
September 12, 2019

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15 Main Street
PO Box 229
Bristol, VT 05443

Reference: Addison Natural Gas Project Safety and Regulatory Compliance

Subject: Report

Dear Attorney Dumont,

My resume is attached. Based upon my review of documents pertaining to the Addison Natural Gas Project (ANGP) that was constructed by Vermont Gas Systems, Inc., (VGS), I have reached the following conclusions:

1. The ANGP, a natural gas pipeline construction project, was a public project with potentially huge public safety risks. The ANGP was not exempt from generally accepted engineering standards and the Vermont laws that dictate when and how a Licensed Professional Engineer (LPE) must review, sign and seal plans and specifications. This engineer is referred to as the Engineer of Record. It was essential for protection of the public that an Engineer of Record sign and place his or her seal upon the "Issued for Construction" (IFC) plans prior to commencement of construction. The seal and signature indicate the drawings and specifications were prepared under the licensee's responsible charge, or the licensee has performed a full and independent review and assumes full professional responsibility for the work if prepared by others.
2. The records I have seen include plans that were submitted to VGS by James Colantonio, P.E., a Vermont licensed Civil Engineer in 2012. However, the samples I saw were labelled "Not for Construction."
3. Construction commenced in 2014, using IFC plans, but VGS and CHA have informed the Commission by letter dated January 25, 2019 that none of the IFC plans were signed and sealed by an LPE, regardless of discipline, prior to construction.
4. The IFC plans I reviewed for 2012 onward represent design work by civil, mechanical and electrical engineering disciplines.



5. In response to VGS President Rendall's request in late 2018, CHA provided to VGS civil IFC engineering plans that had been signed and sealed by Mr. Hollowood, a Vermont licensed Civil Engineer in 2018. The signing and sealing were of no value or in compliance with Vermont law, and would not have ensured public safety during or after construction.
6. Mr. Hollowood has not stated that he was the responsible charge engineer in June of 2013 or in 2015 or 2016. He was not licensed in Vermont until September 5, of 2013. He could not have been the responsible Vermont licensed engineer in June of 2013. (CHA's letter to VGS states he was the responsible charge engineer, but he could not have been because he was not licensed in Vermont at that time.)
7. The IFC plans that have been produced that were signed and sealed by Mr. Hollowood, in 2018, do not include IFC mechanical and electrical plans for the ANGP. Mr. Hollowood is a civil engineer. No mechanical or electrical IFC plans that I have seen have been signed and sealed by an LPE in those disciplines at any time. The mechanical and electrical plans for the ANGP pertain to components of the ANGP that, if improperly designed or constructed, could risk public safety.
8. A comprehensive Quality Assurance plan is necessary to protect the public in a large project such as the ANGP and should include or reference the Engineer of Record's signed and stamped IFC specifications, and in particular requirements for material submittals and testing prior to, and during construction. Furthermore, it should make clear how the contractor is to comply with these signed and stamped submittal and testing requirements. ANGP construction commenced and was completed without any signed and stamped IFC plans and specifications for civil, mechanical and engineering design, and without any QA plan to ensure that construction conformed to the signed and stamped IFC plans and specifications. Moreover, the flawed QA plan that was adopted began to take shape in the summer of 2015 and was completed in December of 2015, after two full construction seasons.
9. If the records I have reviewed are complete, the ANGP was constructed in a manner that repeatedly and fundamentally departed from generally accepted engineering standards and practices. As a result, public safety was not adequately protected.

Discussion

Vermont law, 26 V.S.A. §§ 1161 and 1163, exempts some project types from the requirement for Vermont licensed Engineer's responsible charge for the design. For example, a person who designs private buildings or a person who designs manufactured parts need not comply. A natural gas pipeline, however, is a public project, and the statutes explicitly state that utility projects are covered, except for certain telecommunications projects. Under generally accepted engineering practices, and Vermont law, the IFC plans and specifications for a natural gas pipeline must be signed and sealed by an LPE before they utilized for construction. Other

engineers may prepare (and place their initials on) plans or specifications, but the Engineer with responsible charge must have direct control and personally supervise this engineering work.

I have reviewed the plans and specifications that were collected by VGS for submission to Mr. Byrd, as well as the plans and specifications submitted to Mr. Byrd by Intervenors. As noted above, a civil engineer affixed his signature and seal to a cover letter to a plan labeled "Not for Construction." The letter was dated December 17, 2012. The engineer was James Colantonio.

Other plans were submitted to the Commission and the Department prior to the Commission's order of approval dated December 23, 2013. These plans were dated June 28, 2013. They stated they were "Issued for Construction." The Commission's order requires construction in conformity with these plans. However, none of the June 28, 2013, IFC plans were signed and sealed by the Engineer of Record.

I was dismayed to discover that construction commenced in 2014, and then continued until the pipeline was completed in early 2017, based entirely upon IFC plans and specifications that lacked the signature and seal of an LPE. It is difficult for me to understand how a large project such as this, with obvious public safety risks, could be constructed without the signature and seal of an LPE upon the IFC plans. Signing and sealing are intended to ensure that an LPE has exercised his or her professional involvement and judgement in preparing or in directly supervising others who are preparing all the plans and specifications, within his or her discipline, to ensure project safety. The National Transportation Safety Board report on the Lawrence, MA explosion partially blamed the accident on the failure to have an LPE sign and seal the plans, because Massachusetts law exempted all utility projects.

The LPE who signed and placed his seal on some of the 2015 plans in 2018, Mr. Hollowood, is a civil engineer, not a mechanical or electric engineer. A civil engineer generally is not competent or authorized by law to place his or her signature and seal upon mechanical or electrical plans and specifications, and Mr. Hollowood did not do so.

I was again dismayed to discover that no LPE has signed or placed his or her seal on any of the mechanical and electrical plans for the ANGP, from 2012 to the present, according to the records submitted to the Commission's investigator, Mr. Byrd, and those the intervenors provided to me. The mechanical and electrical plans for the ANGP pertain to components of the ANGP that, if improperly designed or constructed, could risk public safety. These include the plans for the Metering and Regulation stations and the Colchester Launcher and Tie-in Site. Failure to include mechanical and electrical design reviews of the demolition and new construction for the natural gas pipeline in Lawrence, MA caused the explosion, property damage and loss of life.

Typically, Quality Assurance plans are developed by the contractor as part of the contracting process and are reviewed by the Engineer of Record regarding their materials submittals, testing requirements and other requirements that insure their design will be constructed according to their signed and stamped IFC plans and specifications. Typically during construction, the Engineer reviews inspection and testing reports to ensure that the signed and stamped IFC plans are being complied with, and sometimes will personally inspect the construction site to ensure

compliance. Whether drafted by the Engineer of Record, the owner or the contractor, all parties must agree to these terms, the point of which is to ensure public safety during construction.

The documents I have reviewed demonstrate that ANGP construction commenced in 2014 and continued throughout 2015 without adoption of a complete Quality Assurance plan by VGS or its contractors or its engineers. The ANGP QA plan was not adopted by VGS until December of 2015, at the close of the second construction season.

The QA plan, once it was adopted, was deficient, because it was not designed to implement the signed and sealed IFC civil, mechanical and electrical plans.

I have been informed by counsel that VGS's senior management has testified in another Commission proceeding that VGS authorized the first general contractor, Over & Under, to commence construction before a contract was executed, that construction then proceeded for months without a signed contract, that there never was a signed contract, and that VGS and Over & Under ended up suing each other in federal court for millions of dollars. Regardless of who prevails or the terms of settlement of that litigation, the key point is that QA is the contractor's responsibility, that the terms of QA must be set forth in detail in the contract, and that without agreement on the terms of the contract there simply could not have been effective QA.

The Commission's order approving of the ANGP relied on an effective QA plan during construction. The Commission ruled: "Vermont Gas has provided ample evidence that its design for the project meets or exceeds all applicable federal and state standards and that the Company will implement robust operational and monitoring controls." ("Discussion" following Finding 284). In my view, there were no robust operational and monitoring controls during construction of the ANGP. Sections of the signed-and-sealed IFC specifications regarding requirements for material submittals and testing, should have been included in the QA plan to ensure that those requirements and all specifications in general were being followed. Instead, what I found in the record were numerous "Corrective Action Plans." Sometimes these were adopted after the Department of Public Service had reported violations of the plans or specifications that it felt were important. A robust QA plan would have reported to the Engineer of Record these problems encountered during construction involving design and testing, which would have prevented or corrected them. There should have been nothing significant for the Department's inspectors to find and report. VGS and its contractors had a duty of QA, not the Department.

I was surprised as well by the Department's actions. The Department was the delegated pipeline safety regulator under federal law as well as the Vermont Authority Having Jurisdiction (AHJ). The Department should have insisted that construction await production of civil, mechanical and electrical IFC plans that had been signed and sealed by a Vermont LPE within each discipline. The Department also should have insisted that VGS and its contractors adopt an effective QA plan prior to commencement of construction. While the independent inspections the Department provided were useful, they were no substitute for signed and stamped IFC plans and adoption of an effective QA plan by VGS and its contractors prior to commencement of construction.

Since there were no signed and stamped IFC plans, there was nothing that a QA plan could ensure conformity with. Having said that, the QA plan that was adopted, and the manner in which it was implemented, raise more questions about the quality assurance plan and its implementation that I cannot answer based on the records I have seen. These questions are set forth in Intervenors' Motion to Broaden the Scope of the investigation and their annotated and documented memo to Mr. Byrd.

One important example conveyed by the Intervenors is compaction. Compaction is required for safe construction of a gas pipeline. Inadequate compaction can cause breakage of the pipeline when farm equipment, trucks or other heavy vehicles cross over it, or from lifting or sagging of the pipeline. Intervenors' submissions allege that there is no record that any compaction occurred, or, more importantly, that compaction was tested, anywhere along the 41-mile long project – with the exception of 11 tests within the VELCO right of way, 6 of which failed. The documents attached to their memos support this allegation. I have not reviewed the hundreds of pages of inspection reports myself to see if there were occasions when compaction was inspected or tested outside the VELCO right of way. Because there was no signed and stamped IFC plans and specifications or a timely QA plan to set the standard for compaction, for recording of compaction, or for inspection of compaction, the absence of compaction testing would not be surprising to me.

Another example conveyed by the Intervenors is the laying of pipe directly on trench bottom. The June 28, 2103 plans submitted to the Commission forbade this. Subsequent specifications permitted this in certain specified circumstances. The Department inspector, during a site visit in 2014 of a pipeline section that had not yet been covered with backfill, saw that the section had been laid directly on trench bottom. The Department protested. VGS then agreed to cease the practice, but the records attached to Intervenors' memoranda suggest that zero sand or backfill was used as bedding throughout 2014, and during parts of 2015. Later, in 2016, a Department inspector, when visiting a section that had not yet been covered with backfill, again saw that it had been laid directly on trench bottom. VGS again agreed to cease the practice. Neither VGS nor the Department knows the extent to which the pipeline was laid directly on trench bottom, or in what circumstances, because at different times there either was no QA plan in effect or the QA plan did not require recording or inspection of where and why pipeline was being installed directly on trench bottom.

The fact that construction proceeded without a QA plan that included by reference the signed and stamped IFC plans and specifications may explain why the two construction methods approved of by the Commission, the trench method and HDD, were not used in the New Haven wetlands areas. It may also explain why many pipeline sections had coatings that were damaged and had to be repaired by the contractor, but were buried before inspection. The records attached to Intervenors' memoranda show that there were scores of complaints by coating inspectors, that repaired pipeline sections were being buried before the repaired sections could be inspected. The Intervenors don't know where these sections were located.

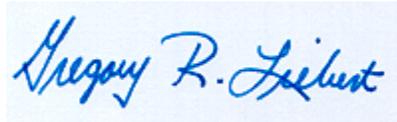
It is significant that CHA/VGS produced some 2015 IFC plans that were signed and sealed by Mr. Hollowood, but has not produced a set of as-built drawings for the civil, mechanical and

electrical plans to document the actual conditions that may be at variance with the IFC plans dated 2013, 2015 and 2016. The “as-built” plans that VGS provided to Intervenors and Mr. Byrd were prepared by a surveyor; they show only GIS positioning, not the actual conditions that vary from the civil, mechanical and electric IFC design plans.

The purpose of the generally accepted engineering practices summarized above and the requirements for a responsible Vermont licensed engineer to sign and seal plans and specifications is to protect the public. The failure to follow these practices, in my view, compels the conclusion the ANGP was constructed in a manner that does not adequately protect the public.

Sincerely,

Liebert Engineering, Inc.



Gregory R. Liebert, P.E., CEM, GBE, CEA, HFDP
Principal Engineer