



National Fuel

December 26, 2017

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
P.O. Box 3265
North Office Building
Harrisburg, Pennsylvania 17105-3265

Re: National Fuel Gas Distribution Corporation
Delta Fund for Research and Development Projects Report

Dear Secretary Chiavetta;

Pursuant to R-00061493 Settlement paragraph 18 A.3 "Distribution will file with the Commission and serve upon other Parties on or before December 31 an annual report for the preceding twelve month period ended September 30, setting forth revenues for the Delta Fund for research and development projects and expenditures for such projects. In addition, Distribution will describe in the annual report projects that have been funded". The enclosed report is submitted under this settlement agreement.

Acknowledgement hereof is desired and duplicate letter is enclosed with a self-addressed, stamped envelope for that purpose.

Very truly yours,

Eric H. Mein
General Manager
Rates and Regulatory Affairs

Encl.

Cc: Office of Special Assistants
Office of Consumer Advocate
Office of Small Business Advocate

The provisions of R-00061493 Settlement paragraph 18 A.3 were adopted on November 30, 2006 and effective January 1, 2007. Paragraph 18 A.3 states:

“3. The Joint Petitioners agree to \$526,466 to fund the Delta research and development program pursuant to the Statement of Scott E. Swartzfager No. 14. The deferral treatment and review process outlined in R-00049656 will continue. The company will not expend these dollars on additional customer outreach for enhanced energy efficiency.

Distribution will be permitted to record a regulatory asset or liability for differences between the annual rate allowance and annual expenditures. However, Distribution will not be permitted to retroactively recover in a future proceeding any expenditures in excess of the annual rate allowance and any deferred balance from the previous year's Delta funding. Distribution will provide for review of research projects as described in its testimony. In order to implement this Settlement, the Joint Petitioners request that the Commission's Final Order in this proceeding include the following language to allow Distribution to qualify for deferred accounting under SFAS 71:

“National Fuel Gas Distribution Corporation's accounting policies conform to the Statement of Financial Accounting Standards No. 71 'Accounting for the Effect of Certain Type of Regulations' which are in accordance with the accounting requirements and ratemaking practices of regulatory authorities. The application of these accounting policies allows the Company to defer expenses and income on the balance sheet as regulatory assets and liabilities when it is probable that those expenses and income will be allowed in the rate-setting process in a period different from the period in which they would have been reflected in the income statement by an unregulated Company.

“Because research and development projects often require a commitment over multiple years and because the expenditures for such projects may not match on an annual basis revenues for funding of research and development projects, deferred accounting is appropriate and is approved. The regulatory deferral treatment sought for the Research and Development expenditures and rate relief requested in the case are in accordance with SFAS No. 71.

“The Company will manage the costs of the Research and Development expenditures to match revenues deferred pursuant to this Order to eliminate any differences between deferred costs and deferred revenues at the end of a five-year period commencing on the day after the R-00049656 Order was entered.”

Distribution will file with the Commission and serve upon other Parties on or before December 31 an annual report for the preceding twelve month period ended September 30, setting forth revenues for the Delta Fund for research and development projects and expenditures for such projects. In addition, Distribution will describe in the annual report projects that have been funded.”

The provisions of R-00049656 Settlement paragraph 44 were adopted on March 23, 2005 and effective April 15, 2005. Paragraph 44 states:

"44. Distribution's proposal to fund the Delta research and development program pursuant to the Supplemental Statement of Ruth Friedrich-Alf No. 102 S2 is approved. Increased rates in this proceeding provide for recovery of \$526,466 in Delta research funds. Distribution will be permitted to record a regulatory asset or liability for differences between the annual rate allowance and annual expenditures. However, Distribution will not be permitted to retroactively recover in a future proceeding any expenditures in excess of the annual rate allowance and any deferred balance from the previous year's Delta funding. Distribution will provide for review of research projects as described in its testimony. In order to implement this agreement, the Parties request that the Commission's Final Order in this proceeding include the following language to allow Distribution to qualify for deferred accounting under SFAS 71:

'National Fuel Gas Distribution Corporation's accounting policies conform to the Statement of Financial Accounting Standards No. 71 'Accounting for the Effect of Certain Type of Regulations' which are in accordance with the accounting requirements and ratemaking practices of regulatory authorities. The application of these accounting policies allows the Company to defer expenses and income on the balance sheet as regulatory assets and liabilities when it is probable that those expenses and income will be allowed in the rate-setting process in a period different from the period in which they would have been reflected in the income statement by an unregulated Company.

'Because research and development projects often require a commitment over multiple years and because the expenditures for such projects may not match on an annual basis revenues for funding of research and development projects, deferred accounting is appropriate and is approved. The regulatory deferral treatment sought for the Research and Development expenditures and rate relief requested in the case are in accordance with SFAS No. 71.

'The Company will manage the costs of the Research and Development expenditures to match revenues deferred pursuant to this Order to eliminate any differences between deferred costs and deferred revenues at the end of a five-year period commencing on the day after this Order is entered.'

Distribution will file with the Commission and serve upon other Parties on or before December 31 an annual report for the preceding twelve month period ended September 30, setting forth revenues for the Delta Fund for research and development projects and expenditures for such projects. In addition, Distribution will describe in the annual report projects that have been funded."

As presented in R-00049656 Statement No. 102 (page 15);

“On an annual basis coming off of September 30, a reconciliation of revenues and expenditures with a description of projects funded will be on file on or before December 31 with the Office of Trial Staff, Office of Consumer Advocate and the office of Small Business Advocate. At the fifth reconciliation, Distribution will file a five year report.”

As presented in R-00049656 Statement No. 102 S2 (page 7)

“Annual revenues will be deferred to offset the costs of the Research and Development expenditures (expenses) to both the Gas Technology Institute (“GTI”) fund and local projects.

The Company will manage the cost of the Research and Development expenditures to match revenues deferred pursuant to this Order to eliminate any differences between deferred costs and deferred revenues at the end of a five-year period commencing on the day after this Order is entered.”

It is under these guidelines and agreements that Distribution files the following report for the period ended September 30, 2017.

National Fuel Gas Distribution Corporation
Pennsylvania Division

Annual Filing of Delta Fund Revenues and Expenditures
For the period ended September 30, 2017

Year Ended	Annual		Cumulative		Balance
	Expenditures	Revenues	Expenditures	Revenues	
Sept. 2005	\$92,300	\$113,927	\$92,300	\$113,927	(\$21,627)
Sept. 2006	\$376,800	\$526,466	\$469,100	\$640,393	(\$171,293)
Sept. 2007	\$596,800	\$526,466	\$1,065,900	\$1,166,859	(\$100,959)
Sept. 2008	\$526,493	\$526,466	\$1,592,393	\$1,693,325	(\$100,932)
Sept. 2009	\$376,368	\$526,466	\$1,968,761	\$2,219,791	(\$251,030)
Sept. 2010	\$455,911	\$526,466	\$2,424,672	\$2,746,257	(\$321,585)
Sept. 2011	\$721,800	\$526,466	\$3,146,472	\$3,272,723	(\$126,251)
Sept. 2012	\$280,300	\$526,466	\$3,426,772	\$3,799,189	(\$372,417)
Sept. 2013	\$626,800	\$526,466	\$4,053,572	\$4,325,655	(\$272,083)
Sept. 2014	\$278,891	\$526,466	\$4,332,463	\$4,852,121	(\$519,658)
Sept. 2015	\$276,800	\$526,466	\$4,609,263	\$5,378,587	(\$769,325)
Sept. 2016	\$458,404	\$526,466	\$5,067,667	\$5,905,053	(\$837,386)
Sept. 2017	\$500,530	\$526,466	\$5,568,197	\$6,431,519	(\$863,322)

Note 1: Rates were effective April 15, 2005 therefore the report ended September 30, 2005 does not represent a 12 month period of revenue collection.

DESCRIPTION OF ACTUAL EXPENDITURES - PERIOD ENDED SEPTEMBER 2017

GTI Utilization Technology Development Program

\$129,500 was submitted to Utilization Technology Development, NFP (UTD) for the April 1, 2017 through March 31, 2018 dues. \$100,578 has been allocated to specific projects as listed below.

UTD Payments, Fees, Credits, Carryover

Payments to UTD	\$129,500
Administration Fees	-\$12,950
Carryover of Unallocated Funds from Prior Year	\$7,036
Funds Available for Allocation	\$123,586

Allocations to Projects

Residential/Commercial Space Conditioning

1.11.H Refund	\$3
1.11.H.4 Residential Gas Absorption HPWH - Six 4th Generation Field Demos	-\$481
1.11.M.5 Building America Whole House Retrofit Program -Phase 5	-\$2,580
1.13.D.4 Codes and Standards for Advanced Gas Technologies - Phase 4	-\$634
1.13.D.5 Codes and Standards for Advanced Gas Technologies - Phase 5	-\$2,257
1.13.F.2 Gas Absorption Heat Pump for Space Conditioning - Phase 2	-\$3,270

1.13.F.3 Gas Absorption Heat Pump for Space Conditioning - Phase 3	-\$3,330
1.13.L.2 Validation of mCHP Test Standard ASHRAE SPC204 - Phase 2	-\$1,468
1.15.J Refund	\$7,400
1.16.C High Performance Building Initiative	-\$1,992
1.16.C.2 High Performance Building Initiative - Phase 2	-\$2,405
1.16.E.2 Low Capacity Heating Systems Portfolio - Phase 2	-\$3,700
1.16.H EnergyPlus Built-in Models for Advanced Gas Space Heating Systems and Combi Systems	-\$2,173
1.17.E Emerging Combi FAU Laboratory Evaluations	-\$1,443
1.17.F Thermolift Comb. Heating/Cooling System Techn Support - Alpha Prototype	-\$5,513
1.17.G Yanmar 3-Pipe Gas Engine HP Field Study	-\$7,380

Residential/Commercial Water Heating

1.11.K Refund	\$361
1.11.L Refund	\$36
1.14.K.2 Advanced Systems for Self Powered Water Heating - Phase 2	-\$5,254
1.15.H.2 Maintenance-Free Tankless HXs - Coatings Development	-\$683
1.16.I Commercial Gas-Fired Heat Pump Water Heater	-\$3,700
1.16.I.2 Commercial Gas-Fired Heat Pump Water Heater - Phase 2	-\$3,885
1.16.L.2 SuperPerm Burner for Water Heaters - Phase 2	-\$1,924
1.17.B Thermoelectric Generator for Self-Powered Water Heater	-\$740
1.17.C Gas Heat Pump Combination Space Water Heating System Design	-\$2,664

Commercial Food Service

1.14.A.4 Next Generation of CFS Burners - Phase 4	-\$481
1.16.A Chain Restaurant Equipment Usage Survey	-\$518
1.16.B.2 CFS Codes and Standards - Phase 2	-\$1,850

Distributed Generation/Combined Cooling Heating and Power

2.12.F.5 Address Regulatory Barriers in Natural Gas Emergency Power Supply Systems Phase 2	-\$629
2.17.E Long-Term Perf. and Reliab. Assessment of CHP and DG Systems	-\$2,220
2.17.F CHP System With Integrated Innovative Particle Thermal Storage	-\$3,515

Industrial Solutions

2.12.U Refund	\$3
2.15.A On-site Electrical Generation	-\$856
2.15.D Advanced Retention Nozzle	-\$2,042
2.16.A Next Generation Infrared Burner	-\$3,256
2.16.B On Demand Heat and Power System	-\$703
2.17.B High Efficiency Food Processing Dryer - Field Demonstration	-\$2,960
2.17.C High Efficiency Commercial Clothes Dryer - Bench Scale Evaluation	-\$2,775
2.17.D iGEN Self-Powered Furnace Lab Testing	-\$2,183
2.17.I High Efficiency Comm. Boiler Field Demo, Devel and Deployment	-\$1,850

Transportation

2.14.F.2 Free Piston Linear Motor CNG Compressor - Phase 2	-\$10,730
2.14.K.2 Design of Mitigation Solutions for CNG Contamination - Phase 2	-\$2,590
2.14.K.3 Design of Mitigation Solutions for CNG Contamination - Phase 3	-\$1,443

2.16.M CNG Dispenser Full Fills	-\$7,585
2.16.N.2 NGV Codes and Standards Monitoring, Devel. and Support - Phase 2	-\$740
2.16.O.2 NGV America Technology Comm Participation and Rep - Phase 2	-\$740
2.17.H CNG Station Methane Release and Measurement Investigations	-\$777

Other

1.10.A Web Program Upkeep	-\$231
1.10.W Development of an End Use New Technology Roadmap	-\$231

Funds Allocated to Projects	-\$100,578
Unallocated Funds	\$23,008

GTI Operations Technology Development Program

\$184,500 was submitted to Operations Technology Development, NFP (OTD) for the 2017 membership fee. \$164,696 has been allocated to specific projects as listed below.

Payments to OTD, Fees, Carryover

Payments to OTD	\$184,500
Administration Fees	-\$13,837
Carryover of Unallocated Funds from Prior Year	\$38,683
Funds Available for Allocation	\$209,346

Allocations to Projects

(1) Pipe and Leak Location

1.08.a.3 GPS EEN: Black Box Reference Device Enhancements, Phase 3	-\$5,535
1.14.d Refund	\$1
1.14.d.2 Field Measurement of Leak Flow Rate Ph2	-\$1,464
1.14.g.4 Residential Methane Detectors Program - Placement Study, Phase 4	-\$1,264
1.15.a.2 Cross Bores – Sewer System Cleanout Safeguard Device – Phase 2	-\$3,630
1.ee Refund	\$5

(2) Pipe Materials, Repair, and Rehabilitation

2.14.a.2 Composite Repair Wrap for Polyethylene (PE) Systems, Phase 2	-\$1,845
2.14.c.2 Assessment of Squeeze-off Location for Small Diameter Polyethylene (PE) Pipe and Tubing, Phase 2	-\$3,690
2.14.e Guidelines/Best Practices for Scraping PE Pipe and Fittings	-\$157
2.b Refund	\$366

(4) Inspection and Verification

4.08.j Refund	\$1,080
4.12.c.2 Demonstration of Above Ground Pipe and Coating Assessment Tool, Phase 2	-\$1,845

4.12.e Refund	\$2,763
4.17.a Develop a Long-Term Enhancement of Direct Assessment (DA)	-\$1,845
4.17.d MAOP and Materials Verification	-\$1,845

(5) Construction/ Infrastructure Techniques

5.06.h Refund	\$4,837
5.07.p GNSS (GPS) Consortium	-\$5,535
5.10.d.2 Remote Field QA/QC Phase 2	-\$590
5.11.e Refund	\$26
5.11.e.3 Intelligent Utility System - Phase 3: Automated Component Validation Software	-\$554
5.11.s.3 Breakaway Disconnect/Shut-off - Product Development and Evaluation, Phase 3	-\$1,903
5.11.t.3 Essential Data Capture for PE Fusion Operations, Ph 3	-\$416
5.12.a.3 Development of an Integrated Intelligent Safety System (IISS) for Commercial and Industrial Customers, Phase 3	-\$1,845
5.12.b.2 Development of a Portable Flash Fire Suppression System (PFFSS) Phase 2	-\$459
5.12.g.2 Large Diameter - High Pressure (60 psig) Inflatable Stoppers – Phase 2	-\$1,338
5.14.d.4 Tracking and Traceability for Transmission: Steel Pipeline Material Traceability	-\$1,476
5.14.d.5 Transmission Tracking and Traceability - Bizagi Platform, Phase 5	-\$3,690
5.14.n.2 Refund	\$8
5.15.d.2 Development of a “Tee Antenna” for Fitting Protection, Phase 2	-\$1,845
5.16.d Stopping Off LP Mains with No Excavation	-\$11,050
5.16.f Improved Safe Excavation Productivity for Locating Buried Utilities	-\$4,653
5.16.n Method to Prevent Blowdown of Gas to Atmosphere	-\$760
5.17.g Material-Supplier Quality Assurance Program	-\$3,690
5.17.h Investigation of Drilling Mud Permeation in PE Pipe	-\$1,845
5.17.k Protect Tracer Wires from Corrosion - Best Practices and New Methods	-\$5,535
5.17.n Survey of Plastic Pipe Locating Technology and Locating Practices	-\$1,845
5.17.p Field Test NeverWet and Other Nano-Tech Coatings to Reduce Aboveground Corrosion	-\$3,690

(6) Memberships/Other

6.08.a Carbon Management Information Center	-\$9,225
6.11.a PRCI Membership	-\$1,845
6.14.a Quality Audit Program	-\$7,380
6.a SMP	-\$36,900

(7) Methane Emissions/Detection and Gas Quality

7.10.c.4 Refund	\$1
7.15.b.3 Remote Gas Sensing and Monitoring Phase 3	-\$1,845
7.15.c Evaluating Leaks from Slow Crack Growth and the Impact on Pipeline Emissions Phase 1	-\$6,519
7.16.b Evaluate Gas Imaging Technologies for LDC Applications	-\$1,160
7.16.d Implications of Odorant Dispersion in a Natural Gas Pipeline	-\$3,642

(8) Intelligent Utilities

8.16.a Intelligent Field Data Collection Platforms	-\$3,674
8.16.b Remote QA/QC: Fusion Inspection and Reporting	-\$3,582
8.16.d Paperless As-Building Solution	-\$3,690
8.17.b Tracking and Traceability Marking Standard for Natural Gas Transmission Components	-\$1,845
8.17.c GNSS Smart Automations for Field Data Collection	-\$3,690
8.17.e Integrity Management Module and GIS Platform for Mobile Data Collection	-\$1,845
8.17.g Supporting Technology for ASTM F2897	-\$3,690
 (9) Risk and Decision Analysis/Models	
9.16.c Best Practices and Methodology for Implementing RCV and ASV Programs	-\$3,721
9.16.d Model of AC Earth Faults and Associated Risks	-\$7,232
 Adjustments and Miscellaneous Refunds	
Board Designated Net Assets 2017	\$1,777
G&A Refund	\$1,767
 Funds Allocated to Projects	 -\$164,696
Unallocated Funds	\$44,650

Local Opportunity Projects

\$177,300 was expended for Local Opportunity Projects in 2017.

SUMMARY OF EXPENDITURES - 2017

Utilization Technology Development Program	\$ 129,500
Operations Technology Development Program	\$ 184,500
Emerging Technology Program	\$ 9,230
Local Opportunity Projects	<u>\$ 177,300</u>
Total Pennsylvania Delta Funds Program Expenditures	\$ 500,530

PROJECTED EXPENDITURES - PERIOD ENDING SEPTEMBER 2018

Expenditures for National Fuel Gas Distribution Corporation's Pennsylvania Delta Funds RD&D Program are projected to be \$639,730 in 2018 consisting of the following planned charges:

1. **Utilization Technology Development** (UTD) membership fees of approximately \$129,500. Specific projects to be determined.
2. **Operations Technology Development** (OTD) membership fees of approximately \$184,500. Specific projects to be determined.
3. **Emerging Technology Program** (ETP) membership fees of approximately \$9,230.
4. **Local Opportunity Projects** spending estimate of \$316,500. Funds not used for the development of qualified local technology projects in National Fuel territory may be allocated to the national Gas Technology Institute programs described above.

STATUS UPDATE OF LOCAL OPPORTUNITY PROJECTS - 2017

Funding of gas industry research through the Gas Technology Institute (GTI), as an example, returns many benefits, including insuring continued improvement and availability of energy-efficient, low emissions and cost-effective gas technologies; while leveraging the funding resources of gas utilities across North America. The Local Opportunity Projects portion of this program intends to identify projects for direct local support offering equal, or better, benefits than GTI. This is challenging but National Fuel endeavors to identify and develop these opportunities. Funds available through this portion of the program, beyond the minimum commitments to GTI, may be used for qualified local projects. Funds not used locally are sent to GTI to be allocated to suitable projects, as shown in the previous supported project listings.

Updates on three Local Opportunity Projects are provided.

1. **Multi-Family Gas Retrofit – Phase I.** This project is intended to serve as a case study demonstrating the relative ease, and cost-effectiveness of converting all-electric multi-family residences to natural gas heating. A belief exists among many building owners that the cost of natural gas infrastructure, equipment, and ducting/venting outweighs the many benefits of natural gas heating. This project will document the costs, and modifications required to convert thirty two three bedroom townhouses from all-electric, to natural gas forced air heating. A successful project will prove to other multi-family building owners in National Fuel's territory that converting to gas heating can be done at a reasonable cost, lowering energy bills and increasing both tenant satisfaction, and unit occupancy rates. As of September 30th, all thirty two units were converted successfully. Existing PTAC units were removed, new gas furnaces and ducting were installed, and all necessary carpentry was able to be completed at a rate of two units per week. Additionally, work was able to be completed in occupied units, with only minimal disruption. Utility bills for past heating seasons are being gathered and will be compared with gas bills from the current heating season as part of a final project report.
2. **Small-Scale LNG Production.** The goal of this project is to develop, test, and demonstrate a small-scale LNG liquefaction plant. If successful, the plant design would allow for cost-effective production of liquefied natural gas using distribution pipelines as the source. Once plant construction and testing is completed, the plant will be relocated and sited permanently at an existing CNG fueling station. The plant design itself is novel in that it would be coupled with existing CNG station equipment. This allows for cost reduction as existing CNG compressor capacity can augment that which would be required for LNG production. Also, existing compressors would see less idle time, as they would be used during off-peak hours for LNG production. The plant, as designed, is estimated to produce 6,000-20,000 LNG gallons per week. As of September 30th, project details and a funding agreement have been recently finalized and work on the project is just beginning.
3. **Public CNG Station Support.** The goal of this project is to promote greater adoption of CNG vehicles in National Fuel's territory by supporting construction of a new public fueling station. The station will be the first to offer public CNG fueling in the vicinity of Erie, PA. Support from National Fuel's Delta Fund program was a critical factor in the developer's decision to locate a public CNG fueling station at the 18th exit of Interstate 90 near Fairview PA.

PROSPECTIVE LOCAL OPPORTUNITY PROJECTS – 2018

1. **Multi-Family Gas Retrofit – Phase 2.** Continuing on the work done in 2017, an opportunity exists in 2018 to support a similar retrofit of an all-electric apartment building to natural gas forced air heating. In this second phase however, an identical building was recently upgraded from electric resistance heat to ductless mini-split heat pumps. This situation provides the opportunity for a case study comparing installed cost, operating cost, energy use, and tenant satisfaction between ductless mini-splits and natural gas heating. It is expected that a successful case study would demonstrate the cost savings of natural gas heating, even when compared to heat pump technology which suffers significant performance degradation in colder climates and often does not approach stated efficiency levels in real world operation.
2. **Small-Scale LNG Production.** Continuing on the work done in 2017 to develop, test, and demonstrate a small-scale LNG liquefaction plant.
3. **Public CNG Station Support.** Continuing on the work done in 2017 to promote greater adoption of CNG vehicles in National Fuel's territory by supporting construction of a new public fueling station.

National Fuel intends to continue efforts to identify other beneficial Local Opportunity Projects for development which may provide direct benefit to our Pennsylvania consumers, businesses, and industries.