Exhibit # _____

NEEDS FOR AND ALTERNATIVES TO (NFAT)

Elenchus Undertaking # 95

"Elenchus to identify cross-elasticities between the differential between electricity and gas prices."

Response:

There is limited empirical research of the cross-elasticity for the impact of changes in the price of natural gas (or the natural gas electricity differential) on the demand for electricity.

The only recent paper found that directly addresses the issue of the cross-elasticity of natural gas prices on electricity demand found a short run cross-elasticity of 0.09 and a long-run elasticity of 0.16 for heating processes and 0.15 for all processes. These values are reported at page 12 of:

> Steinbuks, Jevgenijs (2010) "Interfuel Substitution and Energy Use in the UK Manufacturing Sector", EPRG Working Paper 1015, Cambridge Working Paper in Economics 1032
>
> http://www.eprg.group.cam.ac.uk/wp-content/uploads/2014/01/SteinbuksCombinedEPRG1015.pdf

Additional indirect insight may be provided by another 2010 paper that examined the price elasticity of natural gas and electricity. The findings imply that there would be a non-zero cross-elasticity since there is a demand response to changes in either electricity or gas prices. This implies that relative prices will affect demand. This paper includes a useful discussion of previous literature (on price elasticity, not cross-elasticity).

> Alberni, Anne, Will Gans and Daniel Velez, (2010) Residential Consumption of Gas and Electricity in the US: What are the Effects of Prices and Energy-Efficiency Investments?
>
> http://www.cepe.ethz.ch/education/lunchseminar/Alberini_paper.pdf

Another recent source of indirect evidence is a paper published by the U.S. Energy Information Administration (EIA) that examines the elasticity of substitution of fuel types in power generation. While this paper does not examine natural gas-electricity cross-price elasticity, it does demonstrate that fuel types do compete in an industry (power generation) that relies on multiple fuel types. Long run elasticities are larger than short run elasticities. By extension, it is reasonable to deduce that there will be electricity uses where fuel substitution is feasible and hence there will be a response to the differential in fuel costs. The paper is:

> U.S. Energy Information Administration (June 2010) "Fuel Competition in Power Generation and Elasticities of Substitution"
>
> http://www.eia.gov/analysis/studies/fuelelasticities/pdf/eia-fuelelasticities.pdf