Accufacts Inc.
"Clear Knowledge in the Over Information Age"

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To: Ms. Mimi Gleason
Township Manager
West Whiteland Township
Exton, PA 19341

Re: Accufacts Perspective on Two Questions from West Whiteland's Board of Supervisors on Proposed Changes to ME 2 and ME 2X Construction/Operational Activities within West Whiteland

Introduction

Accufacts Inc. ("Accufacts") was asked to assist West Whiteland Township ("Township") in addressing two questions from a recent Township public meeting and a July 24, 2019 letter to the Township Board of Supervisors ("Board"). These questions concern the Energy Transfer ("ET") proposed construction changes for the new Mariner's East ("ME"), ME 2 (20-inch) and ME 2X (16-inch) highly volatile liquid transmission pipelines proposed to cross West Whiteland. ET is changing some of their original plans to install ME 2 and ME 2X via separate horizontal directional drilling, or HDD, because of various difficulties associated with HDD in certain areas of the Township. These difficulties included concerns about well water and subsidence during HDD attempts in apparently challenging terrain for HDD. Not all HDDs for pipeline installations are successful, and it is not unusual for HDD attempts to be aborted for some pipeline installations for various reasons. I conclude, given the details provided to me by ET under a Confidentiality Agreement, that ET's modified design/construction proposal for the Township is acceptable.

Background and Accufacts' Perspectives

Within the Township, most of the original ME 2 and 2X HDD proposals are to be replaced with more typical open cut trenching as well as "conventional" or direct bore crossing utilizing casings for railroad and other areas in certain locations within the Township.[1] Open cut trenching involves digging a trench from the surface in which pipeline(s) are then placed and buried. Direct bore entails the excavation of large pits on each side spanning an area to be crossed underground by the pipeline(s), such as railroad crossings, and then placing boring equipment in one pit to cut straight across the span between the pits. Depending on

[1] In some locations within the Township, HDDs for ME2 and 2X were successful.

the diameter of the bore, larger diameter casing pipe is installed to shore up the tunnel to maintain crossing integrity in which pipeline(s) are then inserted. In the Township the casings are to be either 42-inch or 48-inch steel pipe in which the 20-inch and 16-inch carrier pipelines will be installed once the casings are in place. For HDD 400 crossing (under SR 30, SE side of the township) the pipes will not be installed together in a casing. The 16-inch was installed via HDD. The 20-inch will be installed via the direct pipe method within a casing under the highway and railroad and will be open cut on either side of that once all approvals/permits are in place.

Direct bores usually don't go as deep as HDDs given various constraints on the size of the excavation pits that increase considerably with depth. ET plans to utilize two forms of pipeline bore casing construction installation within the Township: 1) the more conventional direct bore that sets casing in a straight line via jack and boring with a cutter head, and 2) a DirectPipe® Bore method in which a cutting/tunnel tool cuts one pass while pulling casing with it. Soil differences influence the decisions for the slightly different boring techniques. Open cut trenching and direct boring usually generate more surface disturbance than HDDs.

Residents' Concerns

Residents of West Whiteland have expressed strong concerns to the Board about the safety of two of Energy Transfer's construction methods for ME 2 and 2X. Accufacts was asked to address two specific questions raised by the Board and the public:

1. *Within the conventional bore and open cut trenching, ET is placing the 2 pipes within an inch or two of each other, with clock springs around each pipe, and then surrounding the pipes with a steel casement. Residents have questioned the safety of the pipes in close proximity to each other, especially since federal regulations call for at least a 12 inch separation unless that is not practicable.*

   Clock spring spacers will be utilized on the 20-inch and 16-inch pipeline segments installed within each casing to prevent contact between the pipeline(s) and/or the casing.[2] The separation between the pipelines installed with the open cut trenching method will be from 1 to 10 feet in distance when laid into the open trench and no clock spring wrap or casing is intended for pipelines laid with the open cut trenching installation.

   While federal regulations define a 12 inch clearance for liquid transmission pipelines unless that is not practicable, and I don't speak for the Pipeline and Hazardous Materials Safety Administration, or PHMSA, my observations and operating experience would

[2] A clock spring is a nonconducting durable composite material often used to wrap or sleeve reinforce/repair certain types of pipeline damage.

indicate this 12 inch clearance is not required in federal minimum pipeline safety regulations. It has been my experience that the 12 inch separation distance is misinterpreted as a "must" when, in actuality, the most important consideration is to assure no damage can occur to the transmission pipelines and other structures regardless of the separation distance from any structure. Federal pipeline safety regulations go on to further state:

> "Any pipe installed underground must have at least 12 inches (305 millimeters) of clearance between the outside of the pipe and the extremity of any other underground structure, except that for drainage tile the minimum clearance may be less than 12 inches (305 millimeters) but not less than 2 inches (51 millimeters). However, where 12 inches (305 millimeters) of clearance is impracticable, the clearance may be reduced if adequate provisions are made for corrosion control." [3]

There are various tests and techniques utilized within casings, as well as with pipeline in close proximity to each other in open cut installations, that are employed within the industry to prevent damage and to assure the integrity of each pipeline, both after construction and during its operation.

For cased pipelines:

Several issues related to pipeline installation **within** steel casing pipe are critical for their operation to be effective in these casing crossings:

1. The pipelines should never make direct contact ("shorted"), or be coupled, either directly or via metallic or electrolytic means, with the other pipeline within the casing, or to the steel casing. Such conditions can lead to accelerated nonlinear and unpredictable external corrosion of the pipeline(s) that can result in pipeline failure. Rapid and unpredictable corrosion rates may not be readily identifiable or controlled via inline inspection ("ILI"), or smart pigging, as ILI effectiveness for corrosion threat evaluation is often overstated for casing environments. It is, therefore, important that proper testing leads be installed on the carrier pipes and casing to permit periodic testing for possible shorted/coupled conditions that can develop over time. ET has demonstrated that sufficient test leads should permit suitable testing during construction as well as during the long operating life of the pipelines within the casings, to detect shorted or coupled conditions.

2. ET will place nonconducting spacers along the pipelines within the casing to

[3] 49CFR§195.250 Clearance between pipe and underground structures.

prevent the pipelines from touching each other or the casing. It appears that ET's use of clock spring material and spacing design for the 20-inch and 16-inch pipelines within the casings are appropriate.

3. Since steel casing also shields or prevents cathodic protection, or CP, current from reaching the pipelines within the casing, suitable casing design and installation approaches need to be employed to assure that possible external corrosion of the pipelines in the buried/submerged environment of the pipelines within the casing are prudently managed. ET has demonstrated to me proper design in their proposed casing approaches to allow periodic testing of the pipelines within the casings.[4]

4. Given the higher potential for external corrosion to occur in cased pipelines, several technologies have advanced in the last decade to assist in integrity assessment of pipelines within casings and I believe PHMSA continues to provide prudent guidance in this important area such as fostering development and proper use of advancing technologies such as guided wave ultrasonic testing, an above ground surveying approach, that assist operators in assuring pipeline integrity.[5]

For buried pipelines (not cased) in close proximity:

For buried pipelines in close proximity to each other, even with distances greater than 12 inches, it is important that the operator design and assure that the CP systems work for all of the influenced pipelines. While federal minimum pipeline safety regulations addressing CP requirements are not as prescriptive as I would like, another section of the pipeline federal safety regulations addressing corrosion threat requires that stray currents, usually from CP systems, do not interfere with other metallic structures such as other pipelines.[6] Such stray current or interference currents from CP systems, even for nearby pipelines on the same CP systems (i.e., the same operator), can greatly accelerate external corrosion between pipelines if not adequately considered. It is a relatively easy process to assure that the CP system for multiple pipelines operated by the same operator are working as intended through proper testing and Close Interval Surveys, or CISs, initiated after pipelines have been placed in service.[7] Federal pipeline safety regulations establish

[4] 49CFR§195.575 What facilities must I electrically isolate and what inspections, tests, and safeguards are required?

[5] See PHMSA website: https://www.phmsa.dot.gov/pipeline/cased-crossings-and-gwut/cased-crossings-and-guided-wave-ultrasonics.

[6] 49CFR§195.777 What must I do to alleviate interference currents?

[7] 49CFR§195.563(a) Which pipelines must have cathodic protection? Requires, "The cathodic protection must be in operation not later than 1 year after the pipeline is constructed, relocated, replaced or otherwise changed, as applicable."

minimum inspection frequencies and it is not unusual for state or pipeline safety regulators to periodically assess the results of such CP testing to assure external corrosion is under control and the CP system is operating as intended.

Dedicated cathodic protection inspectors have been on site during the construction of the pipelines since the start of the Mariner 2/2x project. Their task is to ensure continuity of the cathodic protection systems from the existing pipeline to the Mariner 2 system. The inspectors have inspected the casings, as well as the crossings during, and after construction to ensure the cathodic protection systems in place are continuous to the Mariner 2/2x pipelines, as well as monitor for any stray current interference. The interference is mitigated immediately by the cathodic protection inspectors.

2. *Because of subsidence caused by the installation of the 16" pipe via HDD, ET is proposing to change the construction method to a combination of open trench and direct bore under railroad tracks and a highway and to install the second pipe very close to the first pipe. While the 16" pipeline is not yet operational, ET is operating 8" and 12" pipelines carrying natural gas liquids nearby. Residents fear that the direct bore is a dangerous method for installation of pipeline near NGLs.*

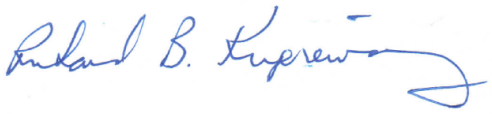
Various direct bore methods historically have been utilized in pipeline construction for many more decades than HDD, and its use in natural gas liquid, or NGL, pipelines is not unique, though the PHMSA reporting databases do not track this specific activity. While I can appreciate the public's concern associated with boring activities near active pipelines, especially NGL pipelines, the less complex nature of a direct bore (basically tunneling straight with a cutting device jacked or pushed from one pit, or by a "tunnel cutter pulling"), activities related to conventional boring should be able to stay well away from nearby active pipelines. Modern boring techniques use technology to determine and monitor the bore "head" location. ET has indicated to me that not only have they determined the location of nearby pipelines but, before boring activity they field verify the location of nearby pipelines including depth before proceeding with such construction activities. ET has indicated that boring activities will stay at least ten feet from existing pipelines, a distance I find to be appropriate.

The issue of whether pipelines so close to each other could affect each other in the case of pipeline failure was also raised in the July 24, 2019 letter to the Board. The Mariner East pipelines are liquid transmission pipelines that operate and fail as liquids. While I never make light of a pipeline rupture event, an HVL liquid pipeline rupture is not likely to impact a nearby pipeline, even if the failing line were to fail as a rupture. The failure dynamics and release forces of a liquid transmission pipeline rupture, even for the more compressible NGLs, are dramatically different than those observed for natural gas

transmission pipeline ruptures. Gas transmission pipeline ruptures tend to generate very large craters and pipe shrapnel associated with pipeline fracture of highly compressible natural gas.

Accufacts' Conclusion

Given the history of many problems associated with ME 2 and ME 2X construction activities within West Whiteland's challenging terrain, the public has asked the Township to file an emergency petition with the PA Public Utility Commission to stay construction until it is determined whether these construction methods are safe. Given the responses provided to me by ET under a Confidentiality Agreement on this matter, and the discussions above, I can find no safety justification supporting the public claims presented to the Board that ET's ME 2 and ME 2X modified proposal construction activities within the Township are unsafe.



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