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**Effect of limitations of ray-tracing software on predicting
community from petrochemical plants**

Frank Brittain^a and Marlund Hale^b

^aBechtel, Corp., 2255 Peavine Valley Road, Reno, NV 89523, USA

^bAdvanced Engineering Acoustics, 663 Bristol Ave., Simi Valley, CA 93065, USA

Ray-tracing software has proven to be a valuable and powerful tool to predict community noise from outdoor petrochemical and power plants. Accurate predictions are necessary to determine noise reductions needed to meet regulations and/or project noise limits, and then to determine individual equipment noise limits, select add-on noise controls, and confirm the plant will comply with its noise limits. Modeling using ray-tracing software is much more powerful and versatile than a spreadsheet model, which had often been used. Ray tracing and similar image source software have many limitations, particularly for outdoor petrochemical and power plants. To effectively use ray-tracing software, the user needs to understand those limitations. For example, ray tracing does not adequately predict for configurations where distances are significant compared to the wave length of sound, reflections from dense pipe racks, or screening by pipelines and equipment. This paper identifies and discusses some of the limitations of ray-tracing software for predicting community noise. Examples are given. This paper emphasizes limitations of ray-tracing methodology, and not those arising from atmospheric effects.