

BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF MISSOURI

In the Matter of the Application of Grain Belt Express )  
Clean Line LLC for a Certificate of Convenience and )  
Necessity Authorizing it to Construct, Own, Operate, )  
Control, Manage, and Maintain a High Voltage, Direct ) Case No. EA-2014-0207  
Current Transmission Line and an Associated Converter )  
Station Providing an interconnection on the Maywood- )  
Montgomery 345 kV Transmission Line )

INTERVENOR ROCKIES EXPRESS PIPELINE LLC'S  
RESPONSES TO GRAIN BELT EXPRESS CLEAN LINE LLC'S  
FIRST SET OF DATA REQUESTS

For its responses to Grain Belt Express Clean Line, LLC's First Set of Data Requests to Intervenor Rockies Express Pipeline LLC, Rockies Express and Robert F. Allen state as follows:

1. Please provide all workpapers supporting the rebuttal testimony of Rockies Express witness Robert F. Allen.

**RESPONSE: Robert F. Allen has no workpapers supporting his rebuttal testimony.**

2. Regarding the statement in the rebuttal testimony of Mr. Allen at page 3, lines 6-8, please identify the studies that should be performed prior to the final structure locations.

**RESPONSE: Studies that model DC interference effects to pipeline systems, during both normal operations of the HVDC circuit and during fault conditions or monopolar operations of the HVDC circuit, need to be conducted.**

**REX is advised that modeling software to conduct such studies is available from companies such as Safe Engineering Services, Beasy Software, and Elecsys.**

3. Regarding the reference in the rebuttal testimony of Mr. Allen at page 6, lines 18-21, please provides copies of any studies or industry reports that support the statement that "a fault condition on an HVDC transmission circuit could result in fault current voltages transferring to the pipeline in the tens or hundreds of volts."

**RESPONSE: Mr. Allen has not located any published studies or industry reports that support this statement. Studies of which Mr. Allen is aware have not included fault conditions at crossings of pipeline and HVDC circuits where these values may be present. A number of factors make it unlikely that published documents would include such specifics:**

- **Industry awareness and reporting is limited due to relatively small number of co-located pipelines and HVDC systems**
- **Studies are often proprietary or confidential to either the HVDC Operator or the Pipeline Operator**

**Mr. Allen's statement is supported by the fact that during a fault condition on the HVDC circuit, the DC current may leave the circuit conductors and travel down the tower and into the soil and onto the pipeline. The effect on the pipeline will be dependent on the exact fault current, and the proximity of the towers or other grounding structures to the pipeline. To avoid the possibility of damage to the integrity of the pipeline, REX is recommending a minimum separation distance between the circuit towers and the pipeline.**

4. Regarding Recommendation #1 in the rebuttal testimony of Rockies Express witness Robert F. Allen at page 9, please identify any industry best practice that requires the placing of a high-voltage transmission line no closer than 1000 feet from a natural gas pipeline.

**RESPONSE: REX is not aware of any industry best practices that identify specific separation distances between pipelines and HVDC circuits. The current "industry practice" is to recommend that the separation distance between pipelines and HVDC circuits at crossings be as great as possible. For this reason REX recommended a minimum separation distance of 1,000 feet. But this also must be correlated with the results from the interference studies. As indicated in No. 3 above, the lack of published industry best practices is partially due to the small number of HVDC systems presently operating that interact with pipelines along their route. This small number results in limited information about the routing and parameters for separation distance and fault current mitigation. Due to this lack of information in the industry, REX recommends a cautious approach with respect to siting and safe operation of both systems.**

5. Regarding Recommendation #4 in Mr. Allen's rebuttal testimony at pages 11-12, please identify and provide: (a) any studies and any industry best practices or standards that support this recommendation; and (b) any studies that show that direct current (DC) interference is minimized by 90 degree angles during both normal and abnormal situations.

**RESPONSE: 5. a) REX is not aware of any industry best practices or standards that support the recommendation. Studies published in the public domain discuss specific systems that are dissimilar to the proposed routing and system design outlined for the GBX project. b) As outlined in No. 4 above, because of the small number of HVDC systems presently operating that interact with pipelines**

**along their route, REX recommends a cautious approach to all pipeline / HVDC circuit crossings. Having HVDC circuits cross the pipeline at a 90 degree angle will ensure that the towers are located at the furthest distance from the pipeline to reduce any effects to the pipeline if there were to be a fault condition at either of the towers at a crossing.**

6. Regarding Recommendation #5 in Mr. Allen's rebuttal testimony at page 12, please identify and provide copies of any industry best practices that require the construction of high-voltage electric transmission line towers no closer than 300 feet from a natural gas pipeline when crossing the pipeline.

**RESPONSE: See # 4 above. REX is not aware of any industry best practices that outline a minimum separation distance at a crossing between an HVDC circuit and a pipeline. REX's recommendation of 300 feet is based upon an assumed minimum 600 foot span/tower separation for the proposed GBX HVDC circuit. REX recommends that at all crossings of the HVDC circuit and the pipeline, that the pipeline be mid-span with respect to the tower separation.**

Prepared By: Robert F. Allen

October 6, 2014