. And that is the focus of the education that the company is doing now. It all relates back to data that the company tracked and communicated with other facility operators. The company knows which of its excavators need the focus. They are the ones that are getting the attention, not only from the board of directors of the notice-center system, but also from the State OPS. And it is teamwork—facility operators, the OPS, and also the excavators. Surprisingly, once an excavator is hit with a $5,000 fine or whatever, the word gets on the street pretty quickly. And that is what is working in Minnesota. Excavating, contracting, and construction associations need to become involved.

A Federal representative stated that the level of third-party damage, or excavation damage, has a plateau. The level does not go down. Why? There are programs out there that are obviously not working. The group should figure out why not. If the group can capture elements of programs that have worked, it would know how to administer the programs that do not work.

**Enforcement:** A Federal representative stated that the most effective programs are the ones that have assigned specific enforcement authority to an agency, rather than to the State attorney general, who may say that he is too busy to handle this type of issue. He has other issues. Arizona, Massachusetts, and others have had a real level of enforcement.

A pipeline representative stated that OPS's position is that enforcement should be done
with administration and civil penalties. The actual process varies from State to State in terms of who can do it, but most incorporate in the enforcement process ways to use the less stringent enforcement mechanisms. The enforcement process may be housed within an OPS or other agency charged with running the pipeline-safety program. Also, the law generally includes authority to take cases to a court. Swift administrative penalties can be imposed without going to the attorney general of each State.

A State representative said that in Ohio the proceedings are initiated by the Commission. When the investigation is open, the staff prepares an investigative report and files it. The staff is represented by the attorney general's office. In a sense, the Commission staff acts as a prosecutor and has the burden of proof. Under an Ohio law that went into effect last year, the Commission may directly assess a forfeiture. If it is appealed, the attorney general will represent the Commission before the Ohio Supreme Court. If after the court rules, a problem with compliance forces the State to go to court, the attorney general will also represent the State. Some here have suggested that enforcement of the damage-prevention program be a self-policing partnership between the utilities, excavators, and the regulatory body. But such a concept has no place. The Commission is the regulator and has specific responsibilities that are dictated by the Federal regulations and by Ohio standards, which are in addition to the Federal standards. The operators have no enforcement role. It is up to the Commission to decide whether to initiate a gas-pipeline safety proceeding and whether to cite a party. It would weaken the effectiveness of the Commission's program to include facility operators as partners in the process. The panelist said that he sees nothing wrong with fostering operator or excavator compliance through self-policing mechanisms, and that that should be encouraged. But it would be wrong to include those entities within the enforcement process.

An excavator stated that the group should not be emphasizing enforcement to the detriment of education. He said that the group should get to discussions on education because education can eliminate the need for enforcement. The group should get to the cause of the problem and work on improving that.

Another excavator stated that this program will be going way beyond the realm of gas-pipeline safety and the existing regulations that are already in place. The group is talking about getting electric and telephone companies involved. Virginia would not have been able to pass the legislation that it passed without assurances from the State Corporation Commission that it would establish a peer group to review and actually assess the penalty that was then enforced by the Commission.

**Education:** An excavator stated that one of the most difficult things he has had to do is to get the notice-center people, the buried-facility operators, and the excavators to sit down at the same table and discuss excavation-damage prevention for the State. But they agreed that they had to get
rid of the references to "you and me, them and us." They agreed to begin discussing "us," collectively. Although not easy, when they got over that hurdle they were able to develop some workable programs. They developed training programs that are jointly administered by both the notice center and their members, as well as by the contractor/excavator association and their members. It is almost a 50-50 deal. Probably some participants on both sides still are not happy with the outcome. One of the things that made it rewarding is there was so little discussion about enforcement and control, but so much discussion about the implementation of the program and who is going to do what, who is going to pay for it and how it is going to be spread around, and how all facets will get equal representation at the seminars. A lot of contractor organizations and a lot of contractors were really willing to sit down and talk some common sense about enforcement and about the implementation of the excavation-damage prevention law. Those in the construction industry were able to point out a number of flaws in the notice-center procedures. And together everyone worked out a better notice-center program in Virginia. Education has to be an equal and joint effort on the part of all parties.

A notice-center operator said that the education program needs to be directed to specific parties. One party is the person who is moving the earth. Next, the locator and the people who are involved in the locate process need to be educated. Then there is the person looking at the records, who actually goes into the field to do the locating. Others are homeowners, the public as a unit, contractor and buried-facility operator associations, regulators, municipal governments, engineers and designers, and buried-facility operators.

An insurance representative stated that the program should be divided into specific subjects. Why do we need a one-call program--a damage-prevention program? The next part is, how do I use a one-call system? What will happen when I use the one-call system? What are my responsibilities as a member of the community to a one-call system? And that is the program the group should be stressing here. The program should be taught to all--to everybody in the community. And the way to present it in the high school is different from the way it should be presented to the State association.

A pipeline-association representative stated that the notice center has two purposes. One is to prevent damage to buried facilities, and the second is to make sure that the system works. When excavation is planned, the two parties, the facility operator and the excavator, get together to talk about how to avoid damaging the facility. However, more important initially is education. It would be helpful also to have education at the zoning-board level because, at least as far as oil pipelines are concerned, one of the biggest problems is encroachment. Many of the local government zoning boards are not aware that pipelines have dangerous facilities out there, and the boards allow building to be too close. So, it would actually help if the one-call system educated the zoning boards to avoid encroachment. As a result,
there would be no digging to begin with in the area of the pipeline.

The group then listed subjects that should be included in the education programs. Some were:

- Why have a damage-prevention program?
- What is a one-call system?
- How do I use a one-call system.
- What happens when I don't use a one-call system?
- What happens when I do use the one-call system?
- What is an emergency, and how should I respond?
- What are the benefits of using a one-call system?
- What are the penalties for not providing advance notice of excavations?
- What is excavation under the law?
- How can planning and design engineers use the one-call?
- What are the responsibilities of the buried-facility operator?
- What are the responsibilities of the excavator?

A State representative said that the education program should also be used to educate lawyers and judges. Quite frankly, he said, what often happens is that the people who are responsible for adjudicating complaints related to the program have little or no knowledge of the program or of its public-safety purpose or, for that matter, of the fact that a law about preventing excavation damage even exists.

**Incentives for Participating in Excavation-Damage Prevention Programs:** An excavator stated that there should be some positive incentives similar to the lower premiums for workman's compensation offered if the work place is drug free. Perhaps excavators could get a 5- or 10-percent discount in their insurance premiums for participating in damage-prevention programs.

The facilitator concurred, stating that enforcement has been described as a negative incentive; thus, there should be some positive incentives in this program. The group then listed positive outcomes as follows:

- Prevent injuries.
- Enhance safety.
- Save time and money because one call will notify all.

The excavator stated that there should be some up-front incentives, such as reductions in insurance premiums, for active participation in the damage-prevention programs.
The insurance representative stated that positive but enhanced safety in a model program is only a set of words that has no absolute meaning, because safety cannot be regulated. Safety cannot be legislated. It is possible to pass a law that says everybody will have enhanced safety. It may not be possible to pass a law that says that the insurance carrier must give a discount. He said that his company and many other companies do give clients a discount for belonging to a one-call program.

A State representative said that Nebraska’s new law grants a degree of immunity from liability to someone who complies with the regulations. She said the immunity is a very strong incentive for participating in the program. It is a little different from a hold-harmless clause.

Another State representative questioned whether the term hold-harmless means that a facility operator or excavator who causes damage will not be penalized as severely if he reports that he is responsible for the damage. If that is what the term means, he said, he does not like the concept. What about a case of excavation damage that results in an explosion that kills people and causes massive property damage? Just because the responsible party calls immediately after causing the damage, should his penalty be reduced? Perhaps it is possible to provide positive incentives that will encourage excavators who report damage to preserve the infrastructure.

An excavator stated that the group should consider incentives to help excavators pay for locating equipment so that they can confirm the validity of the operator’s location markings. Thus the excavators would be able to keep track of the locations of buried facilities after the marks are obliterated, and they would be able to doublecheck the validity of the original marks. He suggested that lowering the insurance premiums for excavators who have their own locating equipment would give them an incentive to buy the equipment.

A notice-center operator said no piece of locating equipment will locate everything. One instrument may locate most metals in certain soils, but a completely different process is necessary to locate plastic pipe. Actually, he said, contractors and excavators are buying their own locating equipment for their own protection. However, training an excavator to locate all types of utilities is too complex. More is required that just the best piece of locating equipment. The process for locating each type of facility is very different. So an excavator would have to train his employees on locating electric, gas, water, sewer, communication cables, and others.

A State representative said that excavators who have been trained in using locating equipment are going to be less motivated to notify of the planned excavation because they are going to feel that they are the experts. Also, many operators would not like having excavators locate and mark buried facilities because of the liability issues.

A Federal representative stated that one way to involve the excavator is to have him mark the excavation area on a construction
site with white paint or flags. That would
save everybody a lot of trouble. The buried-
facility operators would have to mark their
facilities only in areas of proposed
evacuations. The incentive would come
from operator policies of excusing
excavators from paying for the damage
they have caused when the facility is not
where, according to the location marks, it
should be.

An excavator representative said that a
powerful way of enhancing safety is making
locators meet with the excavators while
they are locating, instead of allowing them
to just put a mark on the street and leave.
The contractor industry would like to see a
requirement that the locator be on the
excavation site with the contractor when
any of the following types of facilities are
being exposed: high-pressure lines,
hazardous lines, communication cables,
electric cables, and underground facilities.
There are high-pressure gas operators right
now that will leave their locator there while
the gas line is being exposed. The locator
will not leave until the excavator has back-
filled the facility and done it properly. Some
electric-system operators will do the same
thing, but some will not even put anything
but a mark on the pavement and leave. The
fiber optics operator should have someone
on site when the facility is being excavated
because it is very expensive to damage it.

A State representative stated that it makes
her uncomfortable to include a hold-
harmless clause in the program. She said
that in Massachusetts an excavator who
breaks something is required to call.

A pipeline representative said that it is very
difficult to have locators at every
excavation. It is a physical impossibility for
many of the pipelines—particularly the
interstate ones. His company, for example,
gets 4,000 calls a day in New Jersey. So,
while most companies try to have someone
at the excavation site during excavation,
requiring them to do so is not something
that the operators can endorse.

Panelists’ Concerns: A Federal
representative said that Arizona has a blue
stake program that is probably one of the
best programs in the country. Nebraska
also has a good program. The group should
study the two programs to figure out which
parts work and add whatever is necessary.
The result could be defined as the group’s
program, and then the group could
determine how to get the program
implemented. Should it be done on a
Federal, State, or local level? How should
its effectiveness be measured? There is no
need to reinvent the wheel. There are
elements already in place that have
obviously worked in some areas, and in
some areas they have not worked. The
group should define the elements that have
worked and the elements that have not
worked and go from there.

A State representative said that almost
everyone in the room knows the problem
areas of existing programs. The problems
are obtaining mandatory participation and
developing effective enforcement.

A Federal representative said that 60 to 65
percent of the excavation-caused damage
is caused by people who do not participate
in the State damage-prevention program or who do not provide notice of planned excavations. The program in Arizona has a method of dealing with those who do not participate or do not call the notice center.

The facilitator summed up by saying that the group has already discussed the elements of an ideal program. However, it appears that some members of the group would like to look at existing programs, highlight the elements of existing programs that work, and also highlight some of the problems that need fixing or correcting. Then, from actual real-world experience, the group will decide what a good State program is.

An excavation representative stated that the program needs to include incentives that encourage excavators to comply. One incentive might be helping an excavator obtain insurance credits because he has produced a good damage-prevention program. Excavators should be included as team members, rather than as adversaries. If a program includes only mandatory participation and enforcement, the excavators will always be at odds with the operators.

A second excavator representative stated that mandatory participation is a must to make the damage-prevention program work. He stated that he is certain that there will be some exemptions. However, if people try to make this program work the same way that the OSHA program works, there will be tremendous problems with excavators. Excavators view OSHA as being there to penalize them. Enforcement is the last thing to look at. Some type of enforcement is necessary, but look at education as the first level of enforcement. The excavators should welcome mandatory participation. The biggest problem confronting mandatory participation is the facility owners. All buried-facility operators should be in the program.

A Federal representative stated that his greatest concern is whether excavators, buried-facility operators, notice centers, and government representatives will continue to communicate and work together as they have at this workshop. Personal experiences tend to make people take opinionated positions and oppose good ideas or programs because of one or two small items on which they disagree. The digging community needs to continue working together in the spirit and interest of public safety. The community has advanced without meetings of this nature, but excavation-damage programs have really just started to blossom, after more than 20 years of effort. At this meeting, the community has surpassed the progress of those 20 years because its members chose to sit down and communicate. The digging community should not be so concerned about there being a Federal role that it throws the whole thing out and says it does not support it because it does not want the Feds interfering in States' rights. That is not the Federal intention; rather its intention is to give the assistance members of the community need to get the job done in their States in the way they want it done. He said he is concerned about some members asking for an incentive to participate. It sounds like they are saying that they are waiting for the government to prove that it works. The incentive ought to be that they
and their employees will not get hurt and that they can save some money because participation is cost effective. Through participation, insurance costs will come down. In one State an insurance company gave every municipal operator that joined the notice center a 5-percent reduction. Contractors' insurance premiums are usually based on experience. And if the contractors can show that they have these safety programs in place, insurance carriers will adjust the premiums.

An insurance representative agreed. He stated that the group's definition of a program calls for education, incentives to participate in the program and use it, mandatory participation by all, and specific definitions for the State and Federal roles. He commented that his concern is whether the group has the courage to carry it through.

A State representative stated that she wants the group to make participation mandatory for everyone within the operator and excavator communities, even homeowners.

A notice-center operator stated that she is concerned that the people who have to do these jobs are the excavator, the guy out in the field on the backhoe or the shovel, and the facility owner-locator, whether he is contract or in-house. And the balance between those two parties is the key to the program. As long as the requirements of a facility operator and the excavator are equal and parallel, the program will work. It is when the responsibility of either becomes heavier than the other's that there is difficulty in accomplishing the goal, which is preventing damage. So the most important thing at the local level is that the requirements of the program are equal on both sides, that both parties are equally responsible. And those are the two parties that the group should concentrate on, and nothing else. There is nothing in Arizona's law that makes someone call a one-call center. But everybody does. What the law says is that there is a notification process and a response process. And that is what the group has to concentrate on in its guidelines at the national level. The notice center is a tool and provides services that are needed and required by communities. When the community raises its requirements, the one-call center follows suit to assist its customers in meeting those requirements. It is diversity that makes the program better. When one notice center comes up with a new idea, it shares it, and the idea is implemented where appropriate. If the digging community is over regulated or over restricted, it will not have the incentive to do that any more, and sharing is what makes business exciting.

A State representative stated that he does not agree with universal mandatory participation. The participation of excavators, homeowners, and such can be handled through the correct definition of the term excavation. Enforcement of the program requirements is definitely needed. However, to make the program work, teamwork with the utilities, excavators, and such is necessary to make enforcement policies work. There needs to be a good guideline or rule on how enforcement is to be implemented. The designers of the program need to take a look at the excavator's compliance, and the program
needs to include education for people who are not abiding by the State statute. Homeowners need to be educated about the program. Many millions of homeowners know absolutely nothing about what a notice center is and what the operating procedures of buried-facility operators are. Enforcement and education programs can be enhanced by forming a committee of excavators, buried-facility operators, notice-center representatives, and State officials with responsibly for enforcement to advise about program improvements.

A pipeline representative said that much of what the group has been addressing is applicable to urban rather than rural areas. The group forgets sometimes that there are hundreds of thousands of miles of facilities in rural areas. He stated that it is important to remember that the group is not talking about just inside the city limits. It is talking about all over the country. These requirements will affect every facility operator of an underground facility. He said that his primary concern is the mandatory universal participation without any conditions for exemption because he does not believe it to be a practical or reasonable requirement. He said that it does not matter whether it is called an exemption or put in the definition of excavation or a facility operator. There has to be some level of reasonable exemption in this requirement. Participation needs to be based on risk, and risk-based criteria should be used to define the level of exemption. He stated that the program administration needs to be as streamlined and simple as possible, with a minimum of government oversight. Additionally, the program needs to be sensitive to the fee requirements or cost of the system to small entities, be they local, government, or mom-and-pop facility owners.

A Federal representative said his concern is that programs already have education, mandatory participation, marking, and notice centers that appear to be working; yet buried facilities are still being damaged. How is it possible to get everyone to use the notice centers?

A communications representative said that he also is concerned about requiring universal participation. How is it possible to get the homeowner to notify? What about an interstate pipeline company that takes the position that only a Federal agency has jurisdiction over it? There needs to be some geographical definition to define jurisdiction by the State over the interstate lines for excavation-damage prevention requirements and enforcement. Education is probably the key element, and funding for education can and probably should come from whatever fines are levied. A significant percentage of whatever fines or penalties are levied should go back into education. Finally, data collection—the group is asking why are things going wrong, where are the problems, and so on and so forth. Some folks have said that they know where the problems are. That certainty, in his experience, he said, is a sign of doom for a program. The person who knows where the problems are is not looking at the whole situation. The local jurisdiction needs to have some kind of a review process that will identify problem areas, and the areas need to be targeted for solution.
A Federal representative said that he favors universal participation in a notice center. He observed that the group keeps talking about how to make the program effective, and it keeps talking about enforcement and education. Of course these two go hand in hand. He said that the education concept needs some teeth, such as a means of testing whether people who attend training gain at least a minimum understanding of the program and of the need to comply with it. Those who do not should attend a class until they can demonstrate that they have learned the basics. This should be required of both the excavator and the operator. He stated that in his experience the problem is not only one for the excavator, as some operators never identify the buried facilities in the area of proposed excavation. This goes to the earlier question of why facilities continue to be damaged. The penalty provision still needs to be specified and enforced because people who elect to take the risk of not complying and are unsuccessful should be economically affected.

A Federal representative stated that most State laws include four basic exemptions: agricultural surface cultivation of the soil, homeowners excavating with nonpower tools on their own property, State departments of transportation, and county road commissions performing routine surface maintenance without grade change and excavations during emergency conditions. There have to be some alternatives to universal mandatory participation, and one of them has got to be program flexibility to meet local needs and to work out problems associated with such work as county road grading and such continuing excavation projects as mining and cemetery work.

A notice-center representative stated that a major problem that can be corrected through education is that people often do not know about the program's policy and procedures. They have got to have the rules. It is possible to have to cope with the following situation: an agency can decide on its procedures and then change them so fast no one knows about the new ones. The agency that has oversight should be required to publish and distribute its policies and procedures.

A communications representative expressed his support for the concept of no exemptions. He then expressed his concern about having to mark the location of water- and sewer-service lines to individual residential customers because of the high cost of marking versus the small chance that the customers will be exposed to danger or disruption of service. It has to be possible for the municipalities to afford to participate. He stated that his company is a major underground-facility owner in a five-State area that currently receives well over a million locate requests a year. That is expensive, depending on what type of technician his company dispatches. The hourly cost can be between $38 and $60. Some say that homeowners get a free ride by not having to be members of the notice center, but they do not. They pay the cost of telephone and other buried-facility services, which reflect the cost of supporting the notice centers nationwide. So exemptions benefit the homeowner and rural America as well. He talked about the case given earlier of a road grader going
down a gravel road in rural Missouri. The grader could be working every day that the weather permits. How many employees would Southwestern Bell have to dispatch in front of this road grader operator, one of six in that county, to stay up with his requests? How many additional employees will have to respond every time a homeowner sticks a shovel in the ground? Some exemptions are necessary. The issue needs to be discussed.

An excavator stated that he has done a large amount of excavation on rural water projects where there were many pipeline gathering lines and other unknown buried facilities. These lines are, he said, in all honesty, not as hazardous as a lot of people think. Not only Phillips but no one knows where these lines are. They were laid years and years ago, and they were laid everywhere. It is nothing to jump 20 or 30 lines a day down in that country. The excavator does not want to record and document all of his notifications because he does not even know where the pipelines are located. A lot of people do not understand this up in this end of the world. But in the rural end of the world, it happens.

A notice-center representative responded that there is a counterargument to the one just expressed. Some excavators encounter unknown lines that no one acknowledges owning. Arizona has developed a program to identify unknown lines. The State tests the lines to determine whether they are still active and what type of materials they carry.

A notice-center operator expressed concern about equitable and economical assessment of notice-center fees. She stated that the costs of operating one-call centers do vary from State to State. Depending on the type of rate structure that a particular group of people may be using, the cost can be extremely high. For example, in one State, if one never gets a call, one never gets a bill. If one gets one call, it is 50 cents. In another State, one may have to pay $6,000 a year, even if there are no calls.

A pipeline representative stated that an operator does not only pay for receiving calls, he pays for identifying and locating facilities, an expensive proposition if the operator is in a remote location. He stated that his company generally supports the inclusion of many of the lines, but there are others in the pipeline industry who are strongly opposed. Consequently, it is important that the group come up with a reasonable, program so it can get support from a broad base of facility owners, excavators, and other parties.

An excavator representative stated that his industry understands that the gathering system lines are on private property. But excavators want anything in the right of way or in easements to be included in the one-call system.

A communications representative stated that his company did not support the recent Federal bill. The communications industry wants one-call legislation. It wants the States to be able to enforce penalties and get everyone’s attention, including that of the communications industry because the industry is in many cases its own worst enemy. Its own contractors are probably
some of the worst offenders. The industry wants the bill passed, but it needs some consideration for its customers. Its customers cannot afford the costs if there are not going to be some exemptions. So, please consider the exemptions, not only for the pipelines in remote locations, but for all the other utilities. Additionally, the group needs to consider and work with the municipalities to give them a program that they can afford so that they will cooperate.

A pipeline representative stated that a risk-based framework for determining which facilities must be included in the program is needed. No matter what the Federal bill says, State programs will vary. Texas will not have complete coverage, but perhaps Massachusetts will. It is not possible to pass something that is going to suit every State. So the stakeholders in each State are going to have to decide how universal participation will be. There is no way to define a program that will economically meet the needs of Texas, Wyoming, Massachusetts, and New York. If there is a stronger environmental interest in the Northeast than there is in west Texas, then that will be reflected in the State legislature’s decision. He stated that he believed that the group is on the right track in calling for flexibility in the notice-center procedures.

A State representative stated that he has problems with recommending that there be a certification program for operator personnel who locate facilities. He said that when he thinks of certification, he thinks of an education program whereby operator personnel annually receive training about their responsibilities and then are tested to ensure that they understand what is expected. It is also necessary to define which people are going to be covered by this program; and often with these programs, someone who does not comply is disqualified. That approach at times can invite litigation, especially if an employee is removed or fired from his position because he does not meet certain requirements. Another problem with certification is, who is going to administer the program? Is it going to be the Federal Government, the Department of Transportation? Is it going to be the States? Will it be the local governments? Is it going to be the facility operator?

A pipeline representative stated that he can understand the idea of a certification program in terms of wanting to have some level of assurance that the people who are out there are competent and know what they are doing. In the gas industry and, probably, in most of the other excavation-affected industries, a company by contract requires its contractors to comply with OSHA and Department of Transportation regulations where applicable. So to a large extent, the monitoring of the competency of contractors is developed through contract. In many programs that his company has, the company audits contractors for competency. So to a large extent the competency question should be covered. The question really is one of how do you test the competency of these people because you could have a contract; but if they do not abide by it, and if you are not there to supervise, you do not know whether they are complying with OSHA regulations or not. It might be more appropriate to put in some advisory
language that says, encourage competency reviews of contractors' excavation practices. The question is, do we want to give it a little extra emphasis in this program, a little more focus on excavation?
SECOND PLENARY SESSION

WORKSHOP GROUP REPORTS

Moderator: It is Friday afternoon, and I have some good news. We will have a copy of all of the reports that you are going to hear from our facilitators. The reports are being copied at this moment. Our first report will be from the notification-center group, and Bob Chisholm will make that report.

Group I—Notification Center

Bob Chisholm: In the past 2 days I have enjoyed the exchange of information, and I think any time I can exchange information with people, it makes me a better person. I am an engineer by training and license, the general manager of a one-call system by occupation. I am a Canadian by birth and citizenship, and perhaps that is why I was selected to facilitate this workshop—I am a foreigner.

The charge to our workshop was to reach consensus—not unanimity—consensus on the essential elements of an effective one-call system. Now I will use the terms interchangeably—one call system and one call notification center.

In an effort to provide some focus, I proposed and the panel accepted that we consider the essential elements of an effective one-call system within the context of what must be, what should be, and what could be. We are here in the interests of public safety and the preservation of the integrity of our underground facilities and to provide input for damage-prevention strategies and initiatives. I think we have to remember that we are a partnership. We must recognize that damage prevention has no ownership. It has no citizenship. It has no birth certificate. It is each of us. It is all of us.

Responsibility for preventing damage to buried facilities is not restricted to the excavation community or to the operators of buried facilities. In addressing the elements of an effective one-call system, we have considered the expectations of excavators, as well as the expectations of the facility operators. Unfortunately, we did not have the opportunity to put our findings into any sort of order.

We started out by defining a one-call system. We used the current Utility Location Coordination Council definition in its one-call system manual, which states:

A one-call notification system is a communication system established by two or more underground network owners or operators to provide one telephone number for excavators, be they contractors, homeowners, utilities, public agencies, or others, to call for notification of their intent to use equipment.

And I have a problem with restricting it to equipment for excavating, tunneling, demolishing, or otherwise disturbing the
subsurface of the earth. This below-ground protection system provides participating members with an opportunity to identify and mark their facilities in the vicinity of a proposed activity. The notification also allows the owners of underground facilities to provide any necessary information about the facilities and to post a construction watch, if desired.

For a one-call system to be effective, we agreed, the following must occur:

- All owners of buried facilities must register their facilities, except owners of private facilities restricted to their property and their use.
- All excavators must use the service. No exemptions.
- There must be proactive public-awareness, education, and damage-prevention activities that incorporate a board spectrum of available opportunities.
- Each one-call system must have a specifically defined geopolitical service area that has no overlap with other systems.
- The system must be accessible, toll free, and nationwide.
- The system must have hours of full operation that are compatible with those of the excavation community and must make provision for 24-hour access.
- All incoming calls must be voice recorded. The voice tapes must be retained according to applicable statutes.
- Each caller must be provided with a unique ticket number for each locate request and be given the names of the facilities operators who will be notified.
- The system must be able to provide a printed copy of any ticket for a period of time determined by the applicable statute of limitations.
- Facility operators must be given timely transmission of excavation notifications.
- The system must be able to provide regular statistical, financial, and administrative reports.
- The system must allow input on operational procedures from facility operators and by excavators.
- The system must have documented operating procedures, human-resources policies, and training manuals.
- The system must be user friendly to the entire excavation community.
- The system must be cost effective.
- The system must promote recognition, awareness, and acceptance of the responsibilities of facility owners and excavators, and the system must provide a user's guide.
- System members must have formal agreements.
• The system must verify data submitted by facility operators.

• System operations must be sufficiently flexible to allow incorporation of local requirements.

• System computer and communication systems must be sufficiently flexible to accommodate growth and change.

• The system must be capable of accepting and processing locate requests within the locally accepted advance-notice period.

• The system must tell callers about any limitations on its service or the system. If the system has special knowledge about its abilities, the system has a duty of care under law to tell all callers.

• The system must accept and process short-notice priority and emergency locate requests.

If you look at what we agreed that a notification center should have, you will see that we are saying that one-call notification systems are not static organizations. They are constantly evolving. They are constantly adopting technology as it is proven to benefit damage-prevention systems.

Centers should:

• Not charge excavators for reporting planned excavations.

• Have a contingency plan for operating under emergency conditions and for returning the system to normal operation afterward.

• Foster cooperation and enhance relationships between the excavators and facility operators, including developing a means of communicating the actions that the operators take in response to requests.

• Communicate regularly with system users to determine and maintain the quality of the service as a way of making the system acceptable to its users.

• Employ mechanisms to reduce over-notifications.

• Be governed by a nonprofit organization.

• Be able to track the origin of locate requests by such categories as member, contractor, homeowner, and municipality.

• Work cooperatively with agencies and associations that have mutual areas of interest and concern, including membership in one-call systems international.

• Actively participate in local utility-location coordination and damage-prevention committees.

• Have proactive management.

• Provide for machine-readable notifications and toll-free FAX access.
Also, we considered what notification centers could have that would help to reduce excavation damage. These items are pushing the limits of technology as we understand them today. Some one-call centers are working at this level; but many, if not most, are not. Centers could:

- Have 24-hour staffed operations.
- Accept and process locate requests for design purposes.
- Manage damage-incident databases.
- Facilitate an appointment plan for the scheduling of locators.
- Include protection of aerial facilities.
- Provide contract locating services.
- Provide for no-locate-required responses.
- Provide cellular star numbers for no-charge access to the system for those using cellular phones.
- Provide remote entry of notifications by major users.
- Provide a system of interactive voice tracking on locate status to give excavators a positive response about location-request status.

I would be very remiss if I did not take the opportunity to pass information from this group to the operator-of-the-buried-facilities group. That group needs to address positive response, records of abandoned facilities and location of facilities on private property—not just homeowners, but shopping centers, apartment complexes, exhibition grounds, hospitals, and universities.

On a personal note, I would like to throw out to the group some responsibilities that I attribute to the excavating community. It is responsible for recognizing the inherent dangers in disturbing the ground. It is no longer reasonable for excavators to expect to be able to use mechanized excavation equipment without doing their homework. They need to request that homeowners and operators of buried facilities identify and mark the locations of their facilities before the facilities are disturbed. They need to hand-expose buried facilities that may be in conflict with the proposed ground disturbance before using mechanical equipment. They need to dig prudently to minimize the effects of ground disturbances on buried facilities and to safeguard both their workers and the public. And they need to report to the operator of a buried facility any damage caused or found.

As for the operators of buried facilities, experience shows that they have not always done the best job they could in recognizing their responsibilities to excavators. Operators should install facilities in accordance with accepted practices and governing regulations. They need to respond in a timely manner to excavators’ requests for locates. They need to develop an awareness of and respect for the excavating community’s concerns and the constraints under which it operates. They need to generate respect from the excavating community for the integrity of their buried facilities. They need to maintain accurate and up-to-date as-built records of
both active and abandoned facilities. And, they need to become proactive in damage-prevention activities, including registering facilities with the notice centers.

**Group 2—Buried-Facility Operator**

**Paul Devaney:** I certainly appreciate the opportunity that you have given me to work with a fine panel in this unique forum. The opening of communication is part of the process that we are trying to achieve. The buried-facility-operator group disagreed about some issues and reached consensus about others.

- We agreed that the American Public Works Association’s published guidelines for uniform temporary markings of underground facilities should continue to be the recognized marking code. The APWA code is based upon a lot of good research, including the average person’s ability to distinguish among colors. However, the code needs to make provisions for other buried facilities, such as reclaimed water systems, which may be a major new facility in the future.

- We agreed that facility markings should include identification of the facility owner. This is not being done in all areas today, but we found that it can reduce confusion and also aid people in recognizing the different facilities, especially when there are multiple facilities in an area providing the same type of service.

  We agreed that buried-facility operators should notify excavators if they cannot meet their marking obligations. Operators should make a reasonable effort to notify excavators that they do not have any facilities in the area of planned excavation. It is going to require a partnership approach from both excavators and operators to achieve this communication objective.

  Some innovations are now being made to improve communications between excavators and operators, such as notice centers having electronic mailboxes similar to voice mail. The group did not believe that a positive response to locate requests would be required in all situations, such as when notice centers advise excavators of the identity of operators that have facilities in the area of planned excavation. After the time for marking has lapsed, an excavator who does not see facility markings for each operator name provided earlier by the center should easily recognize that something is amiss and that he should report his finding to the notice center to learn what might be wrong, rather than begin excavating. The markings might have been removed or destroyed by children or vandals.

- We discussed ways of improving communications between facility operators and excavators. We discussed the use of FAXes, beepers, voice mail, and cellular phones. Which of the various means is used is not important; rather, it is more important that we determine a means of improving an operator’s ability to communicate with excavators and to then use whatever means is specified by the excavator.
• We discussed the optimum/minimum response time for marking facilities. In reviewing what exists now, we found that some States allow 24 hours, some allow 48, and some allow 72. We found that no one timeframe fits the needs of all operators, excavators, and notice centers. The group concluded that the timeframe has to be determined locally to best meet the majority of individual interests.

• Next, we addressed the question of marking accuracy. State laws now establish marking tolerance distances of 12, 24, 18, and even 36 inches. Again, we found that the actual distance established is not as important as the facility operator's and excavator's understanding of the tolerance zone. The group recognized that the accuracy of the location marks can be affected by the type of location equipment used, soil composition, rock conditions, and other possibilities. The group recommended continued use of the existing standards, combined with educating operators and excavators on the prevailing tolerance zones, as the best solution.

• The group decided that State statutes should define the term emergency so that operators, excavators, and notification centers will all use the same definition. The group also agreed that the facility operator should advise excavators about the actions to take, including notifications, in an emergency. Some feel that all emergencies should be reported to 911; however, many facility operators want the first call about damage to be to them. The group suggested that each facility operator should establish and publish for use by excavators procedures on emergency notification and provide information on what actions the excavator should take and what actions he should expect of the operator when emergencies occur.

• The group discussed whether excavators should be told the depth of a buried facility. The answer was a unanimous no. Generally, it is not possible, even with location equipment, to determine with reasonable accuracy the depth of a facility, and although the operator may know the initially installed depth, that depth likely will not be accurate in today's environment due to road- and land-surface grade changes made by developers, road departments, and others. When it is possible to use location equipment to determine the depth with reasonable accuracy, the depth is accurate only at the specific location tested and does not account for changes made in the direction of a facility to avoid conflicting buried facilities at the time of installation.

In discussing the operator's role in educating excavators, contractors, and the public on using the one-call notice center and on working next to buried facilities safely, the group agreed that the notification center should have a program for teaching people how and when to use the system and for encouraging people to use the system, both nationally and at the State level. Individual operators also should have education programs that support the one-call system and provide facility-specific protection information.
The group also suggested that individual excavators, excavator associations, and companies that insure operators and excavators should also share in the training of excavator employees and the public. A means of determining the effectiveness of the education and of providing feedback for improving educational programs needs to be developed. The group also recommended that any operator or other entity providing education on damage prevention and the use of the one-call notice center should be coordinated centrally, preferably through the notification center.

- Examples cited to show the need for central coordination include programs that have published the wrong telephone number for the center and have incorrectly defined the area covered by the center. The group emphasized the necessity of excavators ensuring that their employees possess adequate competence for safely excavating in the vicinity of buried facilities. The excavator's competence needs to be ensured, either through completion of a specified level of education on protecting buried facilities or through a certification process.

- Operators need to use clearly identifiable and appropriate materials to mark the locations of their facilities. While this may be accomplished through many marking methods, operators need to be aware of public concerns about marking graffiti, as I call it—that is, large areas of new roads and sidewalks being marked even for very limited excavations. One means of limiting the need for extensive marking is to require excavators to pre-mark with a white color the area of actual excavation. Then facility operators need mark only those facilities that lie within the pre-marked zone.

- Operators should be required to update their maps whenever a facility is exposed and its location is found to be incorrect. The group consensus is that a responsible facility owner will require that mapping errors be corrected, not only when an excavator finds a mistake, but whenever a mistake is found.

- The group agreed that all buried-facility owners should be fully participating members in the notice center and in the State excavation-damage prevention program. Participation includes more than participating in the notice center, it includes being a full partner in all damage-prevention efforts. The notice center is but one part of the effective overall damage-prevention system that is needed in this country today.

- The group also discussed the longer term need for cooperation and coordination between facility operators and excavators. It agreed that operators should support and attend preconstruction meetings for major projects. Additionally, excavators may need to reconfirm excavation notifications through the notice center periodically if an excavation continues for weeks. This will allow facility operators to periodically re-mark facility locations.
We also discussed the best means of marking the locations of customer-owned segments of buried facilities, such as yard lines. The group’s consensus is that the facility owner should accept responsibility for marking those segments up to a predetermined point, such as up to the customer meter or other agreed-on location. However, the group questioned whether this action is sufficient and whether not marking the entire facility is equivalent to putting the facility owner’s interests above that of public safety. The group could not reach a consensus on the latter question, but several operators agreed that their companies would locate the entire service line if possible if it were not for the additional liability they might incur by doing so. Connecticut requires facility operators to mark customer-owned lines; however, although the marking is done in the appropriate color, it is done in dotted lines to distinguish it from facility-operator lines. The facility owner’s liability is either completely negated or significantly reduced because the excavator then recognizes that the best possible information was used to approximate the location.

The group discussed customer education and the best way of reaching the excavating public. The group suggested that the customer needs to recognize that buried facilities, such as outdoor lighting, fuel lines to gas grills, and other buried customer-owned facilities, need to be marked when excavation is to be done on the premises. And we felt some training could be accomplished by distributing educational materials to stores that sell home-building and modification materials and by encouraging operators of home-building stores to include in their promotional materials information encouraging home owners to learn the locations of their buried facilities.

Another means is encouraging building-supply stores and manufacturers of outdoor appliances to provide marking tape with the appliance. They should also supply the customers with instructions on how to bury the marking tape above the pipe or wire used to supply energy to the appliance.

On the question of what to do about abandoned facilities, the group recommended encouraging buried-facility operators to maintain records and to mark their locations at the time active facilities are marked.

The last area we discussed was pre-marking. While a controversial issue, the group believed that pre-marking should be encouraged for projects in which it is practicable and that excavators should use white to mark the area of proposed excavation. The group felt that by knowing the area of the proposed excavation, the buried-facility locator would be able to concentrate his efforts on the specific area of concern and, consequently, do a better job of marking. Also, there would be less marking graffiti, which is objectionable to community residents.
Group 3—Responsibilities of Excavators

Brian Deery: First, I want to thank the panel I worked with. We had an excellent group of people who came into the meeting with open minds and the willingness to cooperate. We plowed through the agenda, and I think we came up with some good recommendations. And I also want to thank the Safety Board for having this timely and useful conference.

Our panel recognized during our deliberations that the notice centers around the country need considerable flexibility, and we defined our role more as coming up with recommendations and guidelines than as being prescriptive. This appears to be the best way, as we found that every time we thought we had the best way, there were at least five people in the room who stood up and told us that the method did not work in their States. Consequently, we tried to develop broad recommendations that could potentially work everywhere. For the most part, we had a consensus that was pretty nearly unanimous. There were a few issues about which I do not believe we could ever get unanimous agreement.

- Which excavators should be required to report proposed excavations to the notice center? We agreed that no excavator should be exempt.

We listened to the panel members and the members of the audience who gave various reasons why railroad maintenance and ongoing operations, such as mining operations and cemeteries, should be exempted. No matter what we tried to do to define some way of coming up with exemptions, we always came back to the point that it seems that exempted activities are what cause much of the damage and that exemption from State

Robert Chisholm, Paul Devaney, Brian Deery, and Thomas Brace (left to right)
laws is more a political decision than a policy decision.

While the group recommends that there be no exemptions under any circumstances, we decided that each State should have the flexibility to decide whether it wants to tolerate exemptions within its boundaries.

- What actions constitute excavation? After due discussion, we decided that the definition of this term should be left to the States.

- We agreed that pre-marking makes a lot of sense. And we had somebody from Maine who spoke very eloquently about how successful it has been in the New England area. But again, it was one of those issues that the more we got into, the more people came up with examples of situations in which pre-marking is not practical.

We decided that the practice of pre-marking the proposed excavation area has been demonstrated to enhance the safety of excavation activities, but the States will have to decide whether they want to require it. We believe that having this national group highlight the need for pre-marking will encourage States to look at the issue and decide for themselves.

- The group recommended that any time damage might affect the integrity of a buried facility, the damage should be reported. Any contact with the buried facility, whether it be a gas line, a water line, or a sewer line, should be reported. The excavator should not assume that the contact with excavation equipment has not caused damage. The contact should be reported to the facility owner so that he can determine whether the facility has been affected.

The group also discussed whether buried facilities sustain damage when heavy construction equipment is moved over them or over the ground adjacent to them. We decided that even when equipment does not come into direct contact with the facility, the movement of heavy equipment near the facility can affect the integrity of the line. If it is a gas line, the equipment could break the line or some of its connections. In either case, the event should be reported.

- Who should damage be reported to? Should it be reported to the notice center or directly to the operator of the damaged facility? There were real differences of opinion. While we were able to agree that all contacts and damage must be reported, we were unable to agree about to whom the report should be made. Instead of being prescriptive, we recommended that all contacts with and damage to buried facilities be reported either to the facility operator or to the notice center, whichever the circumstances dictate. If it is a pipeline and there is an odor of gas, the report probably should be made first directly to the operator of the gas system and the appropriate emergency agency and then to all other buried-facility operators.

- The panel recommends that excavators use nonmechanized hand tools or tools specifically designed to safely expose
an underground facility to determine the facility’s exact location before using conventional mechanized equipment. The intent of the phrasing is to recognize and permit the use of vacuum excavation equipment for exposing an underground facility. It too is a mechanized tool.

Again, we tried to avoid being prescriptive so as to permit the use of hand tools or any other tool that will not affect the integrity of the underground facility.

- The panel further recommended that excavators and underground facility operators work together to develop installation standards and new depth-location technology. We addressed the issue of installation standards because many people, particularly the contractors, believe that if there were some kind of template or standard for the location of all future buried-facility installations, it would be a wonderful world to work in and it would resolve a lot of problems related to the depth of facilities. However, others pointed out that after a facility has been installed, many things can occur to alter the depth, such as road widening or realignment, erosion, or recontouring of property by an owner.

Even though there are many concerns about the capability of facility-location standards to solve the depth problem, the group believes that some attempt should be made to come up with such standards.

- The group recommends that the operation of excavation machinery be permitted in marked areas as required or necessary only after the buried facilities have been exposed and adequately protected. In several States, the use of mechanized excavation equipment is prohibited within the marked zone. But if the excavator takes the time to properly locate, expose, and protect the buried facility, he should be permitted to use mechanized equipment necessary to perform the work.

- The group recommends that excavator associations work in conjunction with buried-facility operators and notice centers to provide buried-facility damage-prevention training as part of their safety training programs. The AGC and most contractor organizations are very safety conscious and have produced a number of video tapes each month about safety issues.

The panel felt very strongly, and I personally feel very strongly, that including excavation-damage prevention measures in the training programs of contractors and excavators would be most worthwhile.

- Although the group did not agree that equipment operators need to be certified for excavating near buried facilities, it did agree that equipment operators should be trained in the use of the notice center and in how to work next to buried facilities without damaging or undermining their integrity.

- The group recommends that excavators take any and all prudent and reasonable
steps in cooperation with facility operators to protect the integrity of the underground facility. We began to be prescriptive about the actions excavators should take to protect buried facilities, but quickly learned that given the variety of facilities and circumstances that will be encountered, it would be very difficult in the short time available to come up with comprehensive, specific recommendations. The group believes that the specific protective actions for each excavation should be left to the facility operator working in cooperation with the excavator.

- The group recommends that excavators tell notice centers the approximate date a project is to be started and the approximate duration of the project. The group recommends that State laws and regulations define how long after notification a project can begin and the length of time for which the notification is valid without the excavator having to contact the notice center again. The panel is not unanimous about whether State laws should actually specify the amount of time that a notification is valid, because the amount of time may have to vary according to the type of excavation activity the notification is for.

There was considerable discussion about whether continuous operations, such as railroad maintenance, mining, and cemetery operations, could be handled by issuing an annual authority provided there are annual communications between the entities and the buried-facility operators about how to protect the buried facilities.

- The group recommends that the APWA standard colors for marking the locations of buried facilities be used at excavation sites only by operators of buried facilities. Surveyors and others who may also perform work at the site of excavations should not be permitted to use the APWA standard colors because their marks often are confused with buried-facility location marks. The group also believes that the ULCC should consider developing other standard colors for additional purposes, such as marking road construction and grades and surveying.

Group 4—Program and Administration

Tom Brace: Our panel was able to reach consensus on almost every issue addressed, although some of the questions were heroic in terms of solutions. First, we defined required participation needed to minimize risks in State programs. Next, we identified areas in which State programs need to have enough flexibility to be able to implement alternative procedures that still meet the spirit and intent of the program. The alternative procedures should be derived from mutual agreements between excavators and buried-facility operators on a case-by-case basis. We dealt with the treatment of exemptions, and we approached it from a little different view point, but felt that the program should be administered in this fashion. Concerning items we believe that every State program must do, the group agreed on the following:

- Create positive, real incentives for damage-prevention programs.
• Include programs to educate all stakeholders on the programs' provisions, including the use of the notice center. Tailor the education for each class of stakeholder to meet specific needs.

• Define clearly the roles of Federal, State, and local governments.

• Retain the strength of current damage-prevention programs. (There are a lot of good programs out there, and we should not lose their accomplishments.)

• Include continuous review provisions so as to keep working on and refining provisions so as to build on successful program aspects.

• Establish, publish, and distribute procedures for dealing with violations. (One panelist pointed out that sometimes people do not know enough about the procedures because it is too hard to find out about them.)

• Balance the requirements of the damage-prevention program with both the buried-facility operator and the excavator in mind. (The playing field must be level for both.)

• Realize that problems cannot be solved unless operators, excavators, and administrators work together.

Because of geographic and climatic differences within and among the States, we next recommended that States consider the following in developing or modifying their programs:

• The different needs of rural and urban areas and metro and out-State areas.

• The need to keep the administration of the program as simple and streamlined as possible with a minimum of government oversight. The group believes doing so will minimize costs to stakeholders and will provide greater potential for success.

• The need to include a data-gathering and analysis system to help identify program-improvement needs and successes so as to maintain a dynamic program capable of keeping pace with technology.

• The need to establish geographic boundaries for notice centers to assist in determining which center is responsible for portions of interstate facilities.

• The usefulness of competency reviews in determining whether operators and excavators are complying with the program.

• The importance of having program requirements that encourage creativity. In so doing, the program will permit the use of innovation and new technologies for solving problems.

• The importance of the rules being performance-based rather than prescriptive so as to allow the use of alternative methods and materials in protecting buried facilities.

• The importance of having only one notice center for each geographic area.
and ensuring coverage for all areas. There should be no overlaps.

- The usefulness of establishing criteria for new underground facilities that will make them locatable without excavation.

AUDIENCE COMMENTS

When the group reports were completed, the moderator opened the meeting to the audience.

Mr. Wigant--One-Call Systems, Inc.: He cited the following information about the Office of Management and Budget (OMB) Circular A16:

The OMB under the direction of OMB Circular A16 created the Federal Geographic Data Committee (FGDC), chaired under the direction of the Secretary of the Department of the Interior. In March 1994, the FGDC offered the 1994 plan for the National Spacial Data Infrastructure (NSDI). The purpose of this was to allow the government to stop reproducing spacial data over and over again. Basically, it is a factor of reinventing government. The NSDI will develop policy, standards, and procedures under which organizations and technologies interact to foster more efficient use, management, and production of Geospatial data.

Data Clearing House, which can eliminate duplicate effort in developing and maintaining spacial data. The Executive Order states that by January 11, 1995, the Secretary of Interior shall offer strategies for maximizing cooperative participatory efforts with government agencies and private-sector and nonfederal organizations to share costs and improve efficiency of acquiring geospatial data.

We are all moving more and more toward digital documentation of facility locations, much of it under the guise of the GIS. However, the best computer and the best software will not resolve the problem of determining where excavation is taking place. That requires data. So I have approached various data vendors to help develop a clearinghouse with the consideration that a notice center is unique in that it is a nonprofit activity that binds all the buried-facility operators together in a daily utilization of spacial data.

I offer to those attending this workshop a paper that deals with a company that is willing to use its 60,000 vehicles in updating the database for its own utilization. It is willing to team with the nonprofit centers so that they, too, can contribute to such a database for spacial internal utilization. Notice centers have no other affiliation with the clearinghouse that we have proposed. We simply want to be a facilitator to establish this for the benefit of the industry.

Albert Richardson--Tenneco Gas, Houston: Several of us had some thoughts we were running over at lunch time. When you start taking the information that you get out of these meetings, the results can be misleading. Not for any reason other than
you are not seeing the person's facial
inflections as he is saying his words. I think
it might be very functional and I would like
to urge you to provide a draft of your
document to the members that are present
so that they can make one last written
comment if some of their words have been
misinterpreted. I would certainly appreciate
it, and I know a number of other people
have expressed the same concern.

**Moderator:** What we have done in the past
is to have a technical review, which
provides the factual data and the
information on which we base some of our
findings. And from those we would also be
able to give you some written material at
that point which would give you a pretty
good idea of where we are going.

**Mr. Richardson:** We basically have
planned this whole process, meeting and
all, with the various associations. And it
would seem to me that the rational thing to
do is to go back through the associations to
do the technical review. That way, they
could contact their members. We will just
have to give them a little more time so that
they can send information out to their
members and get comments back from
them. But we can certainly work with that.
We want to make sure we have a good,
factual, representative document.

**Ed Haas**--Columbia Gas Transmission: I
would like to ask that you include the
following idea in your final
recommendations: excavation with power
equipment is prohibited within 3 feet,
horizontally and vertically, of high-pressure
gas pipelines or gas pipelines of any
nature. Only hand digging should be
allowed within 3 feet of a pipeline.

**Brian Deery**--AGC: The group discussed
that issue and could not come even close
to a consensus on it.

**Ed Haas:** I agree that there was not a
consensus within the group. But I think,
whether the majority believes so or not, that
excavating with power equipment, possibly
a backhoe or whatever, closer than 3 feet
to a high-pressure gas pipeline, which may
be 1,200 psi, is irresponsible. The law
should require that hand digging be
required within a certain distance from high-
pressure pipelines.

**Gene Montgomery**--Shell Pipeline: I think
that the Safety Board and the Department
of Transportation need to recognize that the
workshop is highly populated by public-
utility companies and utility excavators, as
well as one-call managers. Because of the
pending legislation on one-call and the
broadening--significant broadening--of
scope to water lines, communication lines,
etc., some of us are just now getting into
this arena in which the utility companies
have had some 20 years to build up
momentum. And so, there are a lot of other
excavators out there that have not had an
opportunity to get that momentum built up,
and I think they really need to be heard
from and represented. The mining industry.
The railroads. I think they have got some
very valid questions, very valid arguments
that I heard here at the workshop.

Just a quick example: in our industry, in the
oil and gas industry, in the exploration,
drilling, and production end of the business,
we operate hundreds of thousands of miles
of water lines simply for the purpose of
reinjecting water for water-flood operations.
Those are not lines that the public is
dependent on for safety. We also have communication lines that we have buried that are for the purpose of starting and stopping our wells. Damaging one of these lines is not going to interrupt a single 911 call anywhere in this country. Our wells are simply not going to start. So there is a lot more to be heard on this issue that just has not come up yet simply because we do not have the momentum up to deal with it.

**Bob Fronzec**—Association of American Railroads: I felt like a lone wolf in this group. I guess I would like to echo the previous gentlemen, that other people—the miners, the grave diggers—should be invited to this thing. And maybe they were, and they just did not show up.

I think that railroads pose some unique problems. What I would like to do is address what our group talked about. We came up with a recommendation that no excavator should be exempted. I suggested at that time that perhaps it should be risk-based, and, you know, once again it was not unanimous. But there was group consensus, or at least a majority.

But, if you take that to the extreme, every one of us in this room is going to be a violator of the law. The person who is working in his backyard garden is going to be a violator. The kid at the beach digging a hole in the sand is going to be a violator. And I do not think that is the intent of this group. I think there need to be special circumstances.

I would like to talk from the railroad standpoint and tell you why we think we should be exempt, or at least be given special consideration for track maintenance. I think we have an excellent track record when it comes to safety. I do not know of a serious incident involving an underground facility connected to the performance of routine track maintenance. I have heard the story about the Princeton, New Jersey, Amtrak/MCI incident several times today. The incident was caused by somebody cutting the wrong wire in a manhole. So notification would not have prevented it.

We own our rights-of-ways, and we have stringent regulations and requirements when somebody crosses them. And when we are doing valve cleaning and putting in new track, we are not going to come in contact with underground utilities. We feel very confident of that.

We are required by Federal law to inspect our track. If we find an unsafe condition, there is no way we can wait to report that we are going to put in a tie or fix a track. Once again, a lot depends on the definition of *excavation*. If we are disturbing soil, we would have to wait. We are a continuous excavator. We maintain our track continually.

Once again, if we are going to be required to notify, I think some special provision needs to be made—once a year, once a program, something along those lines. I think I heard around the room that, generally, railroads are exempt from reporting at the current time. That may not be universal. We do not feel we should be exempt in all circumstances. I think when we are putting in lines, pipelines, underground utility cables, we should report. But, when we are putting in a tie, maintaining track, we do not need to report.
**Moderator:** I would certainly encourage you to have the Association submit formal comments to us. We certainly have your comments on the record. But, if there is anything further, or anything that you think of after you report back to your members, we would certainly like to have that input.

**Charles Batten:** Bob, I think in many cases, they have not quite come up to speed yet. I am glad you are here because now you can be in the forum with all the rest of these people expressing your viewpoints. When we can get in the room together and start talking about our problems, we can develop solutions. So, I would suggest and encourage you to talk with the railroads and file your viewpoints with us.

**Michael Faison**—Williams Pipeline Company: We have thousands of miles of right-of-way. There may be a problem getting State laws to apply to the Federal authorities. Williams Pipeline Company traverses a great many national forests controlled by the Bureau of Land Management. I would like to make sure that those areas are included. It is very difficult to get an admiral or a forest ranger to believe that when they use a hydraulic truck-mounted tree trencher that they need to notify the one-call.

Also, in a great many areas in the midwestern and western part of the United States, we cross tribal lands. That is another group that is very difficult to sell on the excavation-damage prevention concept. My understanding is that the Federal Government is the largest property owner in the United States. Make it applicable to them.

The Williams pipeline also crosses through cemeteries and mining areas, and those operations have damaged our pipelines. We process and transport high-pressure petroleum products. Because of the nature of the petroleum products and of the highly volatile products, one hit can result in catastrophic problems. I second what Mr. Haas was talking about, a 3-foot protective zone.

**Linda Durbin**—Cable II Montgomery: I would like to address the issue of all owners of buried facilities, except those owners of private facilities restricted to their property and their use, having to register their facilities. We have people in our county who own the land, own the apartment complex, and own a private gas system. They do not participate in the notice-center operations. They do not mark the facilities. We have hit them. They own the facilities. They own the land. And under this kind of ruling and most State rulings, they do not have to participate. I would like to see that sort of thing put into the law—that if you own and operate a system, you have to participate.

**Bob Chisholm:** I think possibly the key to your comment is system. And if it is a townhouse complex or condominium complex, I think there is an ownership item. They are servicing something other than the specific owner.

The intent of our comment is to reduce or eliminate the necessity of a farmer, for example, who might have natural-gas or electric or telephone lines that he owns having to register. Or, what about an industrial complex where there are facilities between different buildings on their
property? They have full control over it. And it is for their own use. Now, if this is a complex, residential complex, I think that, yes, I would like to see them registered, too.

Mary Deluca—Federal Communication Commission: I would like to address the previously mentioned MCI incident at Princeton, New Jersey. I just want to clarify that that outage was due, according to what we were told, to railroad employees doing maintenance and pulling out a conduit that they thought was empty. I believe that it could have been prevented with a one-call because they would have found out that that conduit was not empty. That outage knocked out the Northeast Corridor for telephone service for 4 to 5 hours and part of the NASDAQ Stock Exchange, and it blocked over 4 million calls.

Paul Devaney: I can tell you, there are many associations and many facility owners that I have run into over the years that have no interest in belonging, have no interest in damage prevention, have no interest in anything other than their stock price and their net revenue. And that is what we are trying to get to. I do believe that some programs will have to be developed that will allow for track maintenance, that will allow for big projects and gathering lines, and some of the other programs that are out there. But, we are never going to bring those organizations together unless we get to that mandatory participation.

Rene Roloff—Michigan Consolidated Gas Company: We really are trying to do damage prevention and work with the contractors, and at local levels, we do offer contractor workshops. We work with the contractor in the field if at all possible. Could the excavators return to us an offer to attend some of their meetings so that we can hear first-line questions about the concerns of your workers and begin to address them before they become full-blown problems, either at the law-making level or in a newspaper article?
Brian Deery: I would say that the AGC has 101 chapters around the country. Some of them are statewide. Some of them are in urban areas. Most of them have monthly meetings. If not a monthly meeting, they have at least a semi-annual meeting. And I would say you would be more than welcome. I will gladly give you the names of our three chapters in Michigan, which would more than welcome having you make a presentation and would cooperate with you. Frankly, the contractors welcome one-call systems.

The contractors are not the enemy. I mean, they do not want to hit your facilities. They want them to be marked. And they want to work with you to do that. Many of our chapters have worked very strongly with their State legislatures pushing damage-prevention legislation. So I think that the attitude that the contractors somehow do not want it is totally wrong. The contractors welcome damage-prevention programs and are willing to work with whatever group necessary to get that in place.

Hugh Byers—Penzoil Company of West Virginia: West Virginia has no mandatory participation. I wonder if someone could expand a little bit on what is meant by providing positive incentives?

Tom Brace: A number of possible incentives have been discussed:

- Excavators could be offered reduced insurance premiums in return for having effective damage-prevention programs.

- They could be offered reduced liability in return for reporting themselves if they have caused any damage.

- They might be encouraged to pre-mark their sites if it is pointed out to them that operators will, as a result, be able to do a better job of locating their facilities, thus reducing the excavators' expenses.

And then there are some less mundane incentives—the chance to protect the environment and the chance to improve personal safety at the work site, which in turn can reduce the number of injuries, thus the cost of worker's compensation. This list is just a beginning, and each one of those possibilities would need to be fleshed out. But the idea is that it might be possible to produce genuine fiscal savings, environmental savings, better working relationships, legal reduction in terms of liability, and something that takes the adversarial relationship out of the issue.

Mr. Turnfile—State of Arizona: I would just like to make a comment on the railroad. Before you think about giving them a waiver, please remember that we had two incidents in Arizona in which they were doing routine maintenance and hit a gas line.

CLOSING REMARKS

George Teneley—Associate Administrator for RSPA: I want to thank the Safety Board for being the impetus behind this workshop, but I also want to let you know that the Department of Transportation is a co-sponsor. And in response to the question, "What will the Safety Board do with this information?" it is not just the Safety Board that will be doing with this information. We in the Department of Transportation have already begun our national strategy on one-
call and damage-prevention enhancement. And we plan to take this information to help frame that strategy and kick it off particularly for fiscal year 1995.

I think one of the benefits of this workshop has been for those of you who are not in pipelines to get to see our faces and get to know a little bit about us, because when the legislation passes, you are going to have formal relationships with us as we set about this very important endeavor of improving excavation-damage prevention.

I am very proud of the fact that the industry that I am responsible for overseeing is in large part responsible, I think, for the growth in one-call damage-prevention programs in the last 20 years. Certainly in many areas of the country, it is the pipeline operators that have paid for the lion's share of the work that has been done in one-call development. And I think that industry should be rightfully proud.

Let me just quickly recap what I think are some of the larger accomplishments of this week. First of all, we have opened up critical paths of communication. Just hearing the interplay today and this afternoon and talking to the people in my office who have been on the panels has reminded me how amazing it is that when you sit down with people with whom you thought you had very diverse opinions and very difficult hurdles to overcome, you can actually overcome those hurdles just by talking among yourselves. And I think we have achieved that.

I think the workshop has also provided a sharper focus on the issues and impediments to enhancing excavation-
damage prevention. You cannot really solve the problem until you identify it correctly. And I think one of the things we have done in this workshop is get a clear understanding of just what the parameters of the problem are. And that is critical to solutions.

I think we have laid the foundation for some critical partnerships. The Secretary of Transportation believes strongly in partnerships and echoes the President's commitment to partnerships. And I think this is just a great opportunity for some really interesting cross-functional, cross-interest partnerships that will be essential to achieving a very important part of our national policy.

I am struck by the number of times I have heard the words *innovation* and *creativity* in the 2 days here. That is a good sign in itself. We just cannot look at things through the old lenses. If that is what we have accomplished, then what is left to do? Where should we go from here?

The first thing is to sustain the momentum. And we are building momentum in this whole issue. You can go back to symposia that were held by Congress 2 years ago. Efforts have been made in Federal legislation to attack the problem in the past, usually through the pipeline program. The One-Call Systems International meeting in May sustained it even further. The legislation in Congress now has sustained it. This workshop is sustaining it. And we cannot let it die. It cannot stop here.

We are going to put together some other forum in the future. It might be a Department of Transportation workshop. It
may be the Safety Board and the Department of Transportation working with OCSI next spring. But the momentum cannot be sustained just through meetings. Every one of you has got to be an ambassador for the ideas that came up in here. You have got to go back and take it to two more people, to five more people, to ten more people, and you have got to keep that momentum going on a personal, face-to-face basis. That will create synergy. And that synergy is going to get into State legislatures where this thing has got to get done.

I think we have to identify future forums. I suggested the possibility of the Pittsburgh forum being expanded. I think there are people in the OCSI leadership who would like to do that.

And I think that we, along with the Safety Board, ought to explore joint sponsorship of that forum to the extent they need us; and I think we could probably help fund it. I think the Department of Transportation can certainly help fund it.

One thing that may be valuable between now and whatever future forum we hold, and I think Charlie alluded to it through the record of this proceeding, is perhaps to create a multi-interest focus group that can look at what has been on the board and synthesize it down into a critical agenda of those issues which you really ought to hammer on that really will form the basis for a good and meaningful one-call system. I am interested in it because I am going to have to draft a model program if this legislation passes. And everything I have heard here for the last 2 days is going to help inform that process. We need to continue to push the envelop for creative solutions. You have heard a little bit of the creative tension between certain people, certain groups, and certain ideas. We have to be very careful that we do not construct a paradigm that is heavily laden with regulation, direction, and black-hat enforcement. This has got to be creative. I am concerned that if we do not allow creativity, if we do not make it flexible, we are going to put decisionmakers in the position of doing thumbs up or thumbs down. And we do not want to do that.

It is very clear we have to increase public awareness and public education. Congress wants us to do it. The Department of Transportation wants us to do it. We want to participate in that. The Secretary of Transportation wants us to participate in that. But, these things all grind slowly. And as important as it will be to partnerships to do that, nobody should wait to have effective public education or public awareness. We each have a personal mandate, if we believe in this, to get out and be an evangelist for the idea. And there is a lot of talent in this room. And your colleagues are as talented as you are. Everybody should be urged and challenged to be an ambassador of these ideas.

Finally, as we go forward with our disparate ideas and perhaps conflicting concepts, let's fight fair. If we go into a State legislative committee and we are going to make a point, let's use facts to back up the point. Let's not use innuendo. Let's not fudge facts. Let's get to the real facts. And if we have to do a lot of leg work before we go into that committee to agree on what the facts are, let's do that. This is too critical an issue to play dirty politics with. So let's have
a commitment among ourselves, a silent commitment, that we will play fair as we proceed with these issues.

That is what we can do globally. But, what can the Department of Transportation do? First of all, we have begun to pursue a national policy for one-call enhancement. We are developing a national database on damage caused by third party dig-ins. We believe we need to create that baseline so we can determine what performance measures are needed in the future and how to measure the success of various ideas for this creativity.

I am encouraged by the quality of the thought that went into this conference, the way you all presented your ideas, and your willingness to work collaboratively.

Just to close, we have got to strike a new set of relationships for all we do in Federal public policy. Everybody seems to agree that the number one risk to the pipelines is third-party excavation damage. We have got to find a way to solve it. We have got to find a way to solve it that is not only technically feasible but is also economically doable. We have got to take the best that our minds have to offer to do that.

Jim Arena--Director of the Safety Board's Office of Surface Transportation Safety: I will make this as brief as possible as we are getting late into the afternoon. Board Member Carl Vogt was supposed to be here today, but he had to travel to an aviation accident at Pittsburgh. So, I am pinchhitting for him.

Last October, the Chairman of the Safety Board spoke to the American Gas Association and discussed three concerns: underground storage facilities, excess flow valves, and excavation accidents. He made his presentation just 15 days after an excavation accident in Venezuela. Fifty-one persons died and 34 were injured when a 20-inch gas transmission pipeline exploded after being struck by a 22-ton trenching device operating on a busy highway near Caracas. During that talk, the Chairman asked how long it would be before a similar tragedy occurs here in the United States. Little did we all know that in 1994 we would see accidents in Edison, New Jersey, and Allentown, Pennsylvania, that could have been much more severe than the accident in Venezuela.

Benjamin Disraeli, once the Prime Minister of England, said, "The secret of success is constancy to purpose." The challenge that has brought us here together is to look more closely at today's causes of the excavation-related accidents and develop real solutions that will carry us into the next century. At the Safety Board, we decided to take a fresh look at the problem of excavation-damage accidents to pipelines. What form this would take was not known in October. Your participation was invited as we explored ways to reduce the chances for excavators to damage pipelines.

During the last 2 days, we have drawn upon the experience of everyone who agrees that change is necessary to achieve success. The next logical step, reaching consensus, requires understanding the effectiveness of the existing programs. Then we will move forward with the workable solutions.
Achieving a consensus is no easy task and is only half the battle. But our team at the Safety Board really believes that the efforts expended here will be rewarded by the lives saved and the injuries prevented. We look forward to a continuation of cooperation, and we pledge our support. On behalf of the Safety Board, we appreciate all your efforts. Both Acting Chairman Hall and Administrator Sharma charged this group with developing strategies to prevent excavation damage accidents, and the workshop took up the challenge.

Sponsoring this workshop is a major step the Board has undertaken to seek solutions in reducing excavation-damage accidents. We are grateful that the Department of Transportation combined its resources with ours to provide industry and government the opportunity to work together on this problem. Nothing must keep us from achieving our damage-prevention objectives.

Finally, we are thankful that all of you have committed your time and talents to seeking a successful resolution. We just heard the Office of Pipeline Safety underscore the importance of moving forward and reiterate how committed it is to a national strategy in keeping the momentum going. We at the Safety Board echo that, and we commit to doing the same thing. The Safety Board will publish the results of this workshops as proceedings.

We certainly encourage you to go back to your memberships, your organizations, and your agencies and please provide us with your written comments. This is not a legislative agenda, but rather a fact-finding agenda and an effort to discover what is really going on in the world and what we need to know before we move forward into solutions. So, within several months, hopefully, we will have these proceedings out. So, please, I would ask you to get your comments within 60 days so we can begin massaging the data and figure out what it is we need to do. Meanwhile, please take home what we have all learned here. Be the catalyst for change in your company and your State, and support the necessary changes to your damage-prevention programs. The ripple effect you create should be felt for years to come. Through partnerships with Federal and State governments, local authorities, and trade groups, the industry's innovations have produced excellent results in the past. I am sure we all know the same will occur with the results of this workshop.

I would like to thank the people from the Safety Board and the Department of Transportation, as well as from the industry, and the entire workshop committee for a job well done.

The workshop concluded.
APPENDIX A

Workshop Group Reports

During the afternoon and next morning of the workshop, four work groups were each given a different area to address. Each group had a facilitator and a panel of about 20. Each panel was comprised of representatives from communication, electric, water/sewer, pipelines, excavators, Federal government, State government, notice centers and others. The fluid audience of 25 to 125, in each work group, had the opportunity to participate in every session, and sometimes it was lively. The area addressed by each group was:

**Group 1** - Notification Center - What are the essential elements of effective one-call notification systems?
**Group 2** - Buried facility operator - What responsibilities should buried facility operators have?
**Group 3** - Excavators - What responsibilities should excavators have?
**Group 4** - Program and administration - How should the program be administered?

In each group was a court reporter to document conversations and a laptop computer operator to record and then display so all could see each idea under consideration by the group. The results of each group were printed at the end of the first night to help the groups the next day. At the end of the group meetings, the notes were presented (using an overhead projector) to the plenary session, and handed out at the completion of the workshop. The results of the groups, as handed out are as follows:

**GROUP 1 - One call**

*Definition:*
A one-call notification system is a communication system established by two or more underground network owners or operators to provide one telephone number for excavators, be they contractors, homeowners, utilities, public agencies, or others, to call for notification of their intent to use equipment for excavating, tunnelling, demolition, or otherwise disturbing the subsurface of the earth. This below-ground protection system provides participating members an opportunity to identify and mark their facilities in the vicinity of proposed activity. The notification also allows the owners of underground facilities to provide any necessary information about the facilities and to post a construction watch, if desired.
MUST HAVE:

* All owners of buried facilities shall register their facilities except those owners of private facilities restricted to their property and their use.
* All members of the digging community shall use the service.
* Pro-active public awareness, education and damage prevention activities incorporating a broad spectrum of available opportunities.
* Specifically defined geo-political service area with no over-lap.
* Toll free access nationwide.
* Hours of full operation compatible with digging community with provision for 24-hour access to the system.
* Voice Record of all incoming calls.
* Retention of voice tapes according to applicable statutes.
* Provide and advise caller of ticket number for each locate request, and the names of facility owners who will be notified.
* Be able to provide a printed copy of any ticket for a period of time determined by any statute of limitations.
* Provide timely transmission of notifications to facility owners.
* Be able to provide regular statistical, financial and administrative reports.
* Allow input to operational procedures from facility owners and digging community.
* Documented operating procedures, human resources policies, and training manuals.
* User friendly for entire digging community.
* Cost effective.
* Promote recognition, awareness and acceptance of responsibilities of facility owners and digging community, including a users guide.
* Formal agreements with members.
* Documented owner verification of data submitted by facility owners.
* Sufficient flexibility to incorporate local requirements.
* Computer and communications systems sufficiently flexible to accommodate growth and change.
* Accept and process locate requests placed within the locally accepted advance notice period.
* Advise callers of any limitations on service or system.
* Accept and process short notice, priority and emergency locate requests.

SHOULD HAVE:

* No cost to users of the system.
* Contingency plan
* Foster cooperation and enhance relationships between digging community and facility owners, including the development of a means of communicating the owner response to the excavator.
* Regular communications with customers.
* Determine and maintain quality of telephone service factors acceptable to the users of the system.
* Employ mechanisms to reduce over-notification.
* Governed by non-profit corporation.
* Capability of tracking the origin or locate requests by various criteria - member, contractor, homeowner, municipality.
* Cooperative working relationships with agencies and associations with mutual areas of interest or concern, including membership in OCSI and active participation in utility coordination and damage prevention committees.
* Pro-active management.
* Machine readable notifications.
* Toll free fax access.

COULD HAVE:

* 24 hour staffed operation.
* Accept and process locate requests for design purposes.
* Management of damage incident database.
* Facilitate appointment plan.
* Addition of aerial facilities.
* Do locating on contract basis.
* Provision for "no locate required".
* Cellular "Star" number for no charge access.
* Remote entry by major users.
* "Interactive voice" tracking of locate status - positive response.

GROUP 2: Buried facility operator

What responsibilities should buried facility operators have?

Should the American Public Works Associations' published "Guidelines for Uniform Temporary Markings of Underground Facilities" continue to be the recognized marking code?

* Uniform Color Code should be used to temporarily mark facilities.
* Markings should include facility owner identification.

What responsibilities should buried facility operators have?

* Buried facility operators should advise excavators/contractors when marking can't be performed in compliance with normal state time frame or make a reasonable attempt to advise excavator/contractor when operator has no facilities in area?
  - Partnership approach.
  - Positive response not required for ALL situations.
How?
* Telephone/fax/cellular phone/means by which contractor supplies. (voice mail?)
* One-call as conduit.

What should the optimum/minimum response times for marking facilities be?
* No one size fits all.
* No decision reached on this question.

What accuracy standard should be used for operator marking?
* Need understanding of "tolerance zone".
* Use standards as they exist along with tolerance zone education.

What coordination/communications with excavators should operators have relative to excavation precautions and emergency notifications?
* Provide information to known emergency services, to include anticipated response times.
* Have established procedures for emergency notification.

Should depth of facility be provided?
* NO.

What role should buried facility operators have for educating excavators/contractors/public on use of one-call & working safely adjacent to buried facilities?
* One-call programs should have systematic programs to promote use & function of system: statewide & national.
* Additional educational efforts by individual operators should support the one-call program & also provide facility-specific education. (Contractor/contractor associations/insurance companies ....should share in responsibility of training employees.)
* Mechanism to ensure message is received by public & encourage feedback (program effectiveness analysis).
* Any campaign advertising one-call should be coordinated with appropriate one-call facility.
  Working adjacent to buried facilities
* Facility owners take responsibility for the education of their employees & subcontractors.

What type marking equipment should be used?
* Use clearly identifiable materials appropriate to environment & conditions.

When excavation show errors in mapping information, should operators be required to update maps?
* YES.
What facility owners should be in the one-call system?
* All owners/operators should be full participating members in a one-call system.

Which buried facility owners/operators should participate in damage prevention?
* Any buried facility owner should be involved in a damage prevention program.

What actions should operators take for long-term projects?
* Advance & continuing coordination with documentation between operators & excavators (such as temporary markings).
* Follow-up reports/communications between company & excavator.
* Support & attend preconstruction meetings for major projects.
* The need may exist for excavators to update ticket through one-call.

How will customer-owned services lines get marked?

How will yard lines get marked?
* Facility owners should accept responsibility for marking up to a predetermined point, i.e., meter, interface device, etc.
* [CT state statute allows utilities to mark out customer-owned service lines with a hashed/broken mark which avoids liability for the utility but allows for a best guess locate of a facility they are not responsible for.]
  [Locate if locatable...no liability?]
  [Pool heaters/gas grills/gas lamps? Educate homeowner/public.]

How will abandoned Facilities get marked?
* As a best practice, utilities should be encouraged to maintain future abandoned facilities on facility records.

Standardized markings at time of installation?
[Can provide additional liability protection.]

Excavator Premarking.
* Encourage white line marking where applicable & practicable.
* To improve communications & efficiencies in facilities markings, we encourage the use of white-lining proposed excavations.
* Extensive excavation plans should be submitted.
* If premarking is not used, it is the excavator's responsibility to clearly & adequately identify the area of the intended excavation.

Workshop group three - Excavators
Which excavators should be required to notify the one call system?
* The panel recommends that no excavators be exempted from calling the one-call system.

Should the area to be excavated be pre-marked by the excavator before owners mark their facilities?
Pre-marking the proposed excavation areas has been demonstrated to enhance the safety of excavation activities.

What damage to facilities should excavators report & to whom?
* The panel recommends that any contact or other activity which impacts the integrity of an underground facility be reported.

To whom?
* These reports should be made to the owner, operator and/or one-call system.

How should excavators determine the depth of buried facilities?
* The panel recommends that excavators use non-mechanized hand tools or tools specifically designed to safely expose an underground facility to determine its exact location.
  The panel further recommends that excavators and underground facility owners work together to develop installation standards and new depth location technology.

What operation of machinery should be permitted in marked areas? Under what circumstances?
* The panel recommends that the operation of excavation machinery be permitted in marked areas as required or necessary once the underground facility is exposed and adequately protected.

What role should excavator associations have in educating excavators, equipment operators and the public in working safely adjacent to buried facilities?
* The panel recommends that excavator associations work in conjunction with facility owners, operators and one-call systems to include underground facility damage prevention training as part of safety training.

What actions must excavators take to protect underground facilities?
* The panel recommends that excavators take any and all prudent and reasonable steps necessary to protect the integrity of the underground facility in cooperation with facility owners and operators.

Should excavators be required to advise the center as to length of time for completing the reported project?
* The panel recommends that excavators notify the one-call centers as to the approximate length of time for the project.

Should there be a time limit on the validity of the ticket issued by the one-call center?
* The panel recommends that state laws and regulations define starting times and lengths of time when tickets are valid.

Other recommendations:
* The panel recommends that the standardized color code be limited to the marking of underground facilities at the job site.
The panel further recommends that the ULCC look at developing other color codes for additional circumstances.

**Program and Administration - Group 4**

Federal role in damage prevention
* Set minimum guidelines and encourage standards that a State may set in conformance with the national guidelines
* Determine what went wrong and how do we fix it
* Promote technology transfer
* Comprehensive participation driven by federal law.

Local & State role in damage prevention
* Monitor the levels of construction activity and damage occurrence
  1. To measure effectiveness
  2. To target need for improvement
* Damage going down with construction increasing
* Mandatory participation
  1. Facility operator
     federal-
     state-
     local-
  2. Excavator
     federal-
     state-
     local-

Enforcement
* Self policing partnerships
* Enforcing penalties, ability to recover costs
* Specific Agency responsibility for authority

Education
* An equal partnership between facility owners & the contractors
  a. Targets of education
     1. People moving the earth
     2. Locators
     3. Public
     4. Survey organizations
     5. Regulatory authorities
     6. Engineers & Designers
     7. Zoning & Siting Boards
     8. Attorneys, Legislators & Judges
  b. Format of educational objectives
     1. Training
2. Awareness
3. Benefits of using one-call for
   a. Engineers & designers
   b. Contractors
4. Safety & responsibility
5. Penalties & liability
6. Emergency response
   c. Methods

Positive incentives
   a. Enhanced personal safety at the work site
   b. Cost effective to the excavator and facility owner
   c. Insurance discounts for damage prevention programs
   d. Reduce liability for self reporting (NEB.)
   e. Preserving our infrastructure
   f. Pre-marking sites of proposed construction
   g. Protecting the Environment

Where is the data?
   a. Facility owners
      (may or may not report)
   b. Insurance
   c. Associations
   d. One-Call operation

Concerns of Group 4*

1. Define minimum risk which requires level of participation in the program within each state
2. Flexibility for alternative procedures that meet the spirit and intent of the program by mutual agreement of excavator and operator on a case-by-case basis.

* Create positive incentives for damage prevention programs.
* Educate all stakeholders
* Establish clearly defined federal, state, and local roles.
* Ensure membership control of One Call Centers.
* Retain the strength of current damage prevention programs
* Courage to continue
* Establish, publish, and distribute procedures for dealing with violations and funding.
* Requirements of the damage prevention program are balanced for:
  1. Facility owner
  2. Excavator
* Team work to solve problems
* Practical Considerations
  1. Remember that law affects all areas of the country
  2. Administration of program will be as simple and as streamlined as possible with a minimum of government oversight
  3. Sensitive to cost impacts for all stakeholders
* Why do damages continue to occur even when comprehensive programs are in place?

1. Recommend further research to accomplish continuous improvements.
2. On going data gathering system (i.e. data tracking)

* Geographic boundaries will decide who has responsibility over interstate facilities.
* Encourage competency reviews for owners and excavators.
* Write rules in a way that encourages creativity.
* Require single one-call systems in each geographic area.
* Establish criteria for new underground facilities to be locateable without excavation.
Several persons filed comments for the record. The comments have been included in the National Transportation Safety Board’s Docket for the workshop. Comments were received from:

- Federal Highway Administration, U.S. Department of Transportation
- City of Richmond, Virginia
- Southern California Gas Company
- Smith & Denison, Inc.

Warren J. McGowan
Smith & Denison, Inc.

While I concur with you on the need to have as much participation as possible at the subject workshop, I can not justify the expense to travel to Washington. This does not diminish my concern or interest in the Topic. Possibly future workshops can be held around the country attracting more contractor participation.

This is being done on Wordstar 5.0, and a disc is enclosed for your use.

The following represents the feelings of our personnel concerning this subject.

As a contractor, working in a State with a one-call system, our experience has been mismarking of facilities by USA (one-call agency) personnel and, or not marking the facilities far enough in the area of the proposed excavation. In California USA requires the contractor to first chalk out where the digging will take place. Then, the only facilities USA marks out are those of the participating firms and agencies. CalTrans does not belong and doesn’t mark their facilities.

In most areas sewer mains are not marked while water mains are marked. Cities do not mark their street light systems. Telephone companies mark their facilities in mobile home parks while gas distribution companies only mark if they own the distribution system and bill the coach owners (there have been some exceptions).

Locating does not include any depth readings.

We seem to always run into problems on private systems such as school campus’s and military bases. The telephone systems are usually owned by the serving phone company but
many other underground facilities such as fire lines are owned directly with poor mapping records. There are also a few private propane systems which currently do not belong to the one-call system.

I would appreciate getting a copy of the transcript from your meeting. Please put me on the mailing list.

Subsurface Utility Engineering
An Alternative To Excavation Damage
Paul Scott
Federal Highway Administration
Office of Engineering
Washington, D.C.

Accidental damage to underground utility facilities has been a problem in the highway industry for many years. But now there is a solution -- Subsurface Utility Engineering, or SUE for short.

SUE is an engineering process that incorporates new and existing technologies to accurately locate underground utilities during the early development of a highway project. Although this paper deals with highway work, SUE is not limited to highway work. It can be used in conjunction with any work involving excavation activities.

SUE involves designating, locating, and data management. These components may be defined in terms of "quality levels." Quality levels may be thought of as degrees of risk, or, how much information is really needed before designing and constructing a project.

There are four quality levels, beginning with Quality Level D and ascending to Quality Level A.

Quality Level D is the most basic, the least desirable, and, unfortunately, the most commonly used level of information. It is the information that comes from existing utility records. It is not always accurate. The chief engineer for a large State highway agency was recently quoted as saying, "Any resemblance between where the utility company says an underground utility facility is, and where it actually is, is purely coincidental." Information obtained from available records may provide an overall "feel" for the congestion of utilities, but it is often highly limited in terms of comprehensiveness and accuracy.

Quality Level C information is a little bit better. It involves taking the Quality Level D information and supplementing it with above-ground survey information depicting visible utility facilities, such as manholes, posts, etc. Even so, when using this information it is not unusual to find that 15 to 30 percent of the underground utilities are either omitted or are plotted two feet or more in error.

Quality Level B is the first level where SUE information is used. It involves taking the Quality Level D and C information, and adding "designating," which is the use of surface geophysical techniques to determine the existence and horizontal position of underground
utilities. This provides two-dimensional horizontal mapping and is usually sufficient to accomplish preliminary engineering goals. Decisions can be made on where to place storm drainage systems and other design features in order to avoid conflicts with existing utilities. Slight adjustments in the design can produce substantial cost savings by eliminating utility relocations and moving the work away from the utilities. Even so, the designer still does not know the vertical position of the underground utilities.

Quality Level A information provides the highest level of accuracy presently available. It involves taking the Quality Level D, C, and B information, and adding "locating," which is the use of nondestructive digging equipment at critical points along a subsurface utility's path to determine the precise horizontal and vertical position of buried utilities. This provides three dimensional horizontal and vertical mapping. The use of non-destructive vacuum-extraction digging equipment eliminates damage to underground utility facilities traditionally caused by backhoes. The small work area involved, about 20 x 20 centimeters at the top of the hole, eliminates pavement damage traditionally caused by backhoes. By knowing exactly where a utility is positioned in three dimensions, the designer can often make small adjustments in design elevations or horizontal locations and avoid the need to relocate utilities or work near them.

SUE benefits highway projects by eliminating unexpected conflicts with underground utilities during construction. This, in turn, eliminates unexpected deaths, injuries, and service disruptions. If a contractor begins work on a project where the utilities are accurately located, it is much less likely that they will be accidentally dug up. What often happens when SUE is not used is that the excavator is digging and without warning hits a utility facility that was not known to be there or was not where it was thought to be. Sometimes the excavator is injured or killed. Essential utility services are disrupted. Work on the project is stopped. The utility company is called to come out and look at the damage. Time is required to repair the damage. Costly redesign work is often required. Sometimes the utility facility has to be moved.

Experts predict that a hundred years from now there won't be any more construction delays caused by conflicts with utilities. That could be happening right now. On highway projects to date, where subsurface utility engineering has been used, there have been no unanticipated conflicts with utilities. There have been no deaths, no injuries, no disrupted services, no costly delays. There will be accidents some day. Mistakes are always going to be made, but there haven't been any yet where subsurface utility engineering has been used.

Even though utilities are accurately located on the highway plans, they may
be overlooked, the excavator may not understand how to read the plans, or there might just be such a rush to get the work done that shortcuts are taken. One-Call can be a big help in this regard. Typically, the SUE information obtained early in project development would be made available to the One-Call people, and they could physically mark the location of the underground utilities on the ground prior to excavation. SUE and One-Call working together can virtually eliminate underground utility damage on highway projects.

SUE has been around for a long time. The Virginia DOT has been using it since 1984. They're really sold on it. There are other States that are using it too in some manner, 20 other States at this time. In addition to the State highway agencies, there are a number of city and county highway agencies that are using SUE. In Arizona, the City of Phoenix and Maricopa County use SUE. In northern Virginia, Fairfax County uses SUE and has been since the early 1980's. There are a lot of people using it. And they're all sold on it. Engineers at the Federal Highway Administration are not aware of any agency that has used subsurface utility engineering and been unhappy with it. Usually it is just the opposite. Usually first-time users gear up in a big way once they try subsurface utility engineering and see what it can do for them.

The savings that can be realized by using SUE are substantial. Here's an example. On a major highway project in the City of Richmond, the Virginia DOT's consultant dug 156 test holes at locations where Quality Level B information indicated highway/utility conflicts were possible. Using the Quality Level A data obtained, VDOT's roadway and hydraulics designers determined that conflicts would occur at 75 (almost half) of the sites. As a result, design changes were made and 61 (almost 80%) of the potential conflicts were eliminated. By making these changes, $731,425 worth of utility adjustments were avoided; whereas, the cost of digging the test holes was only $93,553, resulting in a savings of $637,872.

There are other examples similar to the Richmond example. Many have not been documented because the savings have been so obvious. They all indicate, however, that a relatively small expense upfront, can result in big savings later in the project.

There are consultants that do SUE work just like there are consultants that do design work. The SUE consultants do everything necessary to locate underground utilities. They're professional engineers, geologists, and surveyors. They'll provide a set of plans or provide the information to go in the plans. They'll seal their work and stand behind it. If anything goes wrong, they will be responsible. They have insurance to back them up.

The Federal Highway Administration estimates that when all highway
agencies are routinely using subsurface utility engineering, the nationwide savings, conservatively, will be at least $100 million each year. The savings in lives, injuries, and disruptions cannot be estimated, but they will be substantial. Unexpected encounters with underground utilities will be a thing of the past.

City of Richmond
Office of the City Attorney
900 East Broad Street, Suite 300
Richmond, Virginia 23219

Thank you for inviting the City of Richmond, through Bob Cave, to attend the Excavation Damage Prevention Workshop on September 8th and 9th. Unfortunately, our representative was unable to attend because of a last minute scheduling conflict. I apologize for any inconvenience this may have caused you.

We would like to make a few general comments concerning excavation damage from the standpoint of a municipality that is both an "excavator" and an "operator."

The City of Richmond operates municipal gas, water, wastewater, and electric utilities, and also constructs and maintains its own streets. As both a utility operator and excavator, Richmond has been active in the development of Virginia’s one-call notification program and is a strong supporter of coordinated efforts to reduce excavation damage.

The City believes that a strong one-call notification program is essential to the public health and safety.

The focus in developing excavation damage prevention programs should remain on public health and safety. As such, participation in such programs should be mandatory for underground utility operators, if disruption of, or damage to, the particular utility operations would pose a significant risk to the public health and safety.

Some parties have attempted to incorporate strict liability concepts into damage prevention programs in order to shift private liability from underground damage away from excavators and utility operators. Use of strict liability to apportion private liability ignores traditional negligence concepts (i.e., fault), as well as existing contractual and regulatory constraints. The traditional liability considerations provide incentives for excavators to perform their work carefully, and should be retained to better achieve the primary goal of protecting the public health and safety.

Richmond also believes that the individual State’s should retain flexibility to fashion damage prevention programs that fit each State’s needs, rather than trying to impose a single federal program. Richmond is particularly concerned with attempts at the federal level to require the imposition of civil or administrative penalties and fines for noncompliance with State damage prevention programs. Many other types
of sanctions are available (e.g., injunctive relief, newspaper offender lists, contractor disbarment, etc.). Each State should decide which types of sanctions work best. Fines imposed on local governments are an unnecessary punishment on the local residents, ignore other constraints on local government, and are contrary to the enhancement of local-State government partnerships.

I hope the foregoing thoughts are useful to your review. Please don't hesitate to contact me if you have any questions, or if you want to discuss these issues in more detail.

A Facility Operator & Excavator Commentary
By The Southern California Gas Company

INTRODUCTION TO COMMENTS

The Southern California Gas Company welcomes this occasion to participate in the "Excavation Damage Prevention Workshop". Aside from exchanging views, we desire to interact with our hosts, and other attendees, to discuss issues that can lead to enhanced public security. Along the way, we hope to distinguish those areas where the general public is truly at risk, and, very importantly, where they are not.

As a backdrop to our comments, we would like our fellow participants to know that for over 100 years SoCal Gas has been a transporter of underground energy. We serve in excess of 4.5 million customers through a network consisting of nearly 90,000 miles of subsurface facilities. This system is dispersed over a 23,000 square mile area. Sharing this geographical region are approximately 100,000 licensed contractors, and 1,000 owner/operators.

SoCal Gas has considerable experience in practically every aspect of operator, excavator, and "one-call" disciplines. Annually, this organization installs many miles of subsurface facilities, responds to hundreds of thousands of outside locate requests, generates thousands of locate requests of it's own, and daily conducts a multitude of individual excavations in proximity to other underground facilities.

SoCal Gas is a co-founder of a "one-call" system, and for the past 18 years has successfully managed administrative, member, and client roles of "call before you dig" programs.

We are grateful to NTSB and DOT for allowing us the privilege and opportunity of sharing our views with the responsible entities, and all the many other affected organizations.

The Workshop can optimize results by targeting facilities and/or practices that clearly present a genuine threat to
public safety, and by striving to avoid recommending unnecessary mandates. Public safety is maintainable, and best achieved through an equitable, common sense approach that values fact over presumption.

Current Federal provisions should be fully evaluated before new rules are implemented.

That public safety, and business concerns, common to both operator and excavator, dictate that critical underground plant should be located ahead of planned excavations, and that, unless compensated for the activity, owner/operators should not police or monitor excavator performance beyond the extent of owner liability, and internal concerns of the operator.

Accountability for excavations, in the vicinity of otherwise secure facilities, should abide with the benefactor of that activity, and not be transferred onto uncompensated, non-liable, and non-negligent facility operators.

Any unique corporate operating conditions due to chosen facility routes, inadequate installation or security practices, and designed facility redundancy levels should not result in added mandates affecting all operators and all excavators.

That any facility promoted as eminently critical to the public welfare be subject to installation and maintenance standards commensurate to the declared risk, and, as are natural gas, petroleum and hazardous liquid facilities, also be subject to privately funded, plant specific, security responsibilities.

That the "workshop" will fairly evaluate as many views as possible, while being cognizant that certain "expert" positions may well support an unreasonable shift of liability, or an unnecessary and costly increase in industry related professional services.

Finally, that NTSB and DOT keep regulation and review within the guidance provided by Congress. We feel this will allow maximum latitude for the responsible operators and excavators, while providing the State "one-call" reporting and enforcing mechanisms an opportunity to identify and weed out the non-players.

Where possible, the NTSB and DOT should review additional partnering with industry to maximize privately supported research. New methods that may ultimately improve safety, and reliability, of subsurface transportation for the entire United States include:

Ground Penetrating Radar
Sonic Locating Equipment
Geographical Information Systems
Automated Ground Positioning Systems
Computer Based Mapping
Efficient, Non-destructive,
Excavating Processes
"Fail Safe" Digging Equipment
Reliable, Non-intrusive, Facility Depth Verification Processes
Equipment or Facility Impact Signaling Sensors
Protective Installation Methods Trenchless Technologies
Buried Warning Methods Risk Based, Facility Impact Protection Standards

Educational efforts by "one-call" systems, contractors, and individual operators in California have provided measurable successes. However, some of these efforts were (are) limited, or sporadic, in application. Nevertheless, some methods were shown to be effective. These included:

"Locator Workshops", professional and government group presentations, other advertising including: visits to individual contractors, equipment rental yards and permitting offices, the airing of video and radio public service announcements, publication of free "hand-out" materials, and free 1-800 number bumper stickers.

Some individual operators (those that can afford it and have the greatest risk exposure) are doing a commendable job spreading the word and encouraging enforcement. However, solo efforts have limited impact, and are not sustainable over the long haul.

Our "one-call" program makes a twice yearly "Newsletter" mailing to all licensed contractors. Also, various informal groups (mainly the larger facility operators) have joined forces to organize excavator awareness programs throughout California. These
programs, in the form of "Contractor Nights", provide a free meal, a chance for "one-call" and/or operator presentations, and a open discussion forum. Continuing support for these events is in doubt due to a "preaching to the choir" situation. However, some operators feel even very limited dialog is better than none.

Another effort being tried, again sponsored by volunteer operators, is the hosting of events known as "Equipment Rodeos". Excavators are invited, supplied a BBQ meal, and given an opportunity to demonstrate their skills while being exposed to the "one-call" message, all free of course.

All California "one-call" members have access to "call before you dig" promotion materials to give to excavators in the field. These materials explain the process, the benefits, and requirements. Since many field visits are required to fulfill the facility locating function, direct contact is very easy, and very effective.

Collectively, if California is typical, millions of dollars are spent on local advertising. Some portion of these resources might be effectively pooled by siphoning off a small percentage of this amount, and joining these funds with proposed "grant" moneys. The combined sum could then be used to develop and sustain an intensive national public advertising and educational effort.

"One Call Systems International" may be a logical focal point of such a program. A universal "call before you dig" message should be readily supported by O.C.S.I. operator membership.

Either through the licensing, or training, processes some excavator awareness program/testing should occur so all persons engaged in these endeavors are cognizant of the basic responsibilities of both operator and excavator. The consequences of hitting substructures, both personal and financial, should also be made very clear.

NTSB/DOT may be able to work with excavator associations, employers, and unions to promote damage prevention by developing minimum licensing, education, experience, or qualification standards for those digging around buried facilities.

In California, operators and excavators have supported new legislation allowing the California State Licensing Board (CSLB) "one-call" enforcement powers over both operator and excavator.
The Bill now awaits the Governor's signature for enactment in 1995. The CSLB has also agreed to include the "call before you dig" concept into their license testing process.

This action should support the educational/enforcement loop, and result in even more averted damages. Similar approaches should work in any locality since virtually all States have some entity that performs project, contractor, and operator oversight.

The Workshop should focus on the "FACTS" (Fairness, Accountability, Consequences, Truth, and Safety), evaluate fresh ideas, avoid burdening those not contributing to significant public threats, and assist DOT to insure that any new Federal legislation is appropriately addressed.

SoCal Gas firmly supports equitable, sound, and reasonable actions to improve public safety.

What are the essential elements of effective One-Call Notification Systems?

Topic #1: Should there be a capacity to handle notices on emergency basis? Why, or Why not? If so how?

Yes. It is SoCal Gas's experience that "short notice" or "emergency" excavation notices can be effectively accepted by "one call" systems during normal business hours. These calls are processed easily because virtually everyone in the State (public, excavators, and facility operators) are engaged in routine daily activities. These activities can result in unanticipated excavations, and all operators can usually respond. In California, these activity levels decrease substantially after our "normal" hours so the need for after-hour coverage becomes negligible, and most operators wish to discourage after hours digging.

Regarding "an emergency basis" we believe "one-call" centers should not be required to handle a so called "emergency" function after normal hours (especially in areas where alternative 24 hour public access is provided for all emergencies, or if the reason is simply to make the center "easier" to use).

Post business hour "one-call" coverage should be a function of local necessity. Too many regional issues apply to non-business hour responses to dictate that all "one-call" centers must operate for 24 hours. Firstly, the regional "one-call" should ask: Is there a warranted need,
or significant public threat? If the answer is "yes", other issues needing review may include:

What type of extended coverage? Taped message, staffed, or other automation?

Must all owner/operators participate/finance the program? If not, who does? Why?

Are there special member response requirements, does the center send a message to all members for every call regardless, if not, what criteria does the "center" use?

What compliance penalty/issues apply? Are they different from normal hour notifications?

What existing "emergency" response capabilities exist, can or should they be integrated? Will a "center" program interfere, confuse, or conflict with parallel, and possibly mandated, member operated 24-hour service/response systems?

Is the nature of an "emergency" left to the caller? How is abuse of the pre-notification requirement controlled, prevented, or policed?

Is the center prepared to interpret, handle or refer mis-directed, but genuine, "emergency" calls that may be received?

Will operators with mandated response timing be subject to the timing of the call to the center?

If the 24-hour system is only for certain members, is the center prepared to provide dual levels of service based on the time of day?

What is the liability or business risk for operators not participating?

What messages are being sent to public and excavator? (Pre-notification is required, but not really !!).

Is it vital that some facility owners receive all "emergency" type calls directly, and others maybe not so crucial?

Are there regulatory considerations for handling potential safety sensitive calls?

What are the center’s liability/insurance issues?

Are special center employee training requirements needed?

What are the population demographics? How is the public currently conditioned?

As an "emergency" call center, what are the language dialect variables to consider?

Could the center be held responsible for delaying, or misinterpreting, a response to a gas, electric power, or other critical situation?
**Topic #2: What type of requests should be accepted and how far in advance of work?**

The universal function of all existing "one-call" programs is to process prior excavation notices. This should be the only required type of request. Other functions should be at the need of the regional program, and in consideration of the entities paying the bills.

**Topic #3: What documentation should be made of notifications and transmittals?**

Documentation of each call should be required. The specifics should be tailored to local needs with a view to satisfy potential legal questions, or reference for the operator, excavator, and the "one-call" program. The "who, when, what, where, what said, and said by whom" questions should all be addressed.

**Topic #4: How, and in what time interval, should transmittals of notification be made to buried facility operators?**

The "how transmitted" should be a function of the technologies available to the various member operators receiving the notices. It is not practical to mandate a single communication method for all operators. No communication method should be excluded providing the basic need is fulfilled.

Certainly, a "one-call" goal should include sending notifications as closely after receipt as possible. However, the "in what time interval" issue needs to be flexible to local conditions. Frequency greatly depends on incoming and outgoing call volume, the "one-call" system technological capabilities, the prior notification requirements, the extent of "emergency dig" or "short notice" provisions, and the timing of the "dig". Fax sends, sends over computer modem, and phone notices are all viable methods, and should be accomplished either individually, or by multiple batch sends, several times a day or as needed.

On a Federal level, a recommendation should simply require that requests be prioritized and sent in relation to the stated time of digging. If there is a multi-day pre-notification requirement, the interval will be more critical for any "short notice" requests. Requests short of the required notification period should be sent ahead of routine calls, and be responded to based on a "best efforts" basis, and after operator evaluation.

One important safety key is to have some firm expiration date for all locate requests. Expiration dates provide a means for operators to stay current with continuing projects.

**Topic #5: What scale should be used today on mapping systems to identify existence of buried facilities? In the future?**

The question suggests the "one-call" systems have, or will have, some facility mapping function. This is really the
wrong question to ask since only facility operators have facility mapping responsibility, and only they can identify the location of their plant.

A better question might be, "In the absence of such, what effective mapping or grid system could operators use to identify to a "one-call" system those geographical areas in which they need prior notification?".

There are computer based systems which can create a street, or latitude and longitude based map. However, enabling all operators to input their new, and existing, plant onto this grid is another issue. Most underground plant is not, and was never, tied to anything other than local landmarks, old street measurements, or political boundaries. To input all information onto any single system would be a monumental, and in many cases unnecessary, effort quite beyond the present capacity or need of many operators.

However, areas without adequate uniform mapping for operator, excavator, and "one-call" reference would benefit from such systems. Yet, many operators will need assistance in inputting accurate data onto a new mapping system of this sort.

**Topic # 6: What information should be obtained on each notification?**

The basics would include: dig location, nature of work causing the excavation, dig start date and time, identity of person calling, the company performing the work, company the work is being performed for, method of contacting the requester, and any available mapping location (grid).

**Topic # 7: What role should systems have for educating excavators, contractors, or public on the existence of and how to use the system?**

Every "one-call" should have a provision for member supported educational and outreach programs. "One-call" systems should maintain advertising postures. These activities can be supported by operator fees through the budgeting process. Programs can be augmented by individual members, based on need and ability, for activities over and above basic "one-call" messages (i.e. facility specific education).

If "one-call" programs become Federally legislated, as a State initiated responsibility, then State licensing entities should play some role in educating excavators and ensuring that the systems are used. Local permit offices can assist by requiring that excavators obtain a "one-call" notification number before beginning excavations. This will cause a permit to become invalid unless it is accompanied, on site, by a current notification number.

"One-call" systems should have sufficient administrative staff to allow a proactive stance in making presentations to pertinent community centers. "One-call" administrators should visit organizations such as:
homeowner associations, building improvement stores, rental yards, and other open forums. All operators that have a customer base, especially those having safety sensitive plant, should be encouraged by "one-call" programs to insert educational materials in periodic mailings to their customers.

WORKSHOP 2
What Responsibilities Should Buried Facility Operators Have?

Topic # 1: Should buried facility operators be required to advise excavators/contractors when marking can't be timely performed or when operator has no facilities in area? Why? How?

Yes. To do less is not conducive to attaining, or retaining, full participation. The basic requirements should be a balance between operator and excavator responsibility. This operator obligation will foster good will and provide uniform expectations. The best way to insure that an excavating community will consistently call is for operators to respond within the time parameters allowed, or at minimum, make other arrangements suitable to both excavator and operator.

If an operator receives a notification, but has no facilities at the site, then a documented form of positive, operator initiated, response either by a field visit (that can include a special marking for no conflict), or telephone/fax attempt contact to the excavator, is needed. Otherwise, there being no marks or contact, the excavator may not be sure if the absence of marks is a result of no facilities, or simply that an operator has not yet responded.

Topic # 2: What should be the maximum permitted response time for marking?

This should be solely dependent on the notification window adopted. If, for example, there is a 2 to 10 day prior notification requirement, then all operators should simply be required to respond ahead of the stated "dig time". In this manner the excavator knows that if he gives just 2 days, or the full 10 days notice, the project is supposed to be marked ahead of the dig.

Topic # 3: What types of markings should be permitted?

Paint, spray chalk, staking, flags, shinners, nail whiskers, and any other suitable markings should all be permitted depending on the site and surface conditions.

Topic # 4: What accuracy standard should be used for operator markings?

Given today's technologies (as applicable to most underground plant) we should be able to adhere to a 2 foot "tolerance zone" laterally from either side of the facility, providing there is some requirement that excavators hand expose the facility ahead of using mechanized equipment in the "zone". Existing, non-metallic, non-locatable, and non-public threatening substructures should have some waiver
for accuracy, or be excused from the "one-call" program altogether. Non-pressureized sewer laterals are a good example of the types of facilities with historically poor mapping, and no practical way to locate. For open trench work, more problems can be caused by trying to precisely locate them than otherwise. For horizontal boring operations the locations are more critical, and excavators need to exercise more caution, but again, the public threat is negligible.

Finding the precise location of substructures with power driven equipment should be avoided. Without a hand expose "tolerance zone" a more lenient standard than 2 feet may be needed as the range of accuracy levels vary with locating equipment, and the site circumstances.

Topic # 5 What coordination/communications with excavators should operators have relative to excavation precautions and emergency notifications.

Communication
Considering both the current level of outside digging activity (SoCal Gas alone handled over 340,000 locate requests in 1993), and the fact that any new legislation will very significantly increase obligations for most operators, it is important that as much information as possible be given to the excavator on the initial visit, or at some time prior to the digging activity. Much of this information can be communicated through the various types of markings and abbreviations used.

In California, the "one-call" members are developing industry guidelines to suggest uniform marking methods (length of mark, distance between marks, size of letters, etc.), and to standardize facility specific abbreviations (operator of facility, facility material if other than metallic, if the facility is in a conduit, material of conduit, size of facility, etc.).

The preceding guideline will provide information to help the excavator to know what to expect, where to expect it, how to identify it, and consequently, how to avoid a damage.

Field Meets
Operators and excavators cannot always meet in the field, and meets will become increasingly difficult in the future. All reasonable efforts to supply the most information, with the least negative impact, will need to occur on the first visit. If not in person, the marking process should communicate as much useful information as possible. Beyond that, and especially if the excavation has likely conflict with the facility location, extra information such as telephone contacts for damage notifications or resolution of substructure conflicts, should also be provided to the excavator at some point.

Operators should have some additional obligation to assist excavators in instances where the operator is unable to supply information regarding surface
location, size, kind, and number of facilities.

**Emergency Notifications (Damages??)**
"Emergency notifications" in the context of the question appear to mean "emergency damages". In the case of damages we believe that a nationwide "one-call" concept should not include a mandated provision to accept these types of calls. Many operators, like SoCal Gas, have very separate (from "one-call") mechanisms to receive, evaluate, and dispatch facility and service calls, including those that could pertain to damages.

Taking "emergency" calls may unfairly force extra insurance costs, added legal liability, and DOT drug testing issues onto all operators through their "one-call" responsibilities.

Another reason for excluding "Emergency notifications" from a mandatory membership "one-call" program is because some members must retain direct control of proper (and necessary) reactions that may apply to any potential "damage" call. For instance, it could well be dangerous, confusing, or prohibitive for a non-gas facility operation to expose itself, some members, and the public to the risks of handling, or properly relaying, reports of natural gas line "damages".

**On Site Assistance**
SoCal Gas (as operator and excavator) understands both sides of this issue, but recognizes that it is not possible for all operators to provide 100% on site advice, assistance, or monitoring. Aside from the liability questions, there are just too many individual dig sites.

To the extent an operator is able, or where existing law mandates, there is only, 1) an opportunity, or 2) an obligation to be on site. It would be a exercise in futility to mandate criteria that governs when all operators must observe, or assist, at any given excavation.

Where critical services, or vulnerable plant, are involved (and in keeping with existing internal and government mandates) the monitoring, and job site assistance, must be at the complete discretion of the operator. These evaluations are typically based on the level activity on any given day, where government or internal requirements apply, which dig sites present the most hazard to a facility or public, equipment on the job, type of project, operator knowledge of the excavator, and the quality/condition of surface markings.

It is simply not reasonable, nor possible in most cases, to expect operators (at the cost of their customers or public served) to supply uncompensated excavation site services simply to relieve the excavator of the responsibility to dig carefully.

As with most excavators, when we dig it is a commercial endeavor to provide an internal benefit. We have no expectation that other facility operators have some special obligation to assume our business risks, or protect our bottom.
line. If an operator chooses to be on site, fine, that is their choice and we are happy to have them.

**Excavator Responsibility**

By the very conduct of the professional endeavor, all excavators (including SoCal Gas) are very aware of the general make up of underground plant construction.

Professional excavators are very cognizant of the damage potential of their digging implements. Excavators also have the responsibility to know the codes pertaining to their activity or project. Most importantly, they properly (and legally), own the burden of accountability for operating in a responsible manner to protect all pre-existing facilities from their activity.

Once marked, and in the vast majority of cases, we contend that the onus of not causing damage should be entirely on us (the excavator). If an excavator damages a marked and otherwise safe, harmless, and pre-existing facility, it would seem reasonable to focus more on excavator actions, rather than on those of the operator. What processes should the excavator follow to insure that pre-marked facilities are not damaged?

**Topic # 6: What depth of facility (should) be provided? Why?**

A 100% accurate commitment to depth at any given point along a facility route is only obtainable by visual confirmation. This is because current technology, facility records of this nature, and the many variables that can affect post installation depth are either not available, or beyond the control of the owner/operator.

The only way to know the depth of any facility, after it has been installed, is to dig it up and measure it from existing grade.

A modicum of confidence in recorded depths at any one point would only be attainable if sea level measurements were available along every horizontal foot of every underground facility. For the majority of systems the expense and effort required to make all these separate recordings during installation, and then to maintain the archived data, would be prohibitive. Also, considering the vast amount of pre-existing underground facilities not now recorded, any practical application in the field would be negligible for a very, very long time.

Even sea level measurements will not compensate for post installation facility shifts that may occur. The millions of miles of existing underground facilities are both static, and dynamic, in nature. Some facilities have been in service over 100 years, some are rather new, and all of them are subject to having more or less cover than when first installed.

Factors affecting post installation depth include surface changes resulting from street improvements, i.e. resurfacing, grading, lowering, widening, or
abandoning. Earth surfaces change due to flooding, sitting, plowing, and erosion. Facilities can shift due to earth movement, stress, and water saturation.

Until technology provides a 100% reliable method, no depth can ever be guaranteed without "day lighting" the facility in question.

**Topic # 7: What role should buried facility operators have for educating excavators/contractors/public on use of one-call and on working safely adjacent to buried facilities?**

**Facility Operators Through "One-Call"**
All operators, by virtue of their "One-call" membership, should share support for statewide "call before you dig" advertising, and educational efforts (perhaps even on a national scale through an organization like O.C.S.I.).

In California, "one-call" systems perform part of their "mission" through member supported educational programs. This is accomplished by pro-actively availing themselves to organizations in order to promote awareness.

Many operators also have an additional conduit to the public through their customer base, and can conduct "bill stuffer" campaigns to spread the word.

Some operators make special efforts outside the "one-call" system because of the sensitivity of their underground plant. This is a very equitable practice because it does not burden non-involved operators.

Not all operators have common underground plant concerns beyond the "call before you dig" message. Many owner/operators, while mandated to belong to the "one-call" program, simply do not have an internal need, or public security issue surrounding their underground installations. Therefore, they do not expect to be financially responsible for efforts beyond the basic message.

It is clearly not equitable for all "one-call" members to support, by virtue of their mandated membership, any additional or facility specific special protection advertising. "One-call" members should only be required to support those programs that are common to, and benefit, all the membership. If there are public safety issues outside that commonality, they must be addressed by the particular facility operator(s), and/or oversight entity.

**Special Awareness Programs**
All operators of underground plant, having unique operating conditions regarding that plant, should make additional internally funded educational efforts as they deem necessary. Many do. These programs can utilize the auspices of local "one-calls" (contacts, accessing statistics, sharing or co-presenting presentations, etc.), but the activities should not negatively impact other non-involved operator members.
Like oil, gas, and hazardous liquid facilities, all underground plant identified as crucial to the public welfare should be held accountable for internally supported awareness, and/or plant security, programs separate from mutually supported "one-call" systems.

Topic # 8: What type of marking equipment should be used?

There is a wide variety of available methods. The method is less important that the color used, and the durability. Methods of marking should be open for what ever works in a particular local under specific circumstances, but typically these include applications of paints, spray chalk, stakes, shiners, chalk lines, offset marks, whiskers, documented verbally communicated measurements, or provided facility plans.

Durability can be a two edged sword. If the marks last too long complaints from cities or the public arise due to the "graffiti". Even worse, an excavator may assume the marks are current, and digs without calling.

If the marks do not last long enough they are of little use to the excavator, and can lead to operator excessive re-marking. In any case, the particular choice of equipment or method is very site and circumstance dependent, and really is not enough of an issue for a Federal ruling.

Topic # 9: When excavations show errors in mapping information, should operators be required to update maps?

Yes. To the extent the operator is advised of the errors. To do otherwise is missing an opportunity to improve "in-house" records that could lead to a probable future benefit.

Sound "one-call" procedure will have policies that allow excavators to be able to re-contact the "one-call" center, or the operator, to request additional information for situations where facilities are not found as marked. Operators should respond to these requests as soon as possible, and use the opportunity to update mapping, and correct marks.

WORKSHOP 3
What Responsibilities Should Excavators Have?

Topic # 1: Which operations should require notice to one-call system?

No digging activity should be discouraged from accessing the services of a "one-call" system for prior notification purposes. On the other hand, this should not mean that all excavations must be subject to a prior notification.

There are a few instances where the threat to the public, or other facilities, is either too remote, or too great, to pre notify.
It is easier to identify operations that should not require notice. These would include excavations by authorized response entities to address a public (or critical service) threat that requires an immediate remedial action (commonly known as an "emergency waiver"). However, these activities, if on going, should be reported to the one-call center at the earliest practical opportunity.

Also needing exemption are those excavations by facility owners over their own structures in situations where there is no possibility of damaging another substructure owned or operated by others.

**Topic #2: Should excavation area(s) be pre-marked before buried facility markings and if so, how?**

Yes, but only to the extent practical.

In California, pre-delineation of excavation sites is a codified process. This has proven to be a workable, and very positive element of our "one-call" law. Delineation helps the excavator by getting the marks where they are the most use, cuts down on complaints due to over marking, and assists the operator by limiting unnecessary labor due to difficulty of "pin pointing" the location.

A good code will allow for pre-delineation omissions in areas where it is either not possible, not safe, or could be construed as confusing to the public. In lieu of pre-delineation, there should be a requirement for the excavator to alternately supply measurements, or information, sufficient for the operator to precisely locate the excavation area.

We have had satisfactory results using white markings in either paint, chalk, stakes, or flags for these purposes. Our "one-call" system has published pre-delineation "guidelines" for our excavating community.

**Topic #3: Should excavation machine operators receive special training or otherwise be qualified to operate machinery in areas of buried facilities.**

Yes, either through the licensing, or training, process some early excavator awareness program/testing should occur so all persons newly engaged in these endeavors are cognizant of the basic responsibilities of both excavator and operator. The consequences of hitting substructures, both personal and financial, should also be made very clear.

Perhaps the NTSB/DOT can investigate teaming up with excavator trade associations, employers, facility operators, and excavator unions to promote damage prevention by offering minimum orientation, licensing, education, experience, and/or qualification standards for those digging around buried facilities.

**Topic #4: What damages to buried facilities must excavators/contractors report and to whom?**
SoCal Gas does not support a Federal mandate that "one-call" centers should accept "damage" calls. Chiefly, because excavation pre-notification centers are typically not facility specific experts, and as such, are not qualified to handle all types of possible calls. Therefore, a nationwide "one-call" concept should not include a provision to accept damages.

Any damage that punctures, gouges, breaks, bends, kinks, or removes protective coatings should be reported to the facility owner directly. The facility owner(s) involved are known because the "one-call" system should inform the locate requester of every underground operator notified as a result of the original locate request. If contact is necessary, it can be accomplished.

Only by speaking directly to the caller and asking the right questions can the owner/operator of some facilities make the appropriate determination for remedial action.

Many operators, as is the case with SoCal Gas, have very separate, specially designed, mechanisms to receive, evaluate, and dispatch all facility calls, including those that could pertain to damages. We also need to receive the initial call directly because required response times are tied to the original call. Delays in relaying calls will delay our response.

Accepting any purported "damage" could be risky business for the center, the public, and the operator. All damage responses would be necessarily dependent on the information supplied by the caller, and the interpretation of the "one-call" employee.

Per DOT, all SoCal Gas employees receiving calls that may involve investigative procedures relating to a operation, maintenance, or emergency response function (for regulated facilities under 49 CFR Part 192 <also 193 & 195>) are subject to drug testing. "One-call" centers would, under this interpretation and as agents for SoCal Gas, also be subject to a drug testing program simply because all calls related to a gas line condition are operation related.

To summarize, we believe it could well be dangerous, confusing, or prohibitive for a non-gas facility operation to expose itself to the risks of handling, or properly relaying, reports of gas line "damages".

**Topic # 5: How should contractors/excavators determine the depth of buried facilities?**

Operators normally cannot commit to depth of a facility after it has been installed. Therefore, excavators should carefully "hand expose" buried facilities within a pre-determined "tolerance zone" to either side of the facility, as marked, to the point of exposing the facility, or until non-conflict with the excavation is determined.

A 100% accurate commitment to depth at any given point along a facility route
is only obtainable by visual confirmation. This is because current technology, facility records of this nature, and the many variables that can affect post installation depth are either not available, not economically feasible, not totally reliable, or beyond the control of the owner/operator.

To have fairly accurate depths at any given point would require pre-recorded sea level measurements along every horizontal foot of each underground facility. Currently, a practical and economic impossibility.

The millions of miles of existing underground facilities are both static, and dynamic, in nature. Some facilities have been in service over 100 years, some are rather new, and all of them are subject to having more or less cover than when installed.

Factors affecting depth include surface changes resulting from street improvements such as: resurfacing, grading, lowering, widening, or abandoning. Earthen surfaces change due to flooding, sitting, plowing, and erosion. Facilities can shift due to earth movement, stress, and water saturation.

Until technology provides a 100% reliable method, no depth can ever be guaranteed without "day lighting" the facility in question. Currently, the only sure way to know the depth of any facility, after it has been installed, is to dig it up and measure it from existing grade.

Topic # 6: What, if any, operation of excavation machinery should be permitted in marked areas and if so, under what circumstances?

In California code there is a pre-established hand expose "tolerance zone". No power or mechanized digging equipment is allowed within the zone around the facility as marked. However, if the operator is on site, and accepts the responsibility (and his facility is the only substructure within the tolerance zone) then permission to use power digging equipment by that operator is reasonable, and allowed under the law.

A "tolerance zone" is critical to preventing damages because locating equipment is only accurate to a certain degree, and because many facilities can be marked only by measurement from some old reference point. These references have a tendency to be either not where they were originally found, or gone altogether.

Excavators permitted to "prospect" with power equipment may be the cause of many costly mistakes.

Topic # 7: What role should excavator associations have for educating excavators/contractors/public on working safely adjacent to buried facilities.

Professional excavator groups should have the lead responsibility for educating their constituents. These are the people whose welfare and interests are most directly linked to the ability to
conduct business in a crowded subterranean environment. Facility operators, and "one-call" programs, should avail themselves to assist in these efforts.

In California operators that also happen to be excavators are, by virtue of their "one-call" participation, very proactive in this regard. Specific direction for effective education is a natural "one-call" function that should encourage excavator participation on some level. The particular level will need to consider local requirements and opportunities.

Those not normally engaged in digging as a part of a commercial or professional endeavor, but still susceptible to follow code (i.e. the general public), must be made aware of their legal obligations. They should be provided some background on underground facilities by the local "one-call" and membership. Mass media, citizen and business association visits, and operator mailings need to be utilized to get the word out.

For sure, education is critical. If HR 4395 passes (as constructed in mid August '94) there is not a single person in the United States that may be exempted from the pre notification requirements, and penalties, if they dig with "mechanized" equipment in locations containing substructures owned by others (i.e. the golf club grading their private driveway, to the weekend gardener renting a post hole digger).

**WORKSHOP 4**

**How Should the Program be Administered?**

**Topic # 1: What should be OSHA's role in preventing excavation damages?**

OSHA should play a role that is appropriate to it's jurisdiction.

**Topic # 2: What should be RSPA's role in preventing damages?**

RSPA, being responsible for developing performance oriented code language consistent with current legislation, can ensure that such language addresses only those areas clearly in the Federal domain and critical to the general public's welfare. RSPA should ensure that any new policy will not unjustly shift responsibilities, or result in jurisdictional conflicts.

**Topic # 3: What should be the State role in preventing excavation damage?**

The State can provide forums for education through inspectors or Fire Marshals, and through other existing oversight mechanisms which normally provide for code enforcement or contractor licensing.

In California, the Contractors State Licensing Board is about to adopt enforcement of the "one-call" codes for both operators, and excavators. State offices with public access, especially if they have anything to do with construction, should be open to
installation of "one-call" supplied education and display materials.

Topic #4: What role should buried facility operators have in initiating enforcement action?

Topic #5: What role should buried excavators have in initiating enforcement action?

Operators and excavators should have equal access to report negligent, repeat type, offenders. Hopefully, to the same entity.

This system is beginning to be developed in California as the State licensing board views both operators and excavators as coming under their jurisdiction. Some consensus on what is reportable and what is not will need to be worked out. There is a general feeling that operators and excavators will need to exercise considerable judgment when filing complaints.

It will be important not to swamp the industry in frivolous reporting. To this end, some very basic reporting criteria will need to be worked out by operators, together with excavators, and hopefully, under the auspices of the local "one-call" program. Unless done with some thought, animosity between excavator and operator may ruin whatever cooperation and working relationships may exist, and bog the industry down with unproductive litigation.

Targeting the general public for enforcement should be discouraged. Is it not reasonable to try enforce the code on the citizens to the extent of punitive judgments, at least not at this point. Simple "one-call", or operator, generated "post damage" education letters, or notices should suffice. After all, the public is not causing the type of threat that jeopardizes the general safety and welfare of the community.

Topic #6: What types of penalties should be established for persons who violate provisions of damage prevention statutes?

Reasons for penalties should be clear and simple. They should only consider the basic concepts of the State provisions. Otherwise the only thing to be accomplished will be the swelling of attorney's wallets.

Enforcement should focus on, "Did the excavator give prior notice?", and, "Did the operator respond appropriately?".

Staged levels of warnings (verbal to written), job site ticketing, fines, and suspension or cancellation of licenses should all be reviewed as possible. While penalties are necessary to enforcement, they need to be accessed or weighted against the total opportunities or exposure. A graduated scale based on time between incidents should provide for lesser, or greater, penalties. These issues should be worked out in the same forum that determines the State, excavator and operator reporting guidelines (operators, excavators, and
"one-call" administrators working together).

**Topic # 7: How and by whom should violations of damage prevention statutes be identified for investigation and enforcement?**

Violations should be identified by OSHA, Licensing Boards, State, City, and County inspectors, individual operators, and excavators. Most local government agencies involved in construction oversight have some existing internal format for code violations that can be adjusted to include these types of investigations.

Reporting of operators and excavators should be subject to a uniform format so information gathered fulfills some minimum basic requirements.

The local "one-call" program could develop a complaint form for their members and excavator clients. The form should, by design, strive to eliminate (to the extent possible) the frivolous, or nuisance, type claim. In California, the Contractors State Licensing Board has an existing form that can be used. However, it is very generic in nature, so some guidelines on what exactly is reportable will still be needed to be worked out.

**Topic # 8: How and why should charges of violations be adjudicated?**

If California is typical, existing State licensing systems have complaint investigation arms that already follow up on complaints, and levy penalties. Most cities, counties, and States have some department where construction type deviations are handled. In any event, it would be eminently better to leverage an existing local entity, rather than create one.

Penalties should range from the warning letter, warning visit, on site ticketing, fines, or even threats to suspend licenses to operate.

**Topic # 9: What role should system users have for educating excavators/contractors/public on program use and penalties?**

Of course, "users" of the systems are the excavators. Excavators, if commercial or organized in any way, should promote systems through their respective professional trade, and union affiliations.

Excavators who are also "operators" of underground plant will have, at minimum, an extra burden of supporting these efforts through their fee contributions to the "one-call" system.

The general public, which can also be an "excavator" (per code definition), will have to be educated through efforts of operators, permit offices, and "one-call" programs.

**Topic # 10: What action(s) should be taken for repeat offenders/violators?**

It is not appropriate to set predetermined threshold limits (i.e. how
many times a center is not notified or how many times an operator fails to mark). Numbers of incidents will need to be tied to numbers of opportunities, and the ability/opportunity/responsibility to follow the code.

Actions should range from warning letters to license suspensions. Again, if reporting of violators is limited to the very basic, "Was a call made within the guidelines of the code?" or, "Was a response appropriately executed?", the actions will be much easier to determine.

Tracking and adjudicating offenses will be easier if complaint criteria is simple, and the whole program will be more efficient and meaningful to all concerned. Prospective offenders also need to be presented with information that is clear and concise.

**Topic #11: What reporting should be required of buried facility operators?**

The proposed reporting requirement to the Secretary, for the purposes of tracking code adherence in general, or for identifying specific problem issues, should be a "one-call" system function. These reports should be periodic, and contain general categories such as how many notifications received, how many sent, and how many damages were reported to the "one-call' system as occurring because of no prior notification.

If the question speaks to the issue of reporting specific violators, we feel that operator and excavator reporting to the enforcement entity should be the only formal reporting of this type. The specifics of each complaint will provide useless information to the Secretary since these statistics are immaterial to tracking the effectiveness of a State "one-call" system. There is no need for "one-call" systems to assemble formal reports containing information pertaining identification of excavators, or operators, because they are not in the enforcement business.

**Topic #12: What reporting should be required of "One-Call" notification systems?**

"One-calls" should accept, and report informally to the involved operators, any excavator complaints received regarding the operators' performance. Tracking of the incidence rate, and types, of these complaints for general trending should be encouraged.

The "one-call" system should also accept non-specific operator information regarding complaints filed against excavators. This information can be used to generate useful data for informal "member" reports, and to enable correct focusing of educational efforts.

Formal reports should only be conducted as required by law (as enacted, see Topic 11), and be statistical in nature to document call volume, effectiveness, and promotional/educational activity to the Secretary.
Any additional reporting should be optional to satisfy local "one-call", and general membership, needs.

**Topic # 13: What reporting should be required of State program administration agency?**

This issue is addressed in Topics 11 and 12 since the State program will be the local "one-call" system, and in virtually all cases, the local "one-call" system is made up of the local operators.

**Topic # 14: What reporting should be required of OSHA?**

and

**Topic # 15: What reporting should be required of RSPA?**

None. The individual "one-call" reports to the "Secretary", as enacted, should suffice for all Federal purposes. If there is some regulatory, oversight, or charter function to be fulfilled then perhaps OSHA and/or RSPA should monitor those reports as submitted to the Secretary. Certainly, creation of unused, unnecessary, or duplicative reporting should be avoided.