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June 11, 2024

**E-Portal**

Mr. Adam Teitzman, Clerk  
Florida Public Service Commission  
2540 Shumard Oak Boulevard  
Tallahassee, FL 32399-0850

**Re: Docket No. 20240071-GU: Petition for Approval of Safety, Access, and Facility Enhancement Program (SAFE) Modifications.**

Dear Mr. Teitzman:

Attached for filing in the above-referenced docket, please find the attached Risk Assessment Report as referenced in Florida City Gas's responses to Staff's First Data Requests.

Thank you for your assistance with this filing.

Kind regards,



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Enclosure



ENGINEERS || INSPECTORS || PROGRAM MANAGERS || SURVEYORS

June 9, 2024

Jason Bennett  
Assistant Vice President  
Regulatory Affairs  
Chesapeake Utilities Corporation  
208 Wildlight Avenue  
Yulee, FL 32097

**RE: Summary and Recommendations related to Florida City Gas Distribution System Independent Risk Assessment**

Dear Mr. Bennett,

As you know, your office retained our firm, R.J. Ruiz and Associates, Inc. dba RUIZ ("RUIZ") to conduct an independent review and analysis of the Florida City Gas (FCG) natural gas distribution system and facilities of record. The scope included an in-depth record data analysis along with analytical modeling needed to conduct a formal review and risk assessment of the existing FCG distribution natural gas mains and services, based on common threats that are typical for a natural gas local distribution utility company. Our staff members led and facilitated the discussions with key FCG representatives that serve as Subject Matter Experts to the FCG natural gas distribution system (SME), as a means to conduct the needed formal risk assessments. RUIZ also conducted independent reviews of existing historical data associated to work orders related to leak repairs, compliance, and maintenance. We analyzed the Geographical Information System (GIS) environment for the FCG facilities of record and developed distribution integrity management risk models needed to efficiently establish ranking of relative risks of failure to the FCG problematic facilities of record. RUIZ was also retained to provide general consulting, guidance, and recommendations to FCG on the basis of the results of the findings produced by the mentioned independent review and analysis of the problematic FCG natural gas distribution facilities of record.

Over 13 years ago, The Pipeline Hazardous Materials Safety Administration (PHMSA) released a Call to Action to all natural gas utility operators with a goal to accelerate the rehabilitation, repair, and replacement of high-risk pipeline infrastructure. This effort was driven by multiple unfortunate high profile pipeline accidents, including the 2010 San Bruno California 30" pipeline incident, and two gas pipeline explosions in Pennsylvania that occurred in January and February of 2011. All of these events resulted in tragic loss of life and property because of pipeline failures related to material integrity. This, among other PHMSA directives, was the basis for the establishment of the required "Distribution Integrity Management Program" for all natural gas operators regulated under Part 192 of Title 49 of the Code of Federal Regulations, as well as Chapter 25-12 of the State of Florida Administrative Code. Because of the general volatility of the commodity product that the natural gas distribution systems transport, the underlying goal of these regulations is to ensure the operator maintains and operates each pipeline in a way that maximizes the safety for the general public.

## APPROACH

RUIZ used information provided by FCG to perform a risk assessment for each segment of “problematic” mains and services that FCG currently operates. The historical leak data with its associated attribute data, was geo-coded by address location and into a spatial GIS environment via a point feature class. The natural gas distribution main data provided by FCG was also imported into GIS. A GIS Buffer was created around the leaks (failures) in order to identify the main segments by leak history based on corrosion related failures, Aldyl-A pipe failures, Xtrubed steel tubing failures, threaded underground galvanized steel failures, and similar problematic leak types. Then, system threat risk characteristics of likelihood and consequence of failure were input from sources such as mains with historical leaks by cause, attributes of the mains like pressure, material and diameter of pipeline, were fed into a risk ranking model which runs a script using GIS research tools to determine a risk ranking score.

Risk ranking on Span Pipe segments were further supplemented from FCG-provided historical above ground inspection reports performed and completed by operator qualified FCG employees. The reports were analyzed for past coating failures, presence of atmospheric corrosion and even certain pipe spans that are damaged, or have sagged and lack proper support. The risk rank for the above ground segments considers potential impact radius based on pressure, diameter, and class location dependent on population density and vicinity to structures intended for human occupancy.

Historical issues at city gate purchase stations, district regulator stations, and other metering and regulator sites were observed from reports generated by the Subject Matter Experts (SMEs) that normally maintain and operate these sites. A total of 12 different sites have concerns, some of which being corroded piping and flange segments, obsolete pressure regulators, inoperable valves, tank safety and corrosion issues.

RUIZ then continued the risk study with a Subject Matter Expert (SME) driven risk assessment. The assessment considered the cause and consequence of pipeline materials, components and threats to the FCG natural gas distribution system based on direct independent feedback and interviews with the SMEs. This SME based approach ensured all threats were considered and ranks the threats based on the risk value. This approach included a detailed discussion led by RUIZ with local FCG SME’s to identify localized conditions of concern where main and services exist with areas of threats such as brittle Aldyl-A plastic, joint failures, corrosion on facilities and others. Multiple in-person SME risk assessments took place as follows:

- On March 5, 2024 an in-person meeting took place with the Subject Matter Experts of the Brevard and Port St Lucie Service Centers of Florida City Gas
- On March 7, 2024 an in-person meeting took place with the Subject Matter Experts of the Miami Service Center of Florida City Gas

This risk analysis allowed the process of understanding what factors affect the risk posed by threats to the FCG gas distribution system and where they are relatively more significant than others. The primary objectives of the evaluation and ranking of gas distribution pipeline risk was to:

- Consider each applicable current and potential threat
- Consider the “Likelihood Of Failure” associated with each threat, (LOF)
- Consider the potential “Consequences Of such a Failure”, (COF)
- Estimate and rank the risks (i.e. determine the relative importance) posed to the distribution system

- Consider the relevance of threats in one location to other areas

During the in-person discussions, key individual FCG SMEs provided a value rank for each of the common threats found in typical natural gas local distribution systems that are known to exist within the FCG system. SMEs provided a value for each pipeline material, component and threat using the ranks on a scale that ranged from “NO Threat and Risk” in the system to “HIGH Threat and Risk” in the system. RUIZ then compared the SME supplied values for each pipeline material, component and threat to leak repair and other available information and determined the equivalent values of LOF and COF, based on experience, engineering judgement, and based on a comparison to the results to the System Level Risk Assessment explained earlier. The values for LOF ranged from 0 to 5, 5 being High probability of leak occurring, and 0 being Minimal or NO probability of leak occurring. The ranks for COF were also 0 to 5, 5 being High consequence to the surrounding population and 0 being Minimal or NO consequence to the surrounding population. Risk of Failure (ROF) rank per segment would then be product of LOF and COF. The final step was to rank each segment of main based on its Relative Risk Of Failure, using the risk rank by threat type established. A model was developed to assign a risk rank to each main based on its likelihood and consequence of failure associated with historical threats and similar pipe characteristics. The pre-final model was then manually analyzed for quality control and was slightly adjusted to ensure areas where the SMEs-identified threats were captured and ranked in the final version of the model.

## **RESULTS AND SPECIFIC RECOMMENDATIONS**

FCG’s highest risk areas remain among threats related to third party excavation damages, inaccessible rear lot mains, and vintage plastic pipe areas. These risks are already well documented in the FCG Distribution Integrity Management (DIM) Plan and are already being mitigated by replacement using accelerated replacement programs such as the FCG SAFE program and the FCG Vintage Orange Plastic replacement program. However, our study has demonstrated that the FCG system of record currently shows other areas of risk as well, and as such, we will summarize those additional “problematic” risk types in this summary.

FCG system displays various types of “problematic” distribution mains that show levels of concern. Changes in updated industry standards have demonstrated that certain “vintage” distribution mains and service lines that were initially safe are now considered problematic. Examples include threaded underground galvanized steel mains, vintage plastic, xtrubed steel tubing, span pipe, shallow or exposed pipe, and obsolete facilities. These older installation gas lines present high levels of challenges for maintenance and have shown past failures (leaks) in the system.

When comparing to other local distribution company operators in the industry, the Florida City Gas (FCG) natural gas distribution system of record is relatively young and healthy in nature. However, this study has identified there are certain threats that are present in the system, which represents a considerable level of risk. These threats were categorized by three major categories, “inaccessible rear lot facilities”, “vintage plastic facilities”, and “Problematic pipe” areas. We understand that you are fully aware of, and have quantified and continue to mitigate, the threats related to inaccessible rear lot facilities and vintage plastic facilities, and as such, we will only summarize the “problematic” pipe areas of concern as follows.

RUIZ performed a thorough review of the records provided by FCG, and collaborated with the FCG SMEs to complete data analyses, conduct risk assessments, and developed a risk ranking model to arrive at conclusions and recommendations noted in this summary as follows:

FCG operates at-risk “problematic pipe”, and the problems that these facility segments show, among other items, are:

1. Above ground span segments showing evidence of past failures and active threats
2. Obsolete facilities and stations showing faulty equipment, corrosion and tanks missing safety mechanisms
3. Rooftop meter areas showing safety risks for the FCG employees that perform maintenance work
4. Xtrubed steel tubing areas not currently being prioritized for replacement
5. Active cathodic protection issues and segments of coated steel pipe with disbondment issues or cathodic protection integrity issues such as stray current or isolated steel, and shorted casings
6. Shallow and Exposed pipe.

The following elaborates on each deficiency noted:

### Span Pipe Segments

FCG maintains span pipe segments that were intentionally installed above grade and that cross features such as rivers, canals, ditches, or highways. Shallow and exposed pipelines, as well as Span pipe segments may be susceptible to outside force damage as well as corrosion threats.

Aboveground pipe segments crossing canals, ditches and bridge attachments have shown multiple integrity issues throughout the years. SMEs have reported coating defects, stress related to movement, unsupported sagged pipe areas, dented pipe, and outside force damages related to vessels, reptiles and animals. One leak report noted a failure (leak) related to an outside force damage on a high pressure distribution main, where a bystander was attempting to hunt an iguana that was standing on a 6” span pipe segment, and the bystander shot the iguana with a firearm, and caused a rupture and uncontrolled release of gas in the pipeline.

These aboveground and exposed pipe segments are not only subject to natural force or outside force damages, but also demonstrate historical issues around coating deterioration, sagged pipe and stresses associated to movement.

Florida City Gas maintains a total of 82 span pipe segments, ranging from nominal diameters 1.25” to as large as 8”, for a total of over 6,200 ft worth of pipe that is either attached to bridges, supported on above grade piers crossing rivers and canals, or free span suspended across certain ditches. The Miami Service Center maintains 54 span pipe segments, Brevard maintains 21, and the Port St Lucie System has seven (7).

Inspection records were provided for the span pipes mentioned. These records demonstrate problems with existing span segments for things such as coating deficiencies, improper pipeline supports, repair weld encirclement fittings from past outside force damages, and other problems.

### Exposed Pipeline Areas

SMEs have reported multiple critical natural gas feeder lines to be exposed in certain areas. They have reported two (2) major feeder lines that are exposed within major river channels and lakes.

The first major feeder line is a large distribution pipeline across the Indian River in Brevard County, which serves as a major trunk line for Merritt Island and Cocoa Beach in many areas. This pipeline was installed over 45 years ago and is currently exposed at the bottom of the river due to natural erosion that has occurred over time. The pipeline has also had multiple repairs performed throughout its life and these repair fittings are still in-service and represent a considerable threat.

Similarly, the second feeder line is a major high pressure distribution pipe that services an industrial park in the Medley area of Miami-Dade County. This pipeline is currently exposed at a waterway crossing across the Miami River. The canal bank has eroded and has caused the pipeline to be exposed and subject to corrosion threats as well as outside forces threats.

This risk represents likelihood and consequence of failure associated to threats around outside force damages as these waterways are navigable, as well as corrosion threats and other integrity concerns.

***RECOMMENDATION NO. 1:***

*FCG should consider deploying a long-term program to replace moderate to high-risk span pipe segments in the distribution system. FCG should also prioritize the replacement of the two main feeder lines that are currently exposed within the major rivers. The replacement piping for both the spans and the exposed piping should be installed via horizontal directional drilling at proper depths underneath the waterways or ditches. This will drastically reduce the risk of span and exposed pipes and will also reduce O&M expenses related to maintenance.*

Obsolete Facilities and Stations

Some of the Company's district metering and pressure regulating stations and city gate tap stations also show moderate-to-high levels of risk. SMEs have reported that twelve (12) of its stations have some unfavorable and risky conditions [Eight (8) are located in Miami Service Center and four (4) located within the Brevard Service Center].

Threats that are present within these 12 facilities are items such as notable evidence of corroded and heavy pitting on aboveground assemblies, risers, flanges, pipe, equipment and similar features. Also, the presence of obsolete equipment currently in-service which present challenges for maintenance and operations such as discontinued pressure regulators with inability to purchase replacement parts, difficult to operate or completely inoperable plug or gate valves. Some pressure vessels and tanks are noted with risk. These bulk odorant storage tanks have no pressure relief valves which is a safety and over pressure protection concern. Some of the tanks show notable presence of Corrosion, and some are missing adequate spill protection.

***RECOMMENDATION NO. 2:***

*FCG should evaluate the feasibility of replacing corroded and obsolete equipment at the 12 existing district regulator stations and city gate stations. Depending on layout and redundancy available at the existing stations, it may be possible to replace certain pipe run segments or swap out flanged end regulators for more modern equipment without having to incur the cost of renewing and rebuilding the entire station. In some stations this may not be an option, and full bypasses or full isolations may be required and will need to be evaluated on a case by case. Properly sized pressure relief valves or similar safety devices*

*should be installed immediately on any pressure vessels or tanks that are missing them, and any corroded tanks should be replaced as soon as it is feasible. Containment berms or containment skids should be provided for any new odorant tanks being proposed.*

### Rooftop Meter Areas

FCG currently maintains Four (4) different residential apartment buildings in the Miami Area where hundreds of residential meter sets are located within the rooftops of the buildings. Similarly, two (2) different shopping strip malls in Brevard County have similar configuration for dozens of commercial accounts.

In all cases, accessing the rooftops involves climbing several sets of ladders and/or stairs, and SMEs state that some of these older buildings lack proper railing & fall protection mechanisms to prevent workers from falling and getting injured. This presents a safety risk for FCG's employees when performing routing compliance maintenance and activation orders for its customers. In addition, the current configuration for the rooftop systems has mainline piping, operating at line pressures nearing 60 psig, exposed to atmosphere and strapped to the roof of these buildings. Coating deficiencies exist in certain areas, and atmospheric corrosion threats are beginning to show.

#### **RECOMMENDATION NO. 3:**

*FCG should collaborate with the property owners for each building and evaluate the feasibility of relocating the meter sets to ground level by either introducing a master meter for each building, or by fabricating meter banks at the ground, and routing new downstream customer-owned fuel gas lines (at much lower pressures) back to the roof to tie-over each active premise. This will dramatically reduce and mitigate FCG's safety risk for its employees by no longer needing to access a rooftop to get to a gas meter, alleviate exposed main line piping and reduce corrosion control risk on its system.*

### Xtrubed Steel Tubing

This type of material exists in the FCG distribution system and historically remains as an area of big concern. System data and Subject Matter Experts have reported many historical leaks in these areas, and repairs are challenging due to its thin wall nature and inability to weld on the material.

Xtrubed Steel Tubing Areas in many areas of Miami are present. The SMEs state that the majority of the xtrubed steel tubing areas located within rear lot areas of the system are currently being replaced under the active SAFE program since they are located within the rear of homes, but over 9 miles of existing xtrubed steel tubing areas located in Miami Lakes are considered "accessible" and located in the front, and therefore are not currently being prioritized under the FCG SAFE program.

#### **RECOMMENDATION NO. 4:**

*FCG should include the 9 miles of xtrubed steel tubing located in Miami Lakes in its replacement plans for the area, regardless of its accessibility condition. Xtrubed steel tubing is considered obsolete piping that is difficult to maintain and represents considerable risk.*

## Cathodic protection (CP) and Corrosion Control Issues

During multiple instances over the years, the Company SMEs have reported other corrosion control integrity issues on certain segments of the steel gas distribution system. These issues include areas of pipe with coating disbondment, atmospheric corrosion leak areas, challenges with isolated steel gas main segments where the CP continuity was interrupted due to plastic installations, and shorted CP system on steel carrier pipe due to contact with its steel casing. SMEs have reported a few distribution feeder mains to have the presence of stray current. Stray current is known to cause corrosion when it flows from an outside source onto the steel gas main or service at one location and then exits the steel distribution system into the earth at another location as it completes a circuit back to the power source. Corrosion typically occurs at the location where the current exits the steel distribution system at coating holidays or sections of bare steel.

FCG has identified four (4) encased steel pipeline road & railroad crossings in the Brevard service center where the steel pipeline carrier is making contact with the grounded steel casing, resulting in a short to the CP system. This condition is a threat to the integrity of the CP system and can result in a lack of appropriate corrosion control on the steel structure (carrier pipeline).

The FCG Corrosion SMEs have also identified areas of beachside in Brevard and Indian River county where the CP system is generally weak in nature, as galvanic anodes in this area have reached useful life and are beginning to become depleted in capacity.

Lastly, Coastal areas of Brevard County are causing excessive atmospheric corrosion on residential, commercial and industrial meter sets due to airborne salinity. SMEs have noted hundreds of meter sets with severe corrosion in need of replacement. History has demonstrated that in many cases the same assembly has been replaced multiple times and frequently because of this issue.

### ***RECOMMENDATION NO. 5:***

*FCG should evaluate the possibility of replacing the four (4) shorted casings and carrier pipe segments, preferably uncased. Modern installation methods using horizontal directional drilling allow for deeper installations across areas of elevated external surface loads related to vehicle weights and rail train car weights, without needing a casing, all while mitigating risks around a casing steel-to-steel current short. FCG would need to collaborate with the authorities having jurisdiction over the railroads and road to confirm construction specifications related to uncased crossings would adhere to the applicable requirements.*

*Improvements to the cathodic protection system in the Brevard and Indian River county areas should be considered by replacing depleted anodes, or proposing new induced current rectifier systems and isolation fittings to segmentalize the limits of steel protection.*

*As to the corroded meter sets in Coastal Brevard County, FCG should evaluate its coating specification requirements for its replacement assemblies in this area. Robust three-part epoxy coating systems with proper surface preparation specific to the Society for Protective Coatings (SSPC) and NACE International standards should be designed and utilized on all assemblies subject to airborne salinity in this area. If budgeting allows, another option is to consider alternative anti corrosive material options for meters, house service regulators, meter set assembly piping and fittings, such as the use of 304 or 316 stainless steel.*



## CLOSING AND NON-SPECIFIC RECOMMENDATIONS

As a general note, and specifically for the other areas of system risk identified not discussed within this summary, The following are some of our non-specific general recommendations that should also be mentioned:

### **RECOMMENDATION NO. 6:**

*FCG should consider deploying a long-term program to replace moderate to high risk "problematic" natural gas infrastructure, giving priority to those segments considered "high-risk". The existing problematic mains and services presents operational risks and challenges for FCG and its customers.*

### **RECOMMENDATION NO. 7:**

*FCG should continuously monitor system threats, adjust and re-prioritize pipe segment risk ranks as needed, and deploy short-term risk mitigation activities. FCG should continue advocating its Distribution Integrity Management Program and monitor system threats continuously to re-prioritize the ranks of risky mains as needed and on a periodic basis (minimum once per year). Continue to deploy robust leak survey programs using advanced new technology, deploy enhanced and remote corrosion monitoring activities, and conduct preventative maintenance to ensure short term risk of failure is mitigated in any way possible.*

### **RECOMMENDATION NO. 8:**

*FCG should continue to strengthen the FCG Damage Prevention Program. Continue the all-employee culture for Patrolling the FCG Gas System, Public Awareness, and Damage Prevention in accordance with RP 1162 / 49 CFR 192.616. Initiatives should have a strong emphasis on homeowner educational notifications for excavation 811 laws and safety tips, using social media, radio announcements, TV commercials, mailers, and other methods. Continue to perform general contractor excavator training and educational seminars and meetings. FCG should take the lead on hosting state-wide seminars in front of builder associations, local and state fire departments, annual FDOT Utility coordination conferences, and similar type events.*

If at anytime you seek clarity, or if you have any questions, concerns or comments, please do not hesitate to contact the undersigned.

As a registered professional engineer in the State of Florida, I certify that the above statements are true and correct to the best of my personal and professional knowledge and experience, with full realization of my responsibility toward the public where the safeguarding of life, health and property is concerned or involved.

Regards,

*/s/ Roland J. Ruiz*

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