

Challenges of Urban Seismic in the Barnett Shale, Tarrant County, Texas

B. Wayne Hoskins¹ and Annette Borkowski²

¹*The MapSnapper Group*

²*XTO Energy Inc*

Conducting a 3D seismic exploration program in a fully urban environment is often frustrating to both the operator and the land owners. Each has objectives specific to themselves that are often in conflict. So much time and effort are required to prepare and evaluate the project's requirements and secure permits, that the participation of a third party consultant may be the most effective use of the operator's time and dollars.

Two methods have been typically used to conduct a 3-dimensional seismic survey. Neither procedure provides flexibility in the field, nor satisfies the operator's exploration objective. The first can be called the rigorous approach. This occurs when a project is designed with strict seismic technical requirements, but little consideration of the obstacles on the ground. The contractors are expected to adhere rigorously to the initial plan. Once those obstacles are encountered, the operator is expected to determine a way to live with it. This leads to conflicting objectives between the contractor and the operator, technically rigorous versus operational efficiency.

The second procedure can be called the serendipity approach. The various contractors are sent to the field with little coordination and simply wander around until a compromised solution develops. Typically, the technical results are degraded; revising the planned activity wastes much time and money; and a feeling of professional proficiency is never established by either party towards each other.

In urban environments the methods mentioned above can be particularly aggravating. As a result the authors propose an Advantage Triangle Model to execute the planning and permit approval process. The process involves five distinct steps:

- Planning the seismic project layout;
- Inventorying the project area for sensitive sites and hazards;
- Planning how to avoid or minimize effects to sensitive area;
- Implementing the protocol used by operational teams on the ground; and
- Monitoring the effectiveness of and adherence to the protocols.

The Triangle is formed between the Public, the Operator, and the Consultant. The advantage is that each party has an expert consultant to address specific requirements in the permitting process as well as the overall project. This paper will examine XTO Energy Inc's River Legacy Project in Tarrant County, Texas as an illustration of this model. In this case the Consultant leg of the triangle was composed of expert consultants representing the fields of permitting, surveying, mechanical vibration monitoring, and seismic design (Consultant). The other two legs of the triangle were completed by the various land owners, state, county, and local governmental entities (Public), and XTO Energy Inc of Fort Worth, Texas (Operator).

The River Legacy Project is located in the cities of Arlington, Euless, and Fort Worth, Texas. The Barnett Shale objective is 8,300 feet deep with an overlying unconformity and known to have significant faulting with possible karsting.