BASS, BERRY & SIMS PLC
A PROFESSIONAL LIMITED LIABILITY COMPANY
ATTORNEYS AT LAW

R DALE GRIMES
TEL (615) 742-6244
FAX (615) 742-2744
dgrimes@bassberry com

AMSOUTH CENTER
315 DEADERICK STREET, SUITE 2700
NASHVILLE, TN 37238-3001
(615) 742-6200

www.bassberry.com

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NASHVILLE MUSIC ROW
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March 1, 2005

VIA HAND DELIVERY

Chairman Pat Miller
c/o Sharla Dillon, Docket Manager
Tennessee Regulatory Authority
460 James Robertson Parkway
Nashville, Tennessee 37243

Re: Generic Docket for the Purpose of Examining TRA Rules, Policies and Procedures in Light of Current Trends in Gas Industries, Docket No. 05-00046.

Dear Chairman Miller:

Enclosed please find the original and thirteen (13) copies of Gas Technology Institute's comments in response to the notice dated February 2, 2005 from the TRA for filing in the above-referenced docket.

Should you have any questions with respect to this filing, please do not hesitate to contact me at the telephone number listed above.

Very truly yours,

R. Dale Grimes

RDG/tn
Enclosure

cc: Certificate of Service List
Mr. Ron B. Edelstein

BEFORE THE TENNESSEE REGULATORY AUTHORITY
NASHVILLE, TENNESSEE

IN RE:	)	
	)	
GENERIC DOCKET FOR THE	)	**Docket No. 05-00046**
PURPOSE OF EXAMINING TRA	)	
RULES, POLICIES AND PROCEDURES	)	
IN LIGHT OF CURRENT TRENDS IN	)	
GAS INDUSTRIES	)	

COMMENTS OF GAS TECHNOLOGY INSTITUTE

I. INTRODUCTION

Gas Technology Institute ("GTI") respectfully submits these comments in response to the notice dated February 2, 2005 from the Tennessee Regulatory Authority requesting comments on "whether the rules and procedures, particularly those relating to audits and mandatory filings, should be amended to reflect current trends in the gas industry and should include suggestions regarding the forum (e.g. workshop, informal meeting) for discussion." GTI believes that there is a need for the TRA's rules and procedures to be amended to reflect the need to provide for the funding of gas-consumer oriented research and development (R&D) activities for purposes including, but not limited to, increasing the safety and integrity of the state's gas distribution system, reducing operating costs of local distribution companies in order to lower the cost to all Tennessee consumers of natural gas, and to determine ways to increase the efficiency of end-use equipment, particularly aimed toward, but not limited to, low-income customers of local distribution companies.

Alternatives to fund gas-consumer interest R&D have been severely limited in an era of energy industry restructuring. Formerly, the Federal Energy Regulatory Commission ("FERC") provided funding at the rate of 1.74 cents per Dth, which was paid by the gas pipeline companies

and passed on to the consumer through the purchased gas adjustment of the local distribution companies. A phase out of this funding began in 1998, and it is now totally eliminated. Another federal approach to funding R&D via Congressional legislation has not found a sponsor. The state-by-state approval approach is now the best and only remaining pathway for funding gas-consumer interest R&D.

Accordingly, GTI proposes that the TRA adopt mechanisms, through changes in rules and procedures or otherwise, to generate the funding necessary to support this R&D that is critical to the interests of the gas consuming citizens of Tennessee. The discussion below states the rationale for supporting this funding, gives examples of R&D projects that are designed to achieve the goals set forth above, and proposes a funding mechanism for consideration and adoption by the TRA.

GTI also endorses the idea of the TRA conducting a public workshop for discussion of the issues raised here and by others under this Docket.

II. SPECIFIC COMMENTS

A. Research Funding is Needed to Determine Ways to Increase the Efficiency of End-use Equipment, Particularly Aimed Toward, but not limited to, Low-Income Customers of Local Distribution Companies.

Tennessee's low-income ratepayers are facing a particular challenge given high gas costs and increased price volatility. From the U.S. Bureau of Census data, 12.4% of Americans, and 13.5% of Tennesseans, are below the Federal poverty line. For those over 65 years of age, 9.9% of Americans and 13.5% of Tennesseans are below the poverty line. The development of advanced, low-cost, high-efficiency end-use equipment targeted to low-income customers can help to lower gas demand and hence lower gas bills to relieve the burden on this customer set, as

well as to reduce "uncollectibles" that are a burden to the rest of Tennessee's gas consumers and the LDC's. The focus of the R&D would be on residential furnaces, water heaters, and combination units and taking a systems approach (whole house, energy distribution system, and "smart" controls) toward reducing low-income customers' gas bills. Of course, the devices could be used by all residential customers in Tennessee. Specific projects include:

- **Combination Space/Water Heater** - GTI is seeking to assess the performance via field testing in Tennessee of an optimized fully condensing water heater in combination space/water heater applications. The system will eliminate the need for a space heater, using the water heater (and a water-to-air heat exchanger) for both water and space heating, and should aid low-income customers by reducing the first cost and operating cost of buying a space and water heater at the same time. The high-efficiency, condensing water heater uses porcelain coating on both sides of the heat exchanger to avoid corrosion and keep manufacturing costs down (by avoiding the use of stainless steel). It has an energy efficiency of over 93%. However, field testing and system design in a real-world environment is critical to minimizing the technical risk on this project.

- **Low-Income Energy Management Device** - Develop a low-income energy management device that incorporates intelligent learning and advanced sensors to analyze desired comfort levels, occupancy habits, and budgetary constraints to provide a sophisticated energy management system that optimizes occupants' comfort but yet reduces energy costs.

- **Multifamily Superboiler** - Using results of GTI's industrial (94% efficient, low-NOx, 10 MMBtu/hr and larger) superboiler efforts, develop a smaller scale (1-2 MMBtu/hr)

boiler for multifamily residential use that will enable these customers to take advantage of a 94% efficient boiler technology, for those multifamily dwellings using boilers for heating.

- **Instantaneous Tankless Water Heater** - Develop the next-generation instantaneous water heater and components. Goals include parasitic electric power reduction/elimination, improved heat exchanger life and efficiency, low NOx burner $\leq$ 20 ppm (80% emissions reduction), design and integration and reduced maintenance requirements using advanced technology to reduce mineral build-up and sensor fouling to maintain operational efficiency and extend the equipment lifetime.
- **Advanced Energy Distribution System** - Develop advanced energy distribution systems (gas, electric, air, water, waste, ventilation/ humidification, and exhaust) that will reduce installation costs and stand-by and distribution system losses, improve energy efficiency, safety and comfort, and increase livable space.

R&D efforts devoted to the above projects have the strong potential to provide benefits to both low-income and other Tennessee customers. These R&D efforts are worthy of funding, which the TRA should provide through the adoption of such rules and procedures as may achieve these goals.

B. Research Funding Is Needed To Determine Ways To Increase The Safety And Integrity Of The State's Gas Distribution System.

While Tennessee's gas local distribution companies are dedicated to providing safe, reliable gas service to Tennessee consumers, there is a need for advanced technology to further enhance system safety, integrity, security, and deliverability. GTI submits that this can best be attained through the R&D funding proposed in these Comments

According to A.G.A.'s 2003 Gas Facts, for example, there are in Tennessee:

- 208 miles of bare, un(cathodically)-protected steel gas mains,
- 152 miles of bare, protected steel gas mains,
- 17,588 miles of plastic gas mains, and
- 346 miles of cast iron pipe.

The recent Office of Pipeline Safety (OPS) regulations on pipe integrity are impacting gas LDC's in Tennessee and across the country. Regulations require the inspection of high-pressure steel pipe by one of three methods: (1) hydrostatic testing, (2) internal inspection (pigging), or (3) direct assessment. Hydrostatic testing requires that the line be taken out of service and requires the proper disposal of hydrostatic test waters. Internal inspection requires that the line be "piggable," which many distribution mains are not. Direct assessment methods offer the best viable solution to the OPS requirements for nonpiggable lines. The establishment of direct assessment protocols validated by real-world tests for external corrosion, internal corrosion, and stress corrosion cracking of steel pipe are critical to moving forward on this issue. Bare, unprotected steel mains and bare, protected steel mains are two sections that may require this approach, depending on line pressure.

For high pressure gas distribution pipe, like that near or in Nashville, an alternative to steel pipe is high-strength plastic pipe, like PA-12. Such testing is already under way, but additional funding is needed to complete the testing and validate the life of this pipe.

Polyethylene (PE) gas pipe has proven to be impervious to corrosion and lower cost than steel gas mains. However, if the tracer wire used to help locate the plastic pipe has corroded away or been severed, the plastic pipe is almost impossible to locate from above ground, barring

GPS mapping of the pipe as it is put in the ground. Development of a plastic pipe locator that can operate under the unique clay, sand, and rocky soil conditions of Tennessee is needed.

For cast iron pipe, advanced technology for repair of pipe joints or replacement or lining of the cast iron is needed to reduce gas leaks at cast iron joints. Much of this pipe is over 100 years old.

Specific projects include:

- **Enhance Gas Main Integrity and Reduce Repair and Incident Costs through Ultrasonic Inspection -** Magnetic Flux Leakage (MFL) pigs measure wall loss in a gas pipeline, but not the remaining wall thickness that determines remaining strength, nor can they well measure corrosion cracking. Ultrasonic inspection can find cracks and measures the remaining wall thickness with a precision of a few percent but currently requires putting a liquid couplant in a gas pipeline. Transducers specialized for inspection in high pressure gas, as well as specialized inspection methods, can eliminate the need for a liquid couplant bringing the advantages of ultrasonic inspection to gas pipelines. Thus a delivery vehicle can be designed that readily bypasses pipeline obstructions. It could be propelled through an unpiggable pipeline by very flexible pig cups or by one of the robots being developed for use in unpiggable pipelines. The technical objectives of this program are to: develop ultrasonic transducers that work with high-pressure gas as the couplant; develop methods for inspecting pipes for corrosion using these Gas Coupled Ultrasonic transducers; and develop methods for inspecting for cracks using Gas Coupled Ultrasonic inspection.
- **Enhance Integrity and Reduce Mandated Inspection Costs through Field-Eddy-Current Inspection of Unpiggable Lines -** The Office of Pipeline Safety has introduced rules that require inspection of pipelines and distribution mains in high consequence areas by

pigging inspection, hydrostatic testing, or direct assessment. Of these three choices, pigging costs the least while providing the most information on the condition of a pipeline. Unfortunately, most pipelines and high-pressure distribution mains cannot be inspected with current pigging technologies because of diameter changes, short-radius elbows and miter bends, offsets, reduced port valves and plug valves, and limited access to the pipeline. An examination of technologies that could inspect these unpiggable pipelines quickly leads to the conclusion that the Remote Field Eddy Current (RFEC) technique offers the potential to inspect unpiggable pipelines. The technical objective is to prove the feasibility of inspecting unpiggable pipelines by Remote Field Eddy Current inspection.

- **Monitor Internal Corrosion using Fluidized Sensors** - Internal Corrosion Direct Assessment (ICDA) holds promise to prioritize locations where corrosion could be occurring and therefore determine potential dig locations for detailed examinations. However, it does not provide a direct measure if water is present at the identified locations or if internal corrosion is active. A need exists to develop a complementary technology to ICDA that can be used to remotely detect and monitor internal corrosion in non-piggable gas pipelines. The objective of this project is to develop sensors on the order of a few millimeters to a few centimeters in size that can be introduced into the natural gas stream and then flow with the gas and accumulate at likely locations of internal corrosion, and validate that the sensor can reach such locations and accumulate there and then detect and remotely transmit the internal presence of water, measure its corrosivity, and determine the likely internal corrosion rate at that location.
- **Distribution and Pipeline Integrity Management (PIM) Risk Analysis and Asset Prioritization** - Distribution PIM regulations will significantly effect gas distribution

companies, both from a resource and financial perspective. Every distribution company will be required to implement methodologies, processes, and procedures to ensure compliance with these regulations. Collectively, the natural gas industry will be able to develop a superior solution at a fraction of the cost if companies work together rather than developing such approaches individually. The objective of this project is to take a risk-based approach to the evaluation and asset prioritization of utility distribution assets, determine input requirements to calculate relative risk, develop a software-based solution that could import asset information from existing sources such as utility mapping systems, and validate that customization is possible of risk-based algorithms based on operating conditions facing individual utilities.

- **Product Development of Obstacle Detection System Using Ground Penetrating Radar (GPR) -** Currently there are no commercial instruments available to sense the presence of obstacles in the vicinity of a horizontal directional drilling (HDD) bore used for installation of pipes. In the on-going project under the sponsorship of GTI, a new advanced GPR system, mounted on the drill head of an HDD that is capable of detecting obstacles such as sewer pipes or other utility lines in the proximity of the bore is being developed. However, this system will require further enhancements to be suitable as a commercially acceptable product from it current pre-production status. The objective of the proposed work is to develop and field test a production prototype version of the drill head mounted GPR applying the results of the past developments.
- **Alternative to Squeeze-Off for Plastic Pipes -** Squeeze-off is commonly used to stop the flow of gas in plastic gas pipes. However, the use of squeeze-off can initiate the development of slow-crack growth, leading to the premature failure of the pipe. This project will develop

an alternative to the squeeze-off technique which will permit the stopping of gas flow in a plastic pipe without damaging the pipe or initiating slow crack growth, thus extending the useful life of plastic pipes presently in use. This will enhance pipe lifetime and create significant O&M cost savings for gas utilities and their customers.

- **Service Applied Main Stopper** - This project focuses on enhancing safety and lowering the costs associated with emergency gas shut-off due to third-party damage, through the development of an innovative tool and method of use. The Service Applied Main Stopper (SAMS) project objectives are to develop technology and the necessary tools that will utilize existing customer service lines and meter sets to isolate pipe ruptures and stop the flow of gas, reduce costs by minimizing excavations through the use of the SAMS "no-dig" technology, and decrease the isolation area, which will reduce customer outages and impact due to third-party main damage

- **Camera Inspections on Live Mains Through Keyholes** - With aging gas main infrastructure, gas utilities face an ever increasing challenge to inspect and repair these pipes. Internal camera inspections provide an effective method to evaluate the condition of these aging mains. The project objectives are to use existing internal cameras and enable them to be installed through keyholes 18-inches in diameter and smaller. This project also requires the ability to install and tap a fitting through a keyhole in order to insert the camera. It is anticipated that this will apply to cast iron, steel and polyethylene (PE) pipes.

- **Nonlinear Acoustic Pipe Inspections** - Currently no good method exists that reliably inspects for cracks in natural gas steel or plastic piping Nonlinear acoustics shows promise as a method for quickly inspecting for cracks during construction or at an excavation, and could be adapted to pigging, or inline inspection. The objective of this project is to validate

that nonlinear acoustics can detect and locate cracks reliably and to develop the method to detect, locate, and estimate crack size.

- **Polyamide 12 (PA12) Pipe for High-Pressure Applications:** Following on the successful R&D on Polyamide 11 (PA11), this project will continue to investigate advanced plastics materials for higher pressure and larger diameter gas main applications PA12 holds the promise of being less expensive than PA11, and is capable of operating at larger diameters and higher pressures. The objective of this R&D is to perform comprehensive testing (laboratory and field) to validate technical feasibility and facilitate development of industry standards and specifications, regulatory approvals, and widespread industry acceptance of PA12.
- **Tow Tension Monitor (TTM)** - A TTM device currently is being designed to help prevent overstressing of PE pipe during horizontal directional drilling (HDD) operations by providing a real-time tensile load measurement value at the towing head. Such a device will help to assure long-term gas main safety, as it will verify that the pipe is not being compromised by the pulling operation. The objective of this project is to advance the initial R&D in this area by developing a production prototype device, including upgrading transducers and operator interfaces, and performing in-ground field tests at difficult locations (e.g., river crossing and railroad crossing) to validate performance under real-world field conditions.

III. PROPOSAL FOR AN R&D SURCHARGE

GTI proposes that an R&D surcharge be instituted in order to meet the above needs to (1) develop increased-efficiency gas end-use technologies for low-income and other customers and (2) support the development of gas technology to increase gas system integrity, safety, and

deliverability and lower LDC O&M costs. GTI proposes (1) $100,000 per year per company for end-use equipment Utilization Technology Development (UTD) to fund the low-income customer efforts and (2) $250,000 per year per company be assessed for Operations Technology Development (OTD) to fund the system integrity and safety projects. This would come to $350,000 per year per company, (using average volumes per company of about 20 Bcf/yr) or about 1.75 cents/MMBtu. (For reference, the former FERC–approved R&D surcharge was 1.74 cents/MMBtu in 1998.) GTI proposes to limit funding to the FERC 1998 level of 1.74 cents/MMBtu.

These dollars would be assessed to all Tennessee customers of investor-owned LDC's, and collected by the LDC's to fund projects (from the above list of candidate projects) of their choice (with TRA oversight) to benefit Tennessee gas consumers in the increased-efficiency and operations R&D in the above-indicated areas of need. (Many of the Tennessee municipals are already collecting the R&D surcharge, including Memphis Gas Light & Water, Middle Tennessee, Jackson Energy Authority, and the Brownsville Utility Department.)

IV. CONCLUSION

Gas Technology Institute appreciates having the opportunity to provide these comments and proposals concerning emerging trends in the gas industry. GTI would welcome the opportunity to address these issues at a workshop or other forum for discussion.

Respectfully submitted,

R. Dale Grimes (#6223)
BASS, BERRY & SIMS PLC
AmSouth Center
315 Deaderick Street, Suite 2700
Nashville, Tennessee 37238
(615) 742-6244

Attorneys for Gas Technology Institute

CERTIFICATE OF SERVICE

I hereby certify that a true and exact copy of the foregoing has been served on the following person(s), via the method(s) indicated, on this the 1 day of March, 2005:

[ ] Hand
[✓] Mail
[ ] Facsimile
[ ] Electronic

D. Billye Sanders, Esq.
Waller Lansden Dortch & Davis PLLC
511 Union Street, Suite 2100
P.O. Box 198966
Nashville, Tennessee 37219-1760

[ ] Hand
[✓] Mail
[ ] Facsimile
[ ] Electronic

James H. Jeffries, Esq.
Moore & Van Allen, PLLC
Suite 4700
100 North Tryon Street
Charlotte NC 28202-4003

[ ] Hand
[✓] Mail
[ ] Facsimile
[ ] Electronic

Joe A. Conner, Esq.
Misty Smith Kelley, Esq.
Baker, Donelson, Bearman Caldwell & Berkowitz
1800 Republic Centre
633 Chestnut Street
Chattanooga, TN 37450-1800

[ ] Hand
[✓] Mail
[ ] Facsimile
[ ] Electronic

Timothy C. Phillips, Esq.
Vance L. Broemel, Esq.
Consumer Advocate and Protection
Office of the Tennessee Attorney General
P.O Box 20207
Nashville, TN 37202