JOHN N. HUGHES
ATTORNEY AT LAW
PROFESSIONAL SERVICE CORPORATION
124 WEST TODD STREET
FRANKFORT, KENTUCKY 40601

Telephone: (502) 227-7270 **jnhughes@johnnhughespsc.comt**

February 15, 2016

Executive Director
Public Service Commission
211 Sower Blvd.
Frankfort, KY 40601

Re: Atmos Energy Corporation
Case No. 2016-00070

Dear Mr. Derouen:

Atmos Energy Corporation submits its petition for adjustment of the R&D tariff as required by the Commission's order of February 8, 2016. Also included with this filing is the testimony of Mark Martin, current and proposed tariff sheets for the R&D tariff proposal and response to Staff DR1-53. These documents comprise the current record from Case No. 2015-00343 related to the proposed change to the R&D tariff.

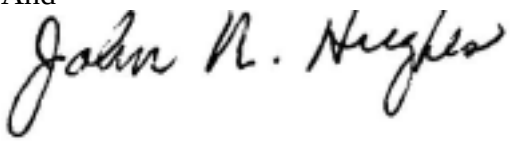
I certify that the electronic documents are true and correct copies of the original documents.

If you have any questions about this filing, please contact me.

Submitted By:

Mark R. Hutchinson
Wilson, Hutchinson and Littlepage
611 Frederica St.
Owensboro, KY 42301
270 926 5011
randy@whplawfirm.com

And



John N. Hughes
124 West Todd St.
Frankfort, KY 40601
502 227 7270
jnhughes@fewpb.net

Attorneys for Atmos Energy Corporation

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

AN INVESTIGATION OF AN INCREASE IN R&D RIDER PROPOSED BY ATMOS ENERGY	**)** **)**	**) CASE NO. 2016-00070**

APPLICATION FOR TARIFF MODIFICATIONS

1. Atmos Energy Corporation ("Atmos Energy"), by counsel, pursuant to the Commission's order of February 8, 2016, KRS 278.180, KRS 278.190, 807 KAR 5:001(14) and (16) and 807 KAR 5:011 submits the attached revised tariffs and proposes that revised tariff provisions for its Kentucky Division become effective on December 23, 2015. This Application and the attached supporting exhibits contain the facts on which the relief being requested is based, a request for the relief sought and references to the particular provisions of law requiring or providing for the relief sought as specified in 807 KAR 5:001. Correspondence and communications with respect to this Application should be directed to:

Mark A. Martin,
Atmos Energy Corporation,
3275 Highland Pointe Drive,
Owensboro, Kentucky
(270) 685-8095 Ph
(270) 689-2076 fax
(Mark.Martin@atmosenergy.com)

Mark R. Hutchinson,
Wilson, Hutchinson & Littlepage,

611 Frederica Street,
Owensboro, Kentucky 42301
270 926 5011 Ph
(270) 926-9394 fax
(randy@whplawfirm.com)

And

John N. Hughes
124 W. Todd St.
Frankfort, KY 40601
(502) 227 7270 Ph
(jnhughes@johnnhughespsc.com)

2. Atmos Energy is a utility as defined by KRS 278.010 (3)(b) and is subject to the jurisdiction of the Public Service Commission ("Commission"), pursuant to KRS 278.040. Atmos Energy delivers natural gas to approximately three million residential, commercial, industrial and public-authority customers in eight states. It has six gas utility operating divisions. They are located in Denver, Colorado (Kansas and Colorado Division); Baton Rouge, Louisiana (Louisiana division); Jackson, Mississippi (Mississippi Division); Lubbock, Texas (West Texas Division); Dallas, Texas (Mid-Tex Division); and Franklin, Tennessee (Kentucky/Mid-States).

3. The President of the Atmos Energy Kentucky/Mid-States Division is J. Kevin Akers. The Vice President – Rates and Regulatory Affairs for the Kentucky/Mid-States Division is Mark Martin. Atmos Energy's corporate office address is:

Atmos Energy Corporation
5430 LBJ Freeway
1800 Three Lincoln Centre
Dallas, TX 75240
P.O. Box 650205
Dallas, Texas 75265-0205
www.atmosenergy.com

Atmos Energy' s Kentucky/Mid-States Division office location is:

3275 Highland Pointe Dr.
Owensboro, KY 42303
270 685 8000 Ph.
(270) 689-2076 fax
(Mark.Martin@Atmosenergy.com)

4. Atmos Energy was initially incorporated in Texas on February 6, 1981 and in Virginia on July 21, 1997. Its articles of incorporation were filed in Case No. 2013-00148. Applicant attests that it is a foreign corporation in good standing to operate in Kentucky. Atmos Energy does not operate under an assumed name in Kentucky.

5. Atmos Energy serves approximately 174,700 customers in central and western Kentucky. The customer base includes residential, commercial and industrial customers. Residential class customers account for the vast majority of meters at approximately 155,400. Atmos Energy's natural gas deliveries totaled 48.6 Bcf during the 12-month period ending September, 2015.

6. Atmos Energy's Annual Reports including the 2014 report are on file with the Commission as required by 807 KAR 5:006§4(1 and 2).

7. Notice of Intent to file a rate application was delivered to the Executive Director and the Attorney General on October 19, 2015. A copy of that notice is filed as FR 16(2)(c) in Volume 3.

8. Atmos Energy is proposing certain rate design features which remove avoidable uncertainties for customers, shareholders and regulators inherent to our traditional rate structures. Atmos Energy's tariff and rate design

proposals are as follows:

1) Update the Company's Research & Development Rider (R&D) unit charge.

9. Atmos Energy has provided notice of this filing to its customers and interested parties by publication in newspapers of general circulation and posting in each of Atmos Energy local offices for public inspection as well as posting on its website.

10. Atmos Energy requests that the Commission allow the proposed rate changes to take effect without delay.

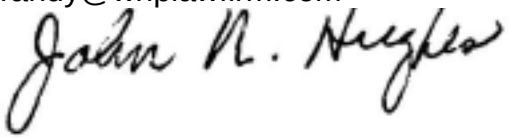
11. Atmos Energy also requests a deviation pursuant to 807 KAR 5:006(22) from any rule, regulation or other requirement that might otherwise delay or impede the review and approval of this Application.

12. All filing requirements (FR) of 807 KAR 5:001 are listed in the table attached to the application in Case No. 2015-00343 and incorporated by reference from that case.

13. Based on the information provided and in compliance with all filing requirements of KRS Chapter 278 and 807 KAR 5:001, Atmos Energy requests that the Commission issue an order approving the proposed tariff revisions and granting all other appropriate relief.

Submitted by:

Mark R. Hutchinson
Wilson, Hutchinson & Littlepage
611 Frederica St.
Owensboro, KY 42303
270 926 5011 Ph.
(270) 926-9394 fax
randy@whplawfirm.com



John N. Hughes
124 West Todd Street
Frankfort, KY 40601
502 227 7270
jnhughes@johnnhughespsc.com

Attorneys for Atmos Energy Corporation

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

AN INVESTIGATION OF AN	)
INCREASE IN R&D RIDER	)
PROPOSED BY ATMOS	) CASE NO. 2016-00070
ENERGY	)

TESTIMONY OF MARK A. MARTIN

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, POSITION AND BUSINESS ADDRESS.

A. My name is Mark A. Martin. I am Vice President – Rates and Regulatory Affairs for the Kentucky/Mid-States Division of Atmos Energy Corporation ("Atmos Energy" or the "Company"). My business address is 3275 Highland Pointe Drive, Owensboro, Kentucky, 42303.

Q. PLEASE BRIEFLY DESCRIBE YOUR CURRENT RESPONSIBILITIES, AND PROFESSIONAL AND EDUCATIONAL BACKGROUND.

A. I am responsible for all rate and regulatory affairs matters in Kentucky. I graduated from Eastern Illinois University in 1995 with a degree in Accounting. I have been with United Cities Gas Company and subsequently Atmos Energy Corporation since September 1995. I have served in a variety of positions of increasing responsibility in both Gas Supply and Rates prior to assuming my current responsibility in 2007.

Q. HAVE YOUR EVER SUBMITTED TESTIMONY BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes. I filed testimony in Case No. 2010-00146, Case No. 2013-00148 and Case No. 2015-00343.

Q. HAVE YOU SUBMITTED TESTIMONY ON MATTERS BEFORE OTHER STATE REGULATORY COMMISSIONS?

A. Yes, I have filed testimony before the Georgia Public Service Commission, the Illinois Commerce Commission, the Missouri Public Service Commission, and South Carolina Public Service Commission.

Q. ARE YOU SPONSORING ANY OF THE FILING REQUIREMENTS IN THIS CASE, AND, IF SO, WHICH REQUIREMENTS?

A. Yes. I am sponsoring the following filing requirements:

FR 16(1)(b)(3) Proposed Tariffs

FR 16(1)(b)(4) Proposed Tariff Changes

Q. DO YOU ADOPT THESE FILING REQUIREMENTS AND MAKE THEM PART OF YOUR TESTIMONY?

A. Yes.

II. PURPOSE AND SUMMARY OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My direct testimony has one primary purpose. I will present the Company's proposed change in the funding level of its R&D unit charge.

III. PROPOSED R&D TARIFF CHANGES

Q. WHAT IS THE PRIMARY OBJECTIVE OF ATMOS ENERGY IN THIS CASE?

A. The Company is proposing the following change to its existing tariff:

1) Update the Company's Research & Development Rider (R&D) unit charge.

Q. PLEASE DISCUSS THE HISTORY OF THE COMPANY'S R&D RIDER.

A. The Company proposed and the Commission approved the Company's R&D Rider in Case No. 99-070. The R&D unit charge applies to all customers with the exception of transportation customers. Prior to Case No. 99-070, interstate pipelines charged LDCs a R&D surcharge which ultimately flowed through the Gas Cost Adjustment (GCA) mechanism. At this point in time, the interstate pipelines began to phase out the surcharge with 2004 being the last year that it would have flowed through the GCA mechanism. In an effort to maintain the same level of funding, the Company planned to initially raise its R&D unit charge a corresponding amount on an annual basis to offset the reduction in pipeline charges. By 2004, the Company's R&D charge should have equaled $0.0174 per Mcf which would have mirrored the interstate pipeline rate prior to the phase-out.

Q. WHAT IS THE COMPANY'S CURRENT R&D UNIT CHARGE?

A. The Company's current R&D unit charge is $0.0035 per Mcf.

Q. HAS THE COMPANY EVER INCREASED ITS R&D UNIT CHARGE?

A. It does not appear so.

Q. WHY DID THE COMPANY NEVER INCREASE ITS R&D UNIT CHARGE?

A. While the Company did not ever increase its R&D unit charge, it did implement the appropriate rate at inception. The Company's proposal is for the future rather than the past.

Q. WHAT IS THE COMPANY'S PROPOSAL RELATED TO ITS R&D UNIT CHARGE?

A. The Company would like to match the spirit of the Order in Case No. 99-070 and increase the R&D unit charge to $0.0174 per Mcf.

Q. WHY IS THE COMPANY PROPOSING TO INCREASE THE R&D UNIT CHARGE NOW?

A. Upon investigating what the Company annually contributes to GTI on a company-wide base, it appeared the portion related to Kentucky was quite low. Upon further investigation, it was

discovered that the initial R&D unit charge had not been updated. The Company is purely proposing to increase the R&D unit charge to what it should have been in 2004.

Q. WHAT IMPACT WOULD THIS HAVE ON CUSTOMERS?

A. With the current R&D unit charge of $0.0035 per Mcf and assuming sixteen (16) Bcf of annual sales, applicable customers contribute approximately $56,000 for R&D efforts. Increasing the R&D unit charge to $0.0174 per Mcf would increase funding by approximately $222,000 for a total annual contribution of approximately $278,000 ($56,000 + $222,000).

Q. DOES THE PROPOSED R&D UNIT CHARGE INCREASE CREATE ADDITIONAL REVENUES FOR THE COMPANY?

A. No. While the Company does not directly benefit financially from the R&D Rider, the Company does benefit by new technology and more efficient appliances that result from research funded by the R&D Rider. All funds collected under the R&D Rider would be remitted to the Gas Technology Institute (GTI), or similar research or commercialization organization. While the Company has flexibility on where it remits funds, all funds collected through the R&D unit charge have been remitted to GTI.

Q. ARE THERE ANY OTHER CONSIDERATIONS RELATED TO THE R&D UNIT CHARGE?

A. Yes. The genesis of the R&D unit charge was over fifteen (15) years ago. While the R&D Rider continues to benefit customers through research initiatives, the cost of conducting R&D initiatives continues to rise. While one could argue that the $278,000 which could have been billed and collected annually since 2004 is somewhat stale, the Company would prefer to initially increase the R&D unit charge to $0.0174 per Mcf and to seek any additional increases in future proceedings.

IV. CONCLUSION

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

PRESENT

FOR ENTIRE SERVICE AREA
PSC KY. No. 2
Original SHEET No. 37

ATMOS ENERGY CORPORATION
(NAME OF UTILITY)

Research & Development Rider
R & D Unit Charge

1. **Applicable:**
This rider applies to the distribution charge applicable to all gas transported by the Company other than Rate T-3 and T-4 Transportation Service.

2. **R&D Unit Charge:**
The intent of the Research & Development Unit Charge is to maintain the Company's level of contribution per Mcf as of December 31, 1998.

R&D Unit Charge @ $0.0035 per 1,000 cubic feet

3. **Waiver Provision:**
The R&D Unit Charge may be reduced or waived for one or more classifications of service or rate schedules at any time by the Company by filing notice with the Commission. Any such waiver shall not increase the R&D Unit Charge to the remaining classifications of service or rate schedules without Commission approval.

4. **Remittance of Funds:**
All funds collected under this rider will be remitted to Gas Technology Institute, or similar research or commercialization organization. The amounts so remitted shall be reported to the Commission annually.

5. **Reports to the Commission:**
A statement setting forth the manner in which the funds remitted have been invested in research and development will be filed with the Commission annually.

6. **Termination of this Rider:**
Participation in the R&D funding program is voluntary on the part of the Company. This rider may be terminated at any time by the Company by filing a notice of rescission with the Commission.

DATE OF ISSUE May 13, 2013
Month/Date/Year

DATE EFFECTIVE January 24, 2014
Month/Date/Year

Issued by Authority of an Order of the Public Service Commission in Case No. 2013-00148

ISSUED BY /s/ Mark A. Martin
Signature of Officer

TITLE Vice President – Rates and Regulatory Affairs

KENTUCKY
PUBLIC SERVICE COMMISSION
JEFF R. DEROUEN
EXECUTIVE DIRECTOR
TARIFF BRANCH
Brent Kirtley
EFFECTIVE
5/1/2014
PURSUANT TO 807 KAR 5:011 SECTION 9 (1)

Proposed

FOR ENTIRE SERVICE AREA
PSC KY. No. 2
First Revised SHEET No. 37
Cancelling
Original SHEET No. 37

ATMOS ENERGY CORPORATION
(NAME OF UTILITY)

Research & Development Rider
R & D Unit Charge

1. **Applicable:**
This rider applies to the distribution charge applicable to all gas transported by the Company other than Rate T-3 and T-4 Transportation Service.

2. **R&D Unit Charge:**
The intent of the Research & Development Unit Charge is to maintain the Company's level of contribution per Mcf as of December 31, 1998.

R&D Unit Charge @ $0.0174 per 1,000 cubic feet (I)

3. **Waiver Provision:**
The R&D Unit Charge may be reduced or waived for one or more classifications of service or rate schedules at any time by the Company by filing notice with the Commission. Any such waiver shall not increase the R&D Unit Charge to the remaining classifications of service or rate schedules without Commission approval.

4. **Remittance of Funds:**
All funds collected under this rider will be remitted to Gas Technology Institute, or similar research or commercialization organization. The amounts so remitted shall be reported to the Commission annually.

5. **Reports to the Commission:**
A statement setting forth the manner in which the funds remitted have been invested in research and development will be filed with the Commission annually.

6. **Termination of this Rider:**
Participation in the R&D funding program is voluntary on the part of the Company. This rider may be terminated at any time by the Company by filing a notice of rescission with the Commission.

DATE OF ISSUE November 23, 2015
Month/Date/Year

DATE EFFECTIVE December 23, 2015
Month/Date/Year

Issued by Authority of an Order of the Public Service Commission in Case No. 2015-00070

ISSUED BY /s/ Mark A. Martin
Signature of Officer

TITLE Vice President – Rates and Regulatory Affairs

ATMOS ENERGY CORPORATION
(NAME OF UTILITY)

Research & Development Rider
R & D Unit Charge

1. **Applicable:**
This rider applies to the distribution charge applicable to all gas transported by the Company other than Rate T-3 and T-4 Transportation Service.

2. **R&D Unit Charge:**
The intent of the Research & Development Unit Charge is to maintain the Company's level of contribution per Mcf as of December 31, 1998.

R&D Unit Charge @ $0.0174 per 1,000 cubic feet (I)

3. **Waiver Provision:**
The R&D Unit Charge may be reduced or waived for one or more classifications of service or rate schedules at any time by the Company by filing notice with the Commission. Any such waiver shall not increase the R&D Unit Charge to the remaining classifications of service or rate schedules without Commission approval.

4. **Remittance of Funds:**
All funds collected under this rider will be remitted to Gas Technology Institute, or similar research or commercialization organization. The amounts so remitted shall be reported to the Commission annually.

5. **Reports to the Commission:**
A statement setting forth the manner in which the funds remitted have been invested in research and development will be filed with the Commission annually.

6. **Termination of this Rider:**
Participation in the R&D funding program is voluntary on the part of the Company. This rider may be terminated at any time by the Company by filing a notice of rescission with the Commission.

DATE OF ISSUE November 23, 2015
Month/Date/Year

DATE EFFECTIVE December 23, 2015
Month/Date/Year

Issued by Authority of an Order of the Public Service Commission in Case No. 2016-00070

ISSUED BY /s/ Mark A. Martin
Signature of Officer

TITLE Vice President – Rates and Regulatory Affairs

REQUEST:

Provide an analysis of Atmos's expenses for research and development activities for the base period and the three most recent calendar years. The analysis should include the following:

a. Basis of fees paid to research organizations and Atmos's portion of the total revenue of each organization. Where the contribution is monthly, provide the current rate and the effective date.

b. Details of the research activities conducted by each organization.

c. Details of services and other benefits provided to the utility by each organization.

d. Annual expenditures of each organization with a basic description of the nature of costs incurred by the organization.

e. Details of the expected benefits to the utility.

RESPONSE:

a) Atmos Energy is an active member of two research and development (R&D) programs offered by the Gas Technology Institute (GTI). These are the Operations Technology Development (OTD) R&D Program and the Utilization Technology Development (UTD) R&D Program. Atmos Energy utilizes funds collected from Kentucky to fund annual dues for both UTD and OTD. These funds are paid to Gas Technology Institute and placed in a hold account and allocated periodically to the UTD and OTD organizations. Per the Company's Original Sheet No. 37, which became effective January 24, 2014, the Research & Development Rider is $0.0035 per 1,000 cubic feet.

Atmos Kentucky contribution:

Calendar Yr.	Collections	Expenses
2012	$ 49,293.79	$116,357.62
2013	$ 61,527.15	$ 59,252.09
2014	$ 66,749.77	$ 66,503.94
2015 (1)	$ 47,728.07	$ 59,520.95
Total	$225,298.78	$301,634.60

Note: (1) Through September 2015

b) The Operations Technology Development (OTD) program provides natural gas companies with the innovative tools, techniques and processes to ensure continued safe, economic and reliable delivery of natural gas to the nation's gas ratepayers. Please see Attachment 1, which highlights OTD results.

The Utilization Technology Development (UTD) program supports the introduction of new end-use technologies that reduce emissions, improve efficiencies, and enhance the ability of natural gas consumers to save money. Please see Attachment 2, which highlights UTD results.

c) Services provided to Atmos Energy Kentucky by GTI include program and project management, R&D work from applied research, to field experiments, to field tests, to demonstration projects. GTI also works with manufacturers and others to get the results of the R&D into the marketplace so that they can be used by gas companies and gas consumers.

d) Annual Expenditure Summary:

OTD: $8.6 million (2014)
UTD: $4.5 million (2014)

e) Expected benefits to the utility and Kentucky gas consumers:

1) OTD projects have and will result in increased gas system safety, deliverability, integrity and O&M cost containment.

2) UTD projects have and will result in gas consumer energy savings, reduced gas bills, reduced gas use, environmental benefits, and enhanced safety.

ATTACHMENTS:

ATTACHMENT 1 - Atmos Energy Corporation, Staff_1-53_Att1 - OTD Exhibit 2014.pdf, 8 Pages.

ATTACHMENT 2 - Atmos Energy Corporation, Staff_1-53_Att2 - UTD Exhibit 2014.pdf, 6 Pages.

Respondents: Greg Waller and Mark Martin

CASE NO. 2015-00343
ATTACHMENT 1
TO STAFF DR NO. 1-53

OTD

Operations
Technology
Development

Results in Use

Since 2003, the OTD program has provided utilities, pipeline companies, service providers, and others in the natural-gas-delivery business with innovative tools, enhanced processes, and advanced equipment for improving gas system operations.

These products represent the results of OTD efforts to build a stronger industry infrastructure, enhance system integrity, and improve the efficiency of a wide range of operations activities.

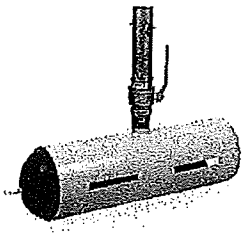
Selected OTD-Developed Products in the Marketplace

> Large-Diameter, Medium-Pressure Inflatable Stoppers

Mainline Control Systems

Marketed as the Kleiss MCS Flow Stopping System, this new system is used to stop the flow of gas in polyethylene, steel, cast-iron, and PVC pipes at diameters up to 18 inches and pressures up to 60 psig. The system, which is manufactured in Europe, was investigated through OTD to validate its operation and potential savings in the U.S. gas industry. *(Project Summary, p. 109)*

Contact: Wade Farr | 812-459-3936 | wfarr@mainlinecs.com | www.mainlinecontrolsystems.com

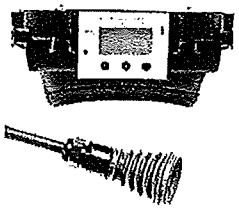


> IRED Infrared Portable Ethane Detector

SENSIT Technologies

This easy-to-use handheld detector was developed for use in the field to discriminate natural gas leaks from other sources of methane (e.g., swamp gas, landfill gas, and engine exhaust) and detect trace levels of ethane. The detection of ethane can be used as a fingerprint for natural gas in situations where the origin of a methane leak signal is questioned.

Contact: Scott Kleppe | 219-465-2700 | jScottK@gasleaksensors.com | info@gasleaksensors.com

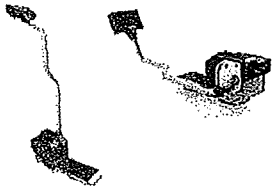


> Acoustic Pipe Locator (APL)

SENSIT Technologies

SENSIT's ULTRA-TRAC® APL acoustic-based pipe locator provides the ability to locate plastic pipes before excavations and construction. Now commercially available, in tests the system was shown to be capable of detecting multiple buried plastic pipes at depths up to five feet.

Contact: Scott Kleppe | 219-465-2700 | jScottK@gasleaksensors.com | info@gasleaksensors.com

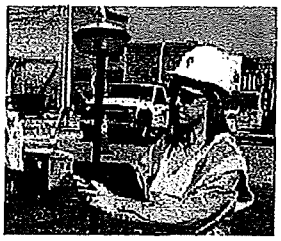


> Mobile GIS for Automated Mapping and Lifecycle Tracking

3-GIS LLC

A software platform developed through OTD is now part of the 3-GIS Mobile product suite to allow users to collect new installation data directly within a GIS environment. Applications to integrate real-time, sub-foot accurate GPS and barcode scanning are included.

Contact: Jerry Golden | 256-560-0744 x223 | jgolden@3.gis.com | www.3-gis.com



> LocusMap Mobile GIS Solution

LocusView

This system maps new installations with comprehensive tracking and traceability data, creating GIS features in a format that allows field-collected data to be directly integrated into the enterprise GIS. Barcode scanning and high-accuracy GPS automate the system and help create high-accuracy maps.

Contact: Alicia Farag | 847-387-9412 | alicia@locusview.com | www.locusview.com

> GPS-Enabled Leak Surveying

Ubisense

Automating the leak surveying and pinpointing process with GPS eliminates paper records, providing increased efficiency and reliable compliance documentation. Pilots of the GPS-enabled system with the VeroTrack AST™ software application were conducted at several utility companies.

Contact: Langley Willauer | 207-236-3485 x306 | langley@ubisense.net | www.ubisense.net

> LocusSurvey for Tracking Leak-Survey Routes

LocusView

LocusSurvey uses tablet computers and GPS to track leak-survey routes. The GPS breadcrumb trail is overlaid in a GIS to track pipe segments that are surveyed to provide real-time reporting and monitoring. LocusSurvey eliminates paper maps and records, automating the process of documenting surveys and leak locations.

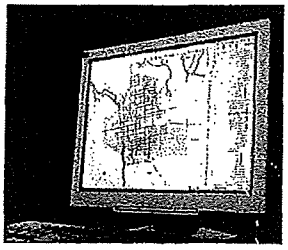
Contact: Alicia Farag | 847-387-9412 | alicia@locusview.com | www.locusview.com

> Uptime® 3.0 Distribution Integrity Management Risk Model

GL Noble Denton

Uptime® 3.0 provides an integrated environment for the integrity management of gas distribution and transmission pipeline assets. Uptime provides core support for all the key elements of distribution integrity management program regulations.

Contact: Michael Moore | 717-724-1900 | michael.moore@gl-group.com | www.gl-group.com

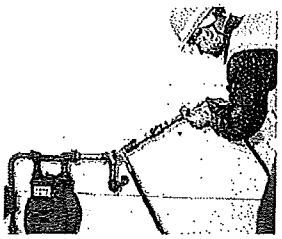


> NO-BLO® DBS System

Mueller Co.

Directional Bag Stopper (DBS) technology allows for routine maintenance without interruption of gas service to the customer. A portable system, it allows field technicians to perform many tasks related to the gas service line, including meter replacement and work on any part of the meter set, such as risers and regulators.

Contact: Bryan Kortte | 217-425-7516 | bkortte@muellercompany.com | www.muellergas.com

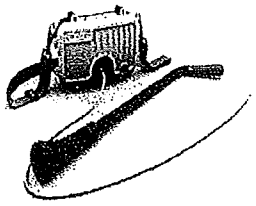


> Portable Methane Detector (PMD)

SENSIT Technologies

The handheld SENSIT® PMD uses optical-detection technology to provide sensitivity and cost advantages over conventional techniques employing flame ionization detectors. The PMD improves the efficiency of leak surveys, is less costly to maintain than other technologies, and can detect leaks from low ppm to 100% gas.

Contact: Scott Kleppe | 219-465-2700 | jScottK@gasleaksensors.com | Info@gasleaksensors.com



> Lift Assists for Pavement Breakers and Rock Drills

Integrated Tool Solutions, LLC

These devices assist workers in lifting pavement breaker and rock drills after the bits break through surface pavements and rocks and need to be repositioned for the next penetration. By eliminating the need to manually lift and re-position the heavy tools, the lift assists make breaking easier and less physically demanding.

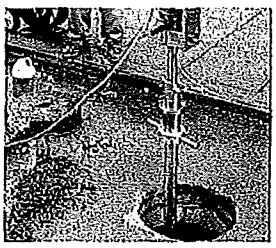
Contact: Ryan Purczynski | 951-929-4808 | rpurczynski@integratedtoolsolutions.com | www.integratedtoolsolutions.com

> Keyhole Pipeline Inspection Camera System

ULC Robotics

The PRX250K keyhole camera is an internal inspection system designed for visual assessment of live mains through conventional pits or small keyholes. The system is easily maneuverable through tight bends, allowing utilities to examine pipe segments without the need to drill additional access holes.

Contact: Greg Penza | 631-667-9200 | gpenza@ulcrobotics.com | www.ulcrobotics.com

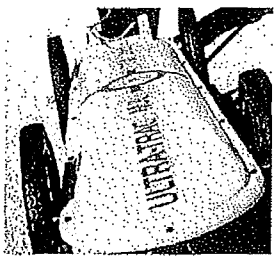


> Metallic Joint Locator (MJL)

SENSIT Technologies

The SENSIT Ultra-Trac® MJL accurately locates bell joints, repair clamps, and service connections on metallic piping systems, significantly reducing excavation areas and pavement restoration costs. In field tests, the MJL was also able to detect bell and spigot joints for an eight-inch-diameter water main buried at a depth of six feet.

Contact: Scott Kleppe | 219-465-2700 | jScottK@gasleaksensors.com | Info@gasleaksensors.com



Information on additional available products can be found at the OTD website: www.otd-co.org

Informational Products

Selected OTD-Developed Technical Reports

In addition to the development of new tools, processes, and products, OTD supports research that results in useful information on various aspects related to gas delivery and operations. Listed here are some of the key reports developed under OTD sponsorship.

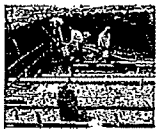
PIPE & LEAK LOCATION

> **RFID Marker Technology Implementation Guidelines**
A set of guidelines was developed for the implementation and application of integrated Global Positioning Systems (GPS), Geographic Information Systems (GIS), and "Smart Tag" technologies to streamline public-improvement project planning and prevent damage caused by excavations.

> **Cross Bores Best Practices Guide & Videos**
Significant research was conducted to investigate gas line/sewer line cross bores. The Guide and "how-to" videos (available through the OTD website) provide recommendations and procedures for preventing and detecting cross bores. (OTD-12/0003) *(Project Summary, p. 15)*

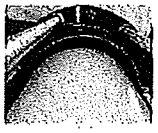
> **Residential Methane Gas Detector Program**
This reports provides results of a project initiated to determine whether commercially available combustible gas detectors are susceptible to giving false positive responses to an assortment of typical household chemicals, including ammonia, ethanol, acetone, toluene, isobutane, ethyl acetate, isopropanol, heptane, and hydrogen. (OTD-13/0003)

> **Underground Facility Pinpointing**
Reports from this project present the results of research conducted on several technologies used by utilities to locate underground pipes and facilities. Researchers investigated standard electromagnetic locators, ground-penetrating radar, and alternative imaging tools. The reports provide a comparative, technical evaluation of tools that are currently available. (OTD-6/0001)

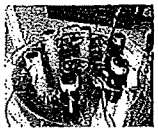


PIPE MATERIALS, REPAIR & REHABILITATION

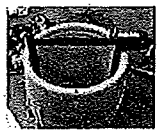
> **Liners/Composites for the Rehabilitation of Distribution and Transmission Lines**
A report titled *Transmission Infrastructure Roadmap* was prepared to address the implementation of composite piping materials in the rehabilitation of gas transmission systems. This report includes information on composite pipes, trenchless repairs, and cured-in-place structural liners. *(Project Summary, p. 33)*



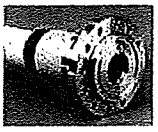
> **Polyurea Coating Testing and Assessment for Gas-Industry Use**
A Final Report is available on research into field-applied polyurea coatings for gas industry use. Through a new initiative, long-term field trials will be conducted to evaluate these additional coatings and determine a cost-effective coating-application method and process.



> **Electrofusion Coupling Evaluation and Best Practices**
Researchers investigated techniques used to perform electrofusion joining of plastic gas pipe in an effort to develop guidelines for the use and operation of electrofusion coupling. With a detailed set of guidelines, the gas industry can enhance the performance and safety of its plastic piping systems.



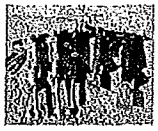
> **Review and Selection Guide for Pipe Rehabilitation**
The focus of this study is on reinforced thermoplastic pipe (RTP) as a pipe-rehabilitation option for use in the natural gas industry. To help pipeline operators gain a better understanding of the technology, researchers developed a product-selection guide based on thorough research of available RTP technology.



EXCAVATION & SITE RESTORATION

> Evaluation of Lightweight Jackhammers

A research team evaluated the performance of currently available lightweight pneumatic and hydraulic jackhammers with respect to their effectiveness in breaking asphalt and concrete pavement, while considering other operational factors such as noise, vibrations, operator impact, and performance. Expanded evaluations are under way.*(Project Summary, p. 45)*



> Cold-Patch Products Performance Results

This report provides the results of a testing program that evaluated nine commercially available cold-patch products, including two products introduced in the market as "green" patches. Cold- and warm-weather tests were performed and repeated moving loads were applied with a wheel-loading machine that conducted 50,000 wheel passes.

> Evaluation of Flowable Fill Around Buried Pipes

Flowable fill is required by some agencies for use as backfill material for pipe repairs, rehabilitations, and other operations. Presented in this report are the results of performance tests of flowable fill, including the effects of flowable fill on pipeline corrosion and on the detection of gas flow and leaks through the backfill. (OTD-07/0004)

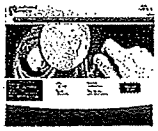
> Alternative Methods of Pavement Cutting

In an effort to reduce the costs and improve the process of pavement cutting, researchers investigated the application of current and new pavement-cutting methods. Technologies examined and summarized in this report include impact breaking, sawing, chemical and thermal methods, water-jetting, and laser cutting.

PIPELINE INTEGRITY MANAGEMENT & AUTOMATION

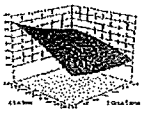
> Inspection Technology Strategy Tool

An on-line software tool was developed to assist pipeline operators in evaluating and selecting appropriate inspection tools. A website provides a centralized resource for technical information and expertise related to internal inspection issues and concerns.



> Leak-Rupture Boundary Report and Calculator

This report and associated software allows operators to determine the leak-rupture boundary for a pipe segment based on properties such as the diameter, toughness, and yield strength. Operators can use the calculator for risk modeling and consequence analysis. (OTD-13/0002 and OTD 13/0004)

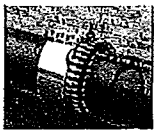


> Field-Applied Pipeline Coatings: Short- and Long-Term Performance

This report presents the culmination of a 10-year research program to assess more than 80 different commercially available field-applied pipeline-coating products. The goal was to establish an unbiased, third-party basis for operators to select the most appropriate coating system for particular applications.

> Evaluation of Guided Wave Technology as a Hydrotest Equivalent

This report details an evaluation conducted to demonstrate and validate the use of Guided Wave Ultrasonic Testing as an equivalent to a hydrotest. A standard was developed and incorporated by the National Association of Corrosion Engineers (NACE) into the NACE TG410 committee standard. (OTD-11/0001)

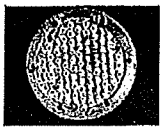


> "Black Powder" Contamination in the Gas Industry: Survey and Best Practice Manual

Black powder – a substance composed mainly of iron sulfides and iron oxides – can cause corrosion and create wear on pipelines. This report provides information on issues, cleanup techniques, and management methods related to "black powder" contaminants. Results were compiled into a "best practices" industry manual. (OTD-07/0002)

> Literature Review for Elemental Sulfur Deposits in Natural Gas Transmission Pipelines

Deposits of "elemental sulfur" – which can block natural gas pipes and equipment – are becoming an increasing concern in the natural gas industry. This report summarizes a literature review to develop a better understanding of the sources, causes, and mitigation possibilities for sulfur deposits found in gas pipelines. (OTD-09/0001)



> **Flaw Acceptance Criteria and Repair Options for Low-Stress Natural Gas Pipelines**
Researchers partnered with pipeline companies and industry organizations to develop modified assessment criteria for low-stress pipelines. The goal was to develop criteria for discriminating flaws that truly affect pipeline integrity from flaws that have no significant impact.

> **In-Field Corrosion Rate Measurement/Determination for Integrity Reassessment Intervals and Risk Prioritization**
Research was conducted to develop a systematic and simple method to calculate realistic corrosion growth rates for determining pipeline-reassessment intervals.

OPERATIONS INFRASTRUCTURE SUPPORT

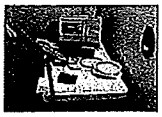
> **Assessment of Frost Impact on Cast-Iron Pipes**
This study of winter leak-breakage records correlated pipe breakage due to freeze conditions with local site conditions, such as soil properties, weather patterns, and pipe attributes (e.g., depth, diameter, and age). Statistical analysis established relationships between various parameters to enhance winter leak-surveillance procedures. *(Project Summary, p. 113)*

> **Evaluation of Static Suppressors on Existing Polyethylene Piping Systems**
Researchers evaluated selected commercially available static suppressors for suitability for use on polyethylene piping systems to eliminate static charge and assess their effects on heat-fusion-joint performance and pipe materials. *(Project Summary, p. 85)*

> **Evaluation of Commercial/Light-Industrial-Sized Excess Flow Valves (EFVs)**
This reports presents the results of an evaluation of the performance of high-volume EFVs for commercial, multi-residential, and light-industrial applications in response to regulations requiring an expanded use of EFVs. *(Project Summary, p. 115)*

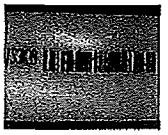
> **Natural Gas & Indoor Air Quality Website**
A website of vital information on indoor air quality and safety issues was developed for OTD members through the OTD website *(otd-co.org)*. The site provides a center of expertise and a single-point access to scientific data, performance information, and natural-gas-related issues. *(Project Summary, p. 87)*

> **UV Degradation and Static Buildup Testing of Personal Protection Equipment Fabrics**
Researchers tested various utility-vest materials to determine if degradation is caused by ultraviolet light and to evaluate the potential for static buildup to become hazardous. The results of safety vest testing are available in technical reports.



> **Ignition Testing of Electronic Devices**
In this project, handheld electronic devices were tested to determine if ignition occurs in the presence of a flammable methane/air mixture. Laboratory tests demonstrated a large margin of safety under the scenarios investigated. (OTD-12/0001)

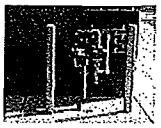
> **Intelligent Utility Installation Process**
This report provides a methodology, field process, and a data model for capturing data during new utility installations. The process is used to capture information regarding the location, materials, installation process, environmental considerations, and other factors. (OTD-12/0002) *(Project Summary, p. 93)*



> **Tracer Wire for HDD Applications**
Extensive research and testing culminated in the release of a report that provides valuable information on the properties and performance of various tracer-wire products for use in horizontal directional drilling (HDD) operations. (OTD-13/0001)

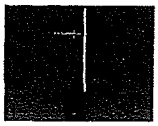
> **Regulator Vault Corrosion and Coating Rehabilitation**
This study focused on thermal-spray and its ability to mitigate the corrosion of gas piping and the components housed in utility vaults. Results from the field work include detailed information on surface preparation methods, pre-cleaning, coating applications, quality-control inspection specification for field use, and the coating-material selection process.

> **Assessment of Vehicle-Barrier Design for Aboveground Facility Protection**
Investigators compiled the latest information on the design, regulations, and installation practices of structural vehicle barriers used to protect aboveground utility facilities from vehicular damages. The Final Report also includes a review of various state and federal safety guidelines.

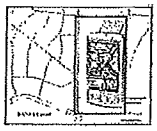


> **Study of Low-Impact Markings**
A variety of paints, materials, and techniques were tested and characterized in an effort to identify products and methods that can be used for temporary utility marking. Information developed in this study allows users to identify the most appropriate marker type for a given environment to achieve the desired marking duration. (OTD-11/0002)

> **Solar-Powered Remote Monitoring**
In this study, solar-powered devices were investigated as power sources for the remote monitoring of various gas utility facilities to more cost-effectively obtain rectifier data, pipe-to-soil measurement, pipe-to-casing readings, and other information.



> **Integrating GPS into Routine Operations**
This report provides a set of recommendations and GPS implementation strategies developed through pilot programs, literature searches, and reviews of existing applications. Operations that were considered included meter reading, leak surveying, new installations, corrosion monitoring, and valve inspections.



> **DVDs for Training First Responders**
DVD training products help gas companies better educate first-responding personnel about natural gas emergencies. Learning modules with realistic scenarios cover a variety of issues to enhance public and worker safety. The product also serves to improve emergency-response effectiveness and coordination.

ENVIRONMENTAL, RENEWABLES & GAS QUALITY

> **Siloxane Concentrations in Biomethane**
Biomethane from various waste products could provide consumers with a significant source of "green" renewable energy. In efforts to help develop this green resource, a study was conducted into siloxane – one of the potential constituents in biomethane – to assess its influence on health, the environment, and gas-fired appliances.

> **Field Measurement Program to Improve Uncertainties for Key Greenhouse Gas Emission Factors for Distribution Sources**
This report summarizes the results of field surveys conducted at six natural gas utilities. With the support of the American Gas Association, research updated emissions factors for metering stations, regulating stations, and customer meters. (OTD-10/0002)

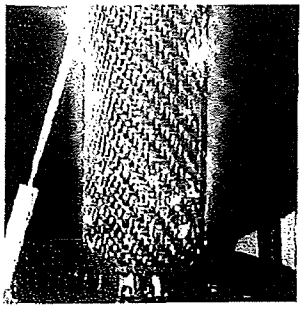
> **Improving Methane Emission Estimates for Natural Gas Distribution Companies**
This report details Phase 2 of a four-phase field-testing program to evaluate gas leak rates from belowground pipelines, provide a simplified procedure that can be used to monitor pipeline leaks from surface measurements, and update the methane emission estimates for the main lines in a distribution system. *(Project Summary, p. 141)*

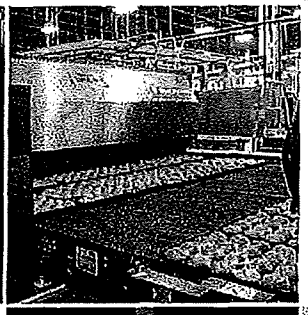
> **Pipeline-Quality Methane: North American Guidance Document for Introduction of Dairy-Waste-Derived Biomethane into Existing Natural Gas Networks**
The guidance document provides reference and recommendations for the consideration of biomethane from dairy-waste digestion for introduction into gas pipeline networks. The report details results of a biogas/biomethane Gas Technology Institute research program.

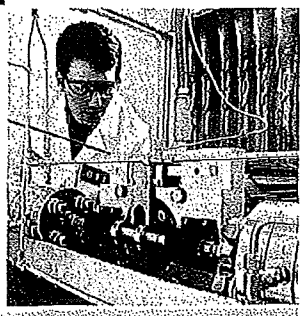
Contact: Maureen Droessler
847-768-0608
maureen.droessler@otd-co.org
www.otd-co.org

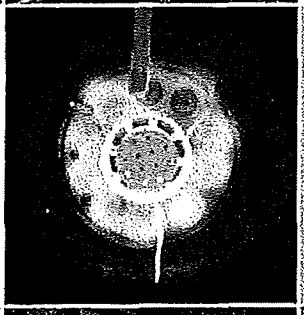
UTD

Utilization
Technology
Development

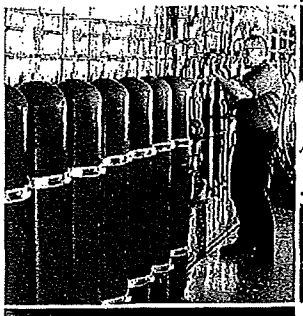


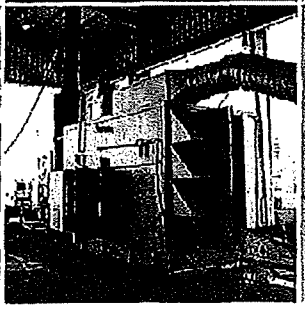


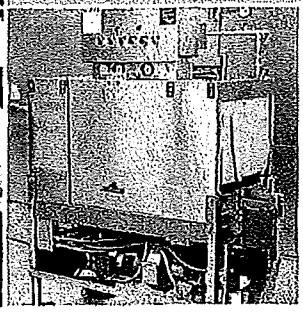


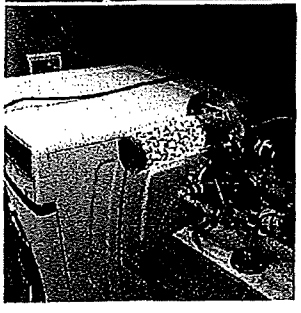


RESEARCH PROJECT SUMMARIES 2013-2014









Market-Ready Solutions

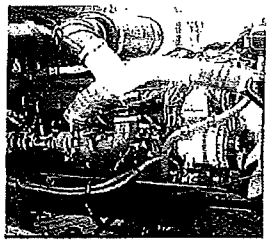
UTD-Sponsored Products Enter the Marketplace

The over-riding goal of Utilization Technology Development is to support the introduction of new end-use technologies into the marketplace to enhance the ability of natural gas consumers to save money, reduce emissions, improve efficiencies, and optimize the use of natural gas as a premium fuel.

Through a combination of research, development, testing, and marketing activities, every year a number of UTD-supported projects evolve into commercially available products.

UTD is proud to present highlights of some recent milestones and market-ready solutions:

Products Commercially Available or Being Readied for Commercialization

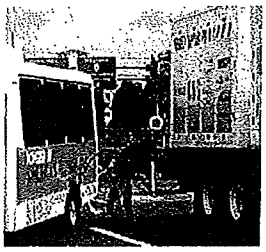


> Cummins Westport (CWI) High-Horsepower NGV Engine

Cummins Westport Inc.

CWI, with UTD support, developed a new 12-liter 400-HP NGV engine (ISX12 G) for the large truck and bus market segment such as regional haulers, refuse transfer trucks, and other larger vehicles. The engine satisfies the stringent California emission requirements. Now in full production, through the end of 2013, CWI had manufactured more than 2,000 ISX12 G engines. *(Project Summary, p. 113.)*

Contact: Stephen Ptucha
Cummins Westport Inc.
604-718-2024
sptucha@cummins.com
www.cumminswestport.com

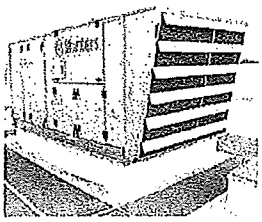


> Ultimate CNG FuelMule

Ultimate CNG, LLC

The FuelMule is a mobile fueling solution that is capable of dispensing eight diesel gallon equivalent (dge) per minute at a pressure of 3,600 pounds per square inch. The FuelMule is fitted with onboard storage capacity of 700 dge that can fuel 35 to 50 medium- to heavy-duty vehicles. Separate electronic metering allows for the filling of two vehicles simultaneously. *(Project Summary, p. 123.)*

Contact: Dennis Pick
Ultimate CNG, LLC
703-209-4086
dpick@ultimatecng.com
www.ultimatecng.com

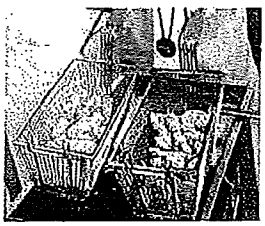


> Dedicated Outside Air System (DOAS)

Munters Corporation

A condensing heating version of this Munters DOAS is in final development. A field evaluation was conducted during the winter of 2013 at a "big box" retail store. UTD research was instrumental in establishing baseline store-heating energy use, developing the DOAS condensing heating module,and defining combustion condensate disposal practices from rooftops. *(Project Summary, p. 41.)*

Contact: Larry Klekar
Munters Corporation
210-249-3883
larry.klekar@munters.com
www.munters.com

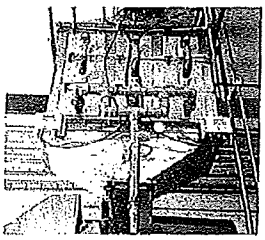


> Low-Oil-Volume Fryers

Frymaster, a Manitowoc Foodservice company

A new commercial foodservice low-oil-volume fryer has undergone development and pre-commercial testing with successful results. The fryer, marketed by Frymaster as Protector® fryers, increases energy efficiency while also extending cooking-oil quality and life to provide significant customer savings.

Contact: Linda Brugler
Frymaster
318-866-2488
lbrugler@frymaster.com
www.frymaster.com

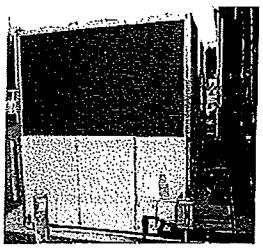


> Cannon Boiler Works' Ultramizer®

Cannon Boiler Works, Inc.

An advanced heat-and-water recovery system, including Transport Membrane Condenser technology, was installed and commissioned at Baxter Healthcare in Thousand Oaks, CA, meeting performance expectations and increasing the boiler efficiency from 80% to 93% – saving the customer 15% on fuel bills, reducing greenhouse emissions by 15%, and saving over 250,000 gallons of water.

Contact: Chris Giron
Cannon Boiler Works, Inc.
724-335-8541 x414
sales@cannonboilerworks.com
www.cannonboilerworks.com



> NextAire™ Gas Heat Pump

IntelliChoice Energy

Researchers conducted a series of tests of the Next-Aire 8-ton and 15-ton gas heat pump (GHP) in commercial applications. This advanced unit uses variable refrigerant flow and multi- zone capabilities (up to 33 zones for the 15-ton unit) to efficiently heat and cool commercial building space with substantially less electricity requirements (up to 80% reduction). *(Project Summaries, p. 53, 63, and 73.)*

Contact: Tom Young
IntelliChoice Energy
623-879-4664
tyoung@lceghp.com
www.lceghp.com

> Equinox Solar-Assisted Heating System

Solar Usage Now, LLC

The Equinox system is a combination thermal storage tank and instantaneous water heater capable of providing 100% of domestic hot-water and space-heating needs. This unit was tested in multiple residential and commercial sites and is available from Solar Usage Now as the S.U.N. Equinox Heating System.®

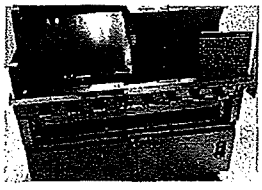
Contact: Tom Rieker
Solar Usage Now, LLC
614-759-7242
service@netwalk.com
www.solarusagenow.com

> Cummins 8.9L Ultra-Low-Emissions Engine

Cummins Westport Inc. (CWI)

This is the first engine certified to the highly stringent California 2010 standards for heavy-duty vehicle engines – achieving emission levels below the 0.2 g NO_x/hp-hr requirement while also retaining high shaft efficiency. Since its introduction in 2007, the engine has been widely used, with more than 13,000 engines now in service throughout the world in transit, refuse-collection, and regional hauling applications.

Contact: Stephen Ptucha
Cummins Westport Inc.
604-718-2024
sptucha@cummins.com
www.cumminswestport.com

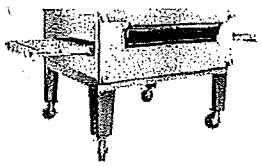


> High-Efficiency Broilers

The Montague Company

New, higher-efficiency broilers were demonstrated in cooperation with The Montague Company. These units use thermostatic broiler-temperature control and an energy-saving hood. Field testing showed an average of 23% energy savings.

Contact: The Montague Company
800-345-1830
www.montaguecompany.com

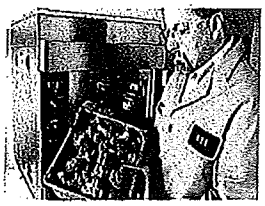


> Energy Star Conveyor Oven

Lincoln, a division of Manitowoc Foodservice

Testing confirmed significant energy savings from Energy-Star-rated conveyor ovens from Lincoln. These products include an advanced energy-management system to reduce energy consumption up to 38%.

Contact: Lincoln, a division of Manitowoc Foodservice
260-459-8200
www.lincolnfp.com

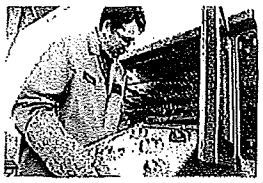


> Market Forge Countertop Steamer

Market Forge Industries Inc.

This compact gas-fired countertop steamer for commercial foodservice offers enhanced cooking rates while providing users with added savings of energy and water consumption. The unit is the first gas-fired boilerless steamer with an Energy Star rating.

Contact: Market Forge Industries Inc.
617-387-4100 – 866-698-3188
custserv@mfii
www.mfii.com

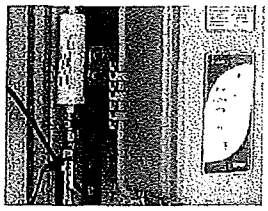


> Avantec Combi-Oven

Avantec Food Service Equipment

The combination oven uses a patented technology for improving cooking performance, quality, and efficiency. Able to operate in various cooking modes, the oven provides enhanced cooking uniformity when compared to similar-sized ovens.

Contact: Dave Goble
Avantec Food Service Equipment
800-322-4374
dave@twomarket.com
www.avantecequipment.com

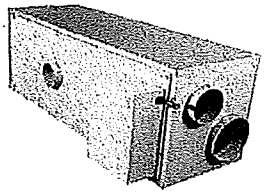


> BRC FuelMaker's *Phill*

BRC FuelMaker

A field demonstration program was conducted to assess the performance, reliability, and economics of a natural-gas-fueling product that allows for the re-fueling of natural gas vehicles at homes and businesses. Data was analyzed and a user survey was conducted at the conclusion of the demonstration.

Contact: Francesco Donalisio
IMPCO Technologies /
BRC FuelMaker
+39 0172.48.68.656
F.Donalisio@brc.it



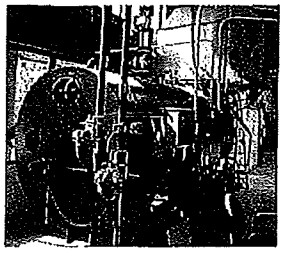
> NovelAire ComfortDry™ 400

NovelAire Technologies

This advanced supplemental dehumidifier was developed for residential and light-commercial buildings where humidity or moisture-related allergen concerns prevail. Research provided enhanced operation and reliability, along with reduced cost, weight, size, and installation requirements.

Contact: Scott Janke
NovelAire Technologies
770-664-4756
sljanke@novelaire.com
www.novelaire.com/residential-dehumidifiers.html

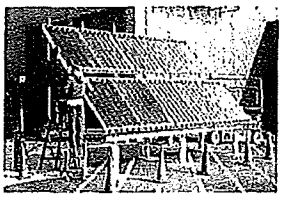
Significant Milestones



> FlexCHP High-Efficiency Ultra-Clean Power and Steam Package

Researchers are developing a cost-effective supplemental burner, integrated with a gas-turbine-based combined heat-and-power system. Laboratory tests have shown total efficiency of over 85% and NO_x emissions that are below stringent California emission levels. In 2013, the FlexCHP-65 system was installed a the facilities of a California food processor for a field demonstration. *(Project Summary, p. 85.)*

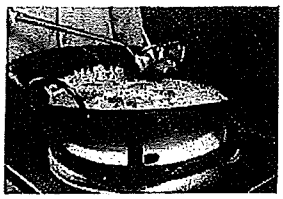
Contact: Dave Cygan
Gas Technology Institute
david.cygan@gastechnology.org



> Solar-Assisted Natural Gas Energy Systems

Progress continues with the installation of solar-thermal collectors using B2U Solar's higher-temperature Non-Imaging Concentrator Collector (NICC) technology. Additional testing is planned with a major food-processing company. *(Project Summaries, p. 43, 87, 93, and 95.)*

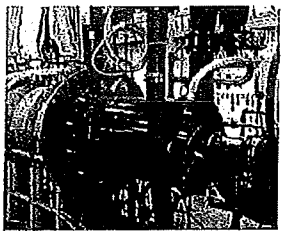
Contact: Dave Cygan
Gas Technology Institute
david.cygan@gastechnology.org



High-Efficiency Wok

A new high-efficiency wok has undergone extensive laboratory testing and is now progressing through field testing prior to commercial launch. Tests show up to a 75% efficiency improvement over conventional woks. Royal Range and other foodservice organizations are evaluating options for commercialization.

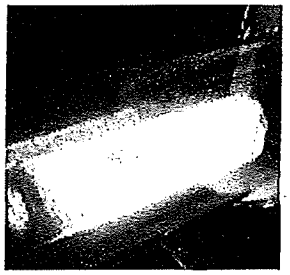
Contact: Frank Johnson
Gas Technology Institute
frank.johnson@gastechnology.org



Ultra-Low-NO_x Burner

Power Flame Inc. is developing an Ultra-Low-NO_x (ULN) burner for firetube-boiler applications to achieve NO_x emissions below 5 ppm without the use of Selective Catalytic Reduction or external Flue Gas Recirculation. A prototype unit rated at 4 million Btu/hr was designed, fabricated, and installed at Gas Technology Institute research laboratories for performance validation testing. *(Project Summary, p. 49.)*

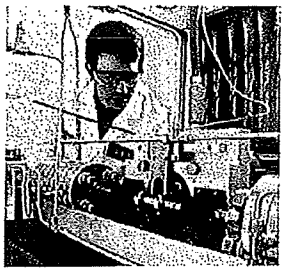
Contact: Derek Wissmiller
Gas Technology Institute
derek.wissmiller@gastechnology.org



Low-NO_x Furnace

Low-NO_x combustion systems developed in with California's South Coast Air Quality Management District (SCAQMD) and five residential furnace manufacturers achieved emissions levels of less than 14 ng/J. Innovative burner materials, including metal mesh and metal foam, were used to achieve even heat transfer and uniform flame temperatures. Commercial residetial furnace burners are currently being developed based on these designs. *(Project Summary, p. 11.)*

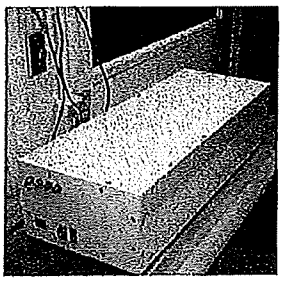
Contact: Frank Johnson
Gas Technology Institute
frank.johnson@gastechnology.org



Home Compressor

A cost-effective home-fueling appliance has the potential to significantly change the light-duty passenger NGV market. With UTD cost share, Gas Technology Institute and the University of Texas, Austin (with specialty materials from Argonne Laboratories), have embarked on a novel approach using a linear motor and only one moving piston. The prototype is scheduled to be running in the laboratory by late 2014.
(Project Summary, p. 127.)

Contact: Jason Stair
Gas Technology Institute
jason.stair@gastechnology.org



Gas Quality Sensor

A research team is developing a commercial prototype of the Gas Quality Sensor (GQS), a sensor utilizing infrared light absorption spectroscopy to measure Btu content and gas composition. Extensive filed trials of a laboratory prototype demonstrated that the GQS is capable of monitoring natural and bio gas composition and heating value in real time with an accuracy of 0.5% or better. The cost of the commercial GQS is expected to be competitively priced to the cost of a gas chromatograph.
(Project Summary, p. 101.)

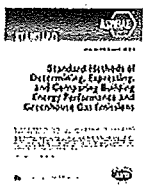
Contact: John Pratapas
Gas Technology Institute
john.pratapas@gastechnology.org

Gas-Fired Heat Pump Water Heater

Researchers designed and demonstrated a novel Gas-Fired Heat Pump Water Heater (GHPWH) through laboratory proof-of-concept testing. The GHPWH has compatibility with SCAQMD NO_x requirements and an Energy Factor (EF) of 1.3 – over twice that of standard gas water heaters. When commercially available in 2016, it will be the only water-heating technology with a source energy-based EF of greater than 1.0. *(Project Summary, p. 17.)*

Contact: Paul Glanville
Gas Technology Institute
paul.glanville@gastechnology.org

Analytical Tools & Information Products

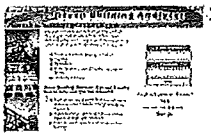


> ASHRAE Standard 105-2014 "Standard Methods of Determining, Expressing, and Comparing Building Energy Performance and Green Gas Emissions
A revised standard now includes a more comprehensive primary (or source) energy-based methodology for comparing building energy performance. This is a significant advancement over the prior standard that only included site energy metrics.
Contact: Neil Leslie | Gas Technology Institute | neil.leslie@gastechnology.org

> Source Energy and Emissions Analysis Tool
The Source Energy and Emissions Analysis Tool (SEEAT) allows calculation of the energy source and greenhouse-gas emissions related to point-of-use (site) energy consumption by fuel type for each energy-consuming device (e.g., appliances and vehicles). SEEAT includes a source-energy and carbon-emission calculation methodology that accounts for primary energy consumption and related emissions for the full fuel cycle for residential and commercial buildings, industrial applications, and light-duty vehicles. *(Available online at www.cmctools.com.)*
Contact: Neil Leslie | Gas Technology Institute | neil.leslie@gastechnology.org

> International Green Construction Code (IGCC)
The International Green Construction Code (IGCC) development committee shifted from site energy to source energy and greenhouse-gas (GHG) emissions as the basis of the performance requirements in IGCC. The latest publication includes a single-reference building approach that will implement the source energy and GHG emission-compliance requirements consistently and equitably.
Contact: Neil Leslie | Gas Technology Institute | neil.leslie@gastechnology.org

> Whole House Residential Energy Efficiency Wizard (REEW)
The REEW provides UTD members and their customers with a user-friendly Internet-server-based tool allowing for the analysis and easy selection of the latest technologies applicable to residential buildings energy-efficiency measures customized to a specific member service territory. *(Project Summary, p. 3.)*
Contact: Jennifer Yang | Gas Technology Institute | jennifer.yang@gastechnology.org



> Commercial Green Building Analyzer (CGBA)
The CGBA is designed to be a user-friendly tool allowing for easy selection of the latest applicable commercial "green" building energy-efficiency measures customized to a specific member service territory. Several new building envelope materials were added to the recent version. *(Project Summary, p. 39.)*
Contact: Jennifer Yang | Gas Technology Institute | jennifer.yang@gastechnology.org

> Venting Solutions
VENT-II, the industry standard software program for vent system design, offers application with commonly used desktop operating systems and spreadsheet tools. A venting Technical Advisors Group includes 30 subject- matter experts, manufacturers, industry groups and associations, and Gas Technology Institute.
Contact: Larry Brand | Gas Technology Institute | larry.brand@gastechnology.org