

low the installation of lower-efficiency appliances than are currently allowed.

In addition, it is unclear that the cost/benefit payback is significant enough to warrant a subcode change to the 1992 CABO MEC. According to the study, the fuel savings for an average detached home built according to the requirements of 1992 CABO MEC is approximately 15 percent, while there are no fuel savings for attached houses.

The data from the comparison study conducted by the DCA consultants indicate that building envelopes that comply with the 1992 CABO MEC add between \$1,076 and \$2,262 to the cost of a single-family detached house with a basement, over the cost of complying with the 1993 BOCA National Energy Conservation Code. The data also shows that simple payback in energy cost savings for single-family detached houses would range from 8 to 24 years, with an average of 10 to 12 years. For attached housing, no payback can be calculated because the heating costs are higher for 1992 CABO MEC than for 1993 BOCA.

Subsequent to the passage of EPA Act, the U.S. Department of Energy (DOE) determined that the 1993 CABO Model Energy Code offered greater energy efficiency in residential buildings than the 1992 Model Energy Code. Consequently, the State must now compare its existing energy subcode with the 1993 CABO Model Energy Code²³. This evaluation must be completed by July 1996, two years after the Federal directive.

This recent Federal mandate means that New Jersey must again compare its energy subcode, this time with the 1993 CABO MEC. An analysis and determination of the model energy codes will be initiated within the next 18 months, and public input will be encouraged during the process.

Considering the lack of confirmation of significant energy and cost savings in a reasonable payback time from the 1992 CABO MEC and the need to re-evaluate the State's energy subcode again within the next two years, the State has decided not to take action on its residential energy subcode at the present time. The DCA will re-evaluate the State's existing residential energy subcode provisions with the 1993 CABO MEC standards within the next two years.

In the meantime, the State-adopted 1993 BOCA National Energy Conservation Code sets a minimum requirement for energy efficiency in new construction. The State, however, should continue to promote the installation of cost-effective energy efficiency measures which exceed the

minimum standards established in the energy subcodes.

For example, the Board of Public Utilities demand-side management (DSM) incentive regulations provide an opportunity for utilities to earn incentives on the implementation of cost-effective DSM measures in new construction. Utilities assist in the promotion of energy-efficient homes and offer financial incentives to builders and homeowners to install appliances which exceed minimum Federal and State energy efficiency standards.

Another example of a way to promote energy efficiency in new construction is a home energy rating system (HERS) program. A HERS program would provide prospective buyers of new and existing homes with information about the present energy efficiency level of a home, including estimated energy costs. A HERS program can also identify potential opportunities to use energy more efficiently. A key incentive of a HERS program is that it allows more purchasers to qualify for mortgages for energy-efficient homes because energy costs are lower, leaving more funds available to satisfy mortgage payments.

Findings:

- A comparison of the State's adopted 1993 BOCA National Energy Conservation Code and the 1992 CABO MEC does not confirm clear cut energy and cost savings.
- Opportunities exist for promoting the installation of cost-effective energy conservation measures in new buildings which exceed the minimum standards established in the State's adopted energy subcodes.

Recommendations:

- ▲ The DCA should continue to evaluate updated versions of nationally recognized Model Energy Codes to determine if they should be adopted to improve energy efficiency in new and renovated residential structures.
- ▲ A Home Energy Rating System should be

developed to encourage builders and others to invest in energy conservation measures that exceed minimum building codes.

▲ The Home Energy Rating System should be tied to an Energy Efficient Mortgage Program to encourage prospective homeowners to buy or build the most efficient homes.

▲ Performance contracting should be encouraged in the residential sector to achieve energy savings.

▲ The State should promote cost-effective energy efficiency measures in the building and renovation of public housing.

▲ The State should adopt a tiered approach to degree day design on a county basis.

Energy Efficiency in State Buildings

The State manages and maintains approximately 2,000 buildings including school and college buildings, institutions for the mentally handicapped, correctional facilities, State office buildings and other structures and facilities. The current inventory of State-owned buildings exceeds 24 million square feet. In addition, the State is responsible directly or indirectly for energy costs in a large number of leased buildings. While some of these buildings are modern, many are antiquated, turn-of-the-century facilities. The great diversity of State buildings presents a challenge to facility managers to conserve energy usage and control cost.

State departments have made energy efficiency a high priority and have taken steps to implement energy conservation initiatives at their facilities. Many of them have participated in the State's Energy Conservation Bond Program (ECBP), which has provided approximately \$50 million for financing energy audits and renovations at State facilities. To date, the ECBP has sponsored renovations identified in energy audits to 50 facilities at a cost of \$23.0 million. An additional \$20.2 million has been committed to projects in progress or recently completed, with an estimated energy savings of \$5.35 million per year. These projects included lighting replacements, building shell improvements, HVAC renovations and the installation of state-of-the-art computerized energy management systems (EMS) to aid facility managers in controlling their energy usage, as exempli-

fied by the Stockton State geothermal system.

Some State facilities have begun to participate in utility conservation programs in addition to utilizing the services provided by energy service companies (ESCO). Several projects have leveraged ECBP funds, utility funds and ESCO financing. This practice has helped the State generate additional energy savings without incurring capital outlays. This financing practice has not developed as quickly as planned. Problems still exist in the procurement of these energy service companies.

The General Service Administration (GSA), the State agency responsible for managing State office buildings as well as many of the State's leased buildings, has focused on initiatives that encourage energy conservation and efficiency. GSA has incorporated such practices as life-cycle costing and energy efficiency ratings of equipment when purchasing lights, motors, energy management systems and improvements to building envelopes.

One of the challenges facility managers face is aging equipment used for heating and cooling (boilers, HVAC equipment) that has become inefficient and in need of replacement. Facility managers have incorporated an integrated planning approach which included feasibility studies leading to the design of long-range facility master plans. These master plans, in many cases recommended several options including cogeneration to replace their existing power plants and to reduce the facilities' energy cost. Cogeneration would allow facilities to replace old boilers with equipment to produce their own electricity and steam at greater efficiencies than if produced separately. To date, at State colleges, hospitals and prisons, there are four cogeneration systems installed. Two are being built and upgrades in several more facilities are in the planning stage.

The Stockton State College (SSC) facility master plan indicated that it should replace its entire old and inefficient HVAC system with a geothermal ground source heat pump system for heating and cooling. This replacement provided the State with an alternative energy resource that would cut the college's electric consumption by one-quarter and natural gas consumption by three-quarters compared to their current HVAC system. Today, Stockton's geothermal heating and cooling system is the largest of its kind in the nation.

Many cost-effective energy conservation opportunities remain in State facilities. These measures have short paybacks and can provide long-term savings to the State. Capital in-

vested in energy conservation today can reduce the State's energy budget for many years to come.

The State faces a formidable challenge in its continuing efforts to conserve energy and reduce energy cost. Funds for capital projects targeted to save energy, in addition to Energy Conservation Bond funds, are limited and being rapidly depleted. The State needs to investigate alternative funding sources. One alternative is to maximize the use of utility conservation programs and the use of energy service companies to finance and install energy projects. To accomplish this, the State must first minimize obstacles to procurement of energy-efficient service, such as bidding restrictions. A task force has been established to review current State procurement procedures to make recommendations to improve the current bidding laws. The task force shall specifically recommend ways to revise current bidding laws to allow State facilities to make better use of energy service companies, and their greater participation in utility conservation programs.

With the recent unbundling of gas utility service, the State should examine if it is profitable for State facilities to purchase gas directly from the interstate pipelines or from the local utility.

The State Departments of Corrections and Human Service are currently in the process of developing facility evaluations as part of a master planning process. These evaluations should consider life-cycle energy costs where practicable, when making decisions on replacing and/or upgrading facilities.

Findings

- Significant efforts have been undertaken to reduce energy usage in State facilities.
- Significant additional cost-effective Demand Side Management opportunities exist in State facilities.
- Various obstacles such as bidding requirements exist which hinder the implementation of cost-effective Demand Side Management in State facilities.

Recommendations

- ▲ The State should maximize the use of utility programs to fund energy conservation measures.
- ▲ The State should investigate ways to minimize obstacles to the procurement of energy conservation.
- ▲ The State should investigate the benefits, if any, in purchasing natural gas from alternative suppliers.
- ▲ The State should authorize additional funding for untapped cost-effective energy conservation measures in State facilities.
- ▲ The State should consider life-cycle energy costs in evaluating institutional facilities for repair or replacement.

Emergency Planning

Electric Energy Emergency Response Plan

Extremely cold and icy weather in January 1994 led to an all time winter peak demand for electricity and resulted in a situation where the PJM Interconnection Control Area was unable to balance its generation and interchange to its load. Approximately 500,000 New Jersey electric customers had their electric power involuntarily curtailed by rolling blackouts for periods of up to one hour.

On the electric supply side, the primary factor contributing to the energy emergency within the PJM area was the cold and icy weather which had detrimental effects on the availability of generation resources. These detrimental effects included natural gas interruptions, oil delivery problems due to icy roads and frozen rivers, frozen coal piles, and the failure of generating units to operate due to frozen instrument air control lines and fuel lines. Other equipment problems were caused by the cold, icy weather which resulted in some units being derated. While the PJM system had sufficient installed capacity to meet the actual load on the date of the rolling blackouts, the unavailability of some of that capacity due to the above-mentioned cold weather problems contributed to the need for the rolling blackouts.

The natural gas supply system was also encountering an extremely high demand and interruptible natural gas was interrupted to some utilities in PJM. In addition, low oil inventories at some generating stations could not be replenished in a timely manner due to the heavy demand for fuel which slowed oil deliveries. Consequently, some generating units virtually ran out of fuel.

While problems were experienced in the generation area, the PJM transmission system transfer capability was sufficient to deliver all generation made available to PJM and the PJM emergency operating procedures were successfully used to maintain the integrity of the PJM interconnected system during the emergency. These emergency procedures included voltage reductions, requests for public curtailment of electric usage, and manual load shedding of electric customers.

Throughout the energy emergency, the New Jersey electric utilities made extensive efforts to keep the public and governmental entities informed of the emergency. Information was dispersed through radio messages, television coverage, newspaper releases and direct notification. However, there was some criticism that municipalities and the public had not been notified of the impending blackouts in a timely manner.

Voluntary conservation measures, implemented following public appeals by the utilities and public officials, contributed to a reduction in customer demand and a lessening of the emergency. Following the electric energy emergency, staff of the Board of Public Utilities met with representatives of the New Jersey electric utilities to carry out an assessment of the utilities' actions prior to, during, and following the energy emergency. The utilities were subsequently directed to respond to staff's written requests for information regarding the cause of the rolling blackouts and the utilities' response. Board of Public Utilities staff also met with representatives of the State's Office of Energy, which was then a part of the New Jersey Department of Environmental Protection and Energy, and with the Program Manager of the Policy Office of Emergency Planning of the United States Department of Energy, as part of their review of this matter. Board staff also reviewed the internal assessments made by the utilities in response to this emergency and reviewed reports of investigations conducted by the PJM Operating Committee and the North American Electric Reliability Council.

As a result of the investigations of this matter conducted by the utilities, the PJM Operating Committee and Board staff, the New Jersey electric utilities have undertaken numerous actions in an effort to prevent the recurrence of a similar emergency situation in the future, and to better respond to such situations should they recur. Examples of some of the actions taken to date or currently under way include the following:

- Fuel inventory and fuel-delivery policies during extreme cold weather have been updated, including increasing the minimum winter fuel oil tank inventory levels, providing daily fuel status reports and acquiring additional firm gas supplies.
- Generating plants have been winterized to mitigate against interruptions in their continued operation in extreme cold and wintry weather, including a detailed inspection of combustion turbine fuel oil system heaters and filters, review of water injection systems, testing of auxiliary heating boilers, the installation of tarpaulin windbreakers in critical areas, and the installation of strip heaters and space heaters.
- Emergency procedures have been reviewed and modified to include winter emergencies.
- Load shedding lists have been updated for use in winter emergencies. Load shedding lists identify critical circuits such as those that serve hospitals, police departments and fire departments, which are the last circuits to be interrupted.
- Plans have been developed and procedures implemented to allow for the timely notification of municipalities which will be subject to rolling blackouts before the service interruptions occur. The plans include coordinating State, county and municipal emergency management teams.
- Contact has been made with the New Jersey State Police to access the statewide Law Enforcement Telecommunications System during energy supply emergencies.
- Winter emergency drills have been scheduled prior to the start of cold weather to supplement drills currently conducted for summer operation.

Findings:

On December 21, 1994, the New Jersey Board of Public Utilities was presented with an analysis entitled "Report on the 1994 Winter Electric Energy Emergency" prepared by the staff of its Division of Electric. The following findings and recommendations are excerpted from the Report:

- While the record-low temperatures experienced in the region during the week of January 17, 1994 caused record winter peak electric demands on the PJM power grid, the principal cause for the need to implement rolling blackouts on the morning of January 19 was the unavailability of over one-third of PJM's generating capacity.
- The generation unavailability rate was driven by an extraordinarily high forced (unplanned) outage rate, caused primarily by weather and fuel-related problems, which reached a high of 28 percent. A large number of the plant outages or deratings occurred over a very short period of time. For example, available generating capacity on the PJM grid dropped by approximately 15% over a 24-hour period between January 18 and January 19.
- Planned maintenance outages occurring during the emergency, representing approximately 9 percent of the system capacity, were within the normal range for that time of year.
- Due to the rapidly growing load on the system and continuing and substantial loss of generating capacity due to fuel and weather problems on January 19, there was very little advance notice of the pending energy emergency. The public notification process was further hindered by the timing of the emergency (PJM emergency procedures were first implemented at approximately 5:00 a.m.).
- The utilities undertook a massive notification effort via paid media announcements and interviews, and telephone contacts with municipal officials, State and local police and county emergency coordinators. Nonetheless, there were scattered complaints from members of the public that they were unaware of the statewide energy emergency, and from some municipal officials that they did not receive sufficient advance notification of specific service disruptions in their locales.
- Through a combination of continued utility load reduction measures, such as curtailment by interruptible customers and the 5 percent voltage reduction, as well as mandated office closings in some locales and voluntary conservation efforts, the electric peak load on the evening of January 19 did not reach expected levels.
- The lower than expected evening peak on the PJM system, as well as the return to service of a number of generating units, averted the need for further service interruptions during the late afternoon and evening of January 19.
- The integrity of the regional transmission system was at all times preserved. Significant purchases of power from neighboring utility systems were effectuated and delivered to the load centers within PJM throughout the emergency.
- As a result of internal technical reviews by each of the State's utilities, PSE&G, JCP&I, and ACE have implemented a number of measures designed to mitigate against future occurrences of weather and fuel-related forced outages during severe winter conditions. These are deemed appropriate steps which should reduce the forced outage rate under severe winter conditions.
- Due to the highly unusual and extreme

confluence of weather patterns which led to the January 19, 1994 electric energy emergency, the relatively short duration of the service disruptions, and the implementation of the mitigation measures by the utilities, an increase in the planned construction of new generating facilities would not be an appropriate and, notably, cost-effective response to the emergency.

- Future use of the statewide Law Enforcement Telecommunications System (NJLETS) to alert local law enforcement agencies of any pending electric supply shortage should result in efficient and timely means of assisting these agencies to begin appropriate mobilization activities.

- Utility programs, which have been developed to create data bases of specific curtailment blocks, including an inventory of the specific circuits within each block, the individual municipalities serviced by each circuit, and specific assignments of utility personnel, should result in a more timely and efficient notification process.

- Through normal reporting procedures, the utilities kept the Board of Public Utilities apprised of the daily capacity situation during the week of January 17. Moreover, as described previously, the New Jersey electric utilities made extensive efforts to keep the public governmental entities informed of the emergency through radio messages, network television coverage, newspaper releases and direct notification. However, the fact that events unfolded very quickly during the early morning hours of January 19, 1994 might have impacted the utilities' ability to provide a timely and complete assessment to public entities as the electric emergency developed.

- If public appeals for voluntary conservation had been made earlier in the emer-

gency, on behalf of not only the utilities but also State government, conservation efforts might have had more of an impact in reducing the need for rolling blackouts on the morning of January 19.

- Use of the Emergency Broadcast System (EBS) offers the potential for alerting the public of electric energy emergencies. The Board of Public Utilities Office of Cable Television has been working with the State Police Office of Emergency Management on a plan which would integrate the cable television industry into the Emergency Broadcast System.

- The Board of Public Utilities, through its Emergency Information Center (EIC) in Edison, has direct links with the Office of Emergency Management's Emergency Broadcast System control center in Trenton. These links enable Board staff to participate in the processing of information to the State Police and ultimately the public in the form of information messages and alerts which involve electric energy emergencies.

- Cable television operators have expressed a willingness to issue alerts to subscribers using channel alerting capabilities of the individual cable systems.

- The various State agencies involved in energy emergencies, most notably the Board of Public Utilities in conjunction with the State Police and the Office of the Governor, have reviewed and established more formalized procedures for internal and interdepartmental communications and coordination of activities and established protocols setting forth the responsibilities of each agency. The reorganization placing the Division of Energy Planning and Conservation within the Board of Public Utilities will further enhance and render more efficient the intragovernment

communications and delegation of emergency responsibilities.

- Coordination between the several states having utility members in the PJM should be undertaken regarding declarations of "states of emergency" since an early declaration of a "state of emergency" by State government might permit the implementation of procedures to reduce energy usage and serve to mitigate an energy emergency.

Recommendations:

- ▲ Utilities should enhance their efforts to keep the Board of Public Utilities and other appropriate government entities apprised of potential supply problems as soon as they begin to develop.

- ▲ Utilities should make efforts to issue public appeals for voluntary conservation in a more timely fashion in an emergency situation.

- ▲ Use of the emergency broadcast system and the use of scroll-type announcements on cable television should be considered as additional sources to provide information and alert the public during electric energy emergencies.

- ▲ New Jersey Utilities should complete their ongoing plans to prioritize feeders and areas for load shedding and develop procedures to communicate that information to local and State authorities. To the extent feasible, these procedures should exempt from rolling blackouts currently identified critical facilities such as hospitals and emergency facilities and gas facilities, including gas production plants and compressor stations. A list of priority facilities that supply essential services will be obtained from each State Department for the Board of Public Utilities to review with the utilities for possible inclusion of such facilities on the utilities' list of priority circuits.

- ▲ Utilities should continue to implement improvement measures identified in their assessment of the electric energy emergency which occurred in 1994.

Gas Pipeline Safety

On March 23, 1994, a severe explosion and fire occurred in Edison, New Jersey, involving a 36-inch diameter natural gas pipeline owned and operated by Texas Eastern Gas Transmission Company. The explosion, which occurred near the Durham Woods Apartment complex, created a massive fireball visible for miles, and destroyed eight apartment buildings and numerous parked automobiles. No apartment residents were killed as a direct result of the explosion or gas fire. The force of the blast created a massive crater and sent pieces of twisted steel pipe hurtling up to hundreds of feet away.

A subsequent accident investigation conducted by the National Transportation Safety Board (NTSB), the Federal Department of Transportation's (DOT) Office of Pipeline Safety, the Board of Public Utilities' Bureau of Pipeline Safety and local authorities revealed evidence of dumping at the blast site, which was adjacent to an asphalt plant. The suspected cause of the pipe failure was mechanical damage, apparently caused by excavation equipment.

Due to the serious nature of the accident and the public's concern with the safety of the operation of natural gas transmission pipelines, Governor Christine Todd Whitman issued an executive order immediately following the accident, which required all operators of natural gas transmission pipelines in New Jersey to reduce the maximum allowable operating pressure at the time of the rupture by five percent. The Board of Public Utilities' Bureau of Pipeline Safety joined the National Transportation Safety Board and the Federal Department of Transportation's Office of Pipeline Safety in the investigation and the inspection of the subsequent pipe replacement.

The Federal Department of Transportation issued a Hazardous Facility Order which required Texas Eastern to reduce the maximum operating pressure of the repaired pipeline by thirty percent. The Order called for the restoration of normal maximum operating pressure only after the pipe

line was subjected to an internal inspection using a "smart pig" or internal inspection device. The "smart pig" is used to detect gouges or corrosion in a pipe.

When the Federal Department of Transportation required Texas Eastern to reduce the maximum operating pressure of the repaired pipeline by thirty percent as part of its Hazardous Facility Order, as well as announced the planned Joint Interstate Inspection Program, Governor Whitman lifted the executive order and all other natural gas transmission lines were permitted to operate at normal pressures.

A series of "smart pig" inspections were conducted by Texas Eastern on its New Jersey pipelines in 1986. The Office of Pipeline Safety and the Board of Public Utilities' Bureau of Pipeline Safety conducted a review of the records of these inspections. Both parties also witnessed the smart pig inspections and subsequent repairs made on the damaged pipeline during July and August 1994. The Federal Department of Transportation eventually allowed Texas Eastern to restore the repaired pipeline to normal operating pressure on September 23, 1994.

A number of pipeline safety projects were either initiated or accelerated as a result of the events in Edison. These included the following:

- A comprehensive joint inspection of all interstate gas transmission pipelines was performed.
- A comprehensive inspection of intrastate gas transmission pipelines was performed.
- The Underground Facilities Damage Prevention Law (One-Call) was enacted.
- A program to replace cast iron and bare steel pipeline was undertaken.
- Gas master meter systems placed under Board of Public Utilities jurisdiction were inspected.
- Construction practices were modified.

Comprehensive Joint Inspection of Interstate Gas Transmission Pipelines

Subsequent to the Edison pipeline explosion, the State of New Jersey, through the Board of Public Utilities and its Bureau of Pipeline Safety, increased its efforts to insure the safety of natural gas pipelines. The State and Federal governments jointly agreed to establish a temporary pipeline safety district office in New Jersey for the purpose of conducting

in-depth, comprehensive safety inspections of all interstate natural gas pipeline operators in New Jersey. The State and Federal agencies agreed that the Bureau of Pipeline Safety would assist in this effort by becoming a full participant in an unprecedented commitment to the evaluation of the States' six interstate natural gas pipeline operators.

The Board of Public Utilities' Bureau of Pipeline Safety co-developed with the Federal Department of Transportation the inspection plan that was utilized in this comprehensive program. The inspection included the following:

1. A review of pipeline inventory for the purposes of determining manufacturers, dates of installation and pipe specifications.
2. An analysis of leakage histories for determination of cause and corrective actions.
3. A review of incident history and actions taken by the operator to prevent reoccurrence.
4. A review of operators' compliance history.
5. A thorough review of gas pipeline operations, maintenance and emergency response procedures with emphasis on personnel training, public education and liaison with public officials.
6. A review of operators' internal inspection program, "Smart Pig" and hydrostatic test program.
7. A review of cathodic protection survey records for the last 5 years. Also, an extensive field review was performed including pipe-to-soil potential readings and visual inspection of rectifiers.
8. A review of operators' class location confirmation studies.
9. A review of right-of-way patrolling records for at least 2 years. One hundred percent (100%) of right-of-ways were inspected via motor vehicle, aircraft or in some cases, walking.
10. A review of operating history, maximum allowable operating pressure and actual operating pressures.
11. Field inspections of exposed pipe and review of existing exposed pipe reports.
12. A review of operators' underground pipeline damage prevention programs.
13. A review of operators' valve maintenance program. Inspectors observed the partial operation of various mainline valves in New Jersey. Also, inspectors noted the type of mainline valves: manual, automatic, remote, as well as any redundant valve operator systems.
14. A review of operators' pipeline marker program.

15. A review of welding procedure specifications and pipeline repair procedures.
16. A review of operators' anti-drug programs.
17. Contractor monitoring by operators. OPS and BPS were informed of all on-going mainline construction activity during the period of this special comprehensive evaluation.
18. A review of measuring and regulating station inspection records for the last 3 years. Review of overpressure protection (relief valve capacity calculation, etc.). Extensive field work was performed to compare recorded inventory to actual inventory. Also, on-site overpressure protection set-points were tested against record data.
19. All compressor stations were inspected.

Six interstate natural gas companies operate approximately 931 miles of gas transmission pipeline in New Jersey. The operations of the six companies and all interstate pipelines in New Jersey were jointly inspected by the Federal Office of Pipeline Safety and the State's Bureau of Pipeline Safety. A draft report of these inspections was prepared by the Federal Office of Pipeline Safety. The draft report has been reviewed and approved by the Federal Office of Pipeline Safety and the Board of Public Utilities. It is anticipated that the final report will be approved by the Office of Pipeline Safety in February 1995. The findings do not indicate any safety concerns or hazards requiring immediate action.

It should be noted that the New Jersey Institute of Technology has received Federal grant money to study pipeline safety issues, particularly pipelines in urban areas and encroachment on pipeline developers.

Comprehensive Inspection of Intrastate Gas Transmission Pipelines

In an effort to instill public confidence in the State's gas pipeline system in the wake of the Edison explosion, the Board of Public Utilities' Bureau of Pipeline Safety, with the cooperation of the State's four regulated natural gas utilities, extended the comprehensive interstate pipeline evaluation to include New Jersey's intrastate pipeline operators. This program is in progress and is being carried out by the Bureau of Pipeline Safety in the same fashion as the joint interstate pipeline inspection program.

The four natural gas pipeline operators in New Jersey op-

erate approximately 375 miles of gas transmission pipeline. To date, staff has completed the inspection portion of the program and is currently preparing the draft report. The deficiencies and possible violations noted do not involve hazardous conditions or safety concerns requiring immediate action. All of these issues, as well as recommendations to the operators, will become part of the final report.

One-Number-To-Call

The Edison explosion also brought to the forefront the need for New Jersey to institute a mandatory one-number-to-call system. New Jersey had been one of the first states to establish a voluntary one-number-to-call program, the Garden State Underground Plant Location Service, which included the participation of all of the intrastate and interstate natural gas pipelines operating in New Jersey.

The Board of Public Utilities, through its Bureau of Pipeline Safety and in cooperation with the State's gas utilities, had begun the process of drafting mandatory one-number-to-call legislation. The Edison explosion confirmed the need for rapid action, and legislation was drafted entitled the "Underground Facility Protection Act".

The legislation was signed by Governor Christine Todd Whitman on October 19, 1994. The legislation mandates excavators who plan to dig deeper than 18 inches to telephone the 24-hour toll-free, one-number-to-call system three to ten business days before the start of excavation. The Garden State Underground Plant Location Service will provide the caller with a confirmation number and will inform all entities with underground facilities of the proposed excavation. They, in turn, are required to mark out their underground lines.

The Act is notable because, in addition to utilities, it covers the New Jersey Department of Transportation as well as municipalities, which are frequently exempted in other states. The law covers all underground infrastructure, including water, forced sewage, telecommunications, cable television, electricity, oil, petroleum products and natural gas. The Act permits fines of up to \$2500 per day for violations not involving gas and hazardous liquid lines. For natural gas and hazardous liquids, the Act increased the daily maximum penalty from \$10,000 per day up to \$25,000 per day, to a maximum of \$500,000 for any one incident.

The Act requires excavators to report all damage. Additionally, the Act requires operators of interstate natural gas

or hazardous liquid pipelines to file maps, depicting their routes, with the clerk of each municipality through which they pass, the Board of Public Utilities and the Department of Environmental Protection.

The One-Number-to-Call legislation passed the State legislature and was signed into law by Governor Whitman within a span of seven months after the Edison explosion. Efforts at the Federal level to impose national one-number-to-call legislation have been unsuccessful.

Cast Iron and Bare Steel Replacement Program

The Pipeline Safety Act of 1992 directed the Secretary of the Department of Transportation to publish a notice as to the availability of industry guidelines for the replacement of cast iron pipelines. In addition, the Secretary was directed to review operator replacement programs. Suggested guidelines were developed by the American Gas Association and published in the Federal Register. To date, the Federal review of operator replacement programs is still in progress.

The Board of Public Utilities' Bureau of Pipeline Safety initiated a review of the local gas utility companies in New Jersey to evaluate their cast iron as well as bare steel pipeline replacement programs. Each gas distribution company has been requested to provide its replacement procedures for review by the Bureau of Pipeline Safety. In addition, the Bureau of Pipeline Safety met with each of the companies to discuss their respective programs.

Master Meters

To date, there have been no incidents related to natural gas master meter pipeline systems in New Jersey. There is a potential, however, for incidents involving leaks due to corrosion or poor maintenance on these systems. Although master meter piping may have been installed under appropriate construction codes, previously, there were no State regulations to assure compliance with operating and maintenance requirements.

Due to manpower and financial constraints, the Federal Office of Pipeline Safety found itself unable to provide the necessary monitoring. At their request, the Board of Public Utilities adopted master meter regulations mandating compliance with federal pipeline safety requirements. Under these regulations, master meter operators were required to submit by June 7, 1994 a certification by a licensed professional engineer that the master meter system was in compli-

ance with Federal pipeline safety rules.

The Bureau of Pipeline Safety is reviewing the certifications received and will take appropriate actions concerning any deficiencies identified. Additionally, the Bureau will contact master meter operators that have not responded, to ensure that they comply with the rules. A letter will be sent requesting their compliance and pointing out that failure to comply may result in the discontinuance of natural gas service.

Construction Practices

As a result of increased pipeline safety inspections by the Bureau of Pipeline Safety, a number of safety-related initiatives have been implemented by the gas companies under the jurisdiction of the Board of Public Utilities. Some significant initiatives prompted by the Bureau of Pipeline Safety are as follows:

- Implementation of a mandatory training program for all construction contractors who work for the gas companies. The program includes training in both standard operating procedures and emergency response programs. The contractor training emphasizes the potential hazard that exists whenever a suspected natural gas facility might have been compromised. The contractor training also alerts contractor personnel to the possibility of encountering unknown gas facilities during construction projects.
- An increased number of gas company inspectors to provide on-site supervision of all construction projects.
- An enhanced natural gas safety public education program which includes regular bill inserts alerting customers of natural gas safety issues and the implementation of toll-free emergency telephone numbers.
- Revision of operating procedures to provide for the retirement of all inactive service lines at the main whenever an account has been idle for two years.
- Revision of operating procedures to establish a precise procedure for pre-construction markout of its gas facilities. The procedure specifies the respective responsibilities of the construction contractor, gas company personnel or other third-party locating company personnel, for each step of the markout procedure.
- Revision of operating procedures to provide a comprehensive emergency response procedure. This procedure provides the specific actions that the gas company and construction contractor shall take whenever a suspected natural gas facility might have been compromised.

Findings:

- State legislation has been enacted mandating a one-number-to-call system which requires that all excavators contact a State-authorized notification center through a toll-free telephone number prior to any excavation in New Jersey.
- A comprehensive inspection of interstate natural gas transmission pipelines in New Jersey was conducted by the Board of Public Utilities' Bureau of Pipeline Safety staff in concert with Federal inspectors. The Board of Public Utilities is awaiting the final report to be issued by the Federal Department of Transportation's Office of Pipeline Safety.
- The New Jersey's gas utilities' transmission systems are currently being comprehensively inspected by pipeline safety inspectors.

Recommendations:

- ▲ Affected parties should be encouraged to assist the Board of Public Utilities in the preparation of appropriate procedures to fulfill the requirements of the One Number-to-Call law. The Board of Public Utilities, through its Bureau of Pipeline Safety, will meet with affected parties to consider appropriate procedures and potential rulemaking.
- ▲ A Board of Public Utilities review should be undertaken once the federal interstate pipeline report is available, to ensure that all safety aspects have been addressed. Upon completion of the intrastate inspection report, the Board will review safety recommendations, and any possible noncompliance with safety requirements will be pursued for corrective action.
- ▲ The Board of Public Utilities should complete the process of adopting enforcement

regulations. Once approved, parties should be directed to inform appropriate operating personnel of the enforcement procedures to minimize the likelihood of noncompliance with gas safety rules.

▲ The Board of Public Utilities Pipeline Safety staff should closely monitor the utilities' cast iron and bare steel pipeline replacement programs to ensure adherence to procedures and replacement in established time frames.

▲ All owners of gas master meter facilities should certify through proper evaluation procedures that their pipeline systems are safe.