

EXECUTIVE SUMMARY [NON-CONFIDENTIAL, NON-TECHNICAL ABSTRACT FOR PUBLIC INFORMATION OR PROGRAM PROMOTION]:

Hydrocarbons are chemicals composed entirely of the elements hydrogen and carbon. Methane is perhaps the best recognized hydrocarbon as it is a major contributor to global warming. Other hydrocarbons are also released into the atmosphere as a result of human activities and natural biological and geological processes. Propane and propylene are two of these hydrocarbons and are major contributors to the non-methane hydrocarbon fraction in the atmosphere. Bacteria have been isolated that can grow using only propane or propylene as a source of food and energy. These bacteria also have the ability to detoxify other hazardous chemicals that in an industrialized society can taint soil and groundwater. An example of one of these chemicals that was recently shown to be degraded by a propane oxidizing bacterium is methyl-tert butyl ether (MTBE), a gasoline additive that has been heavily used in the state of California. *Rhodococcus rhodochrous* B-276 and *Xanthobacter autotrophicus* Py2 are two bacteria that can grow using propane and propylene respectively. Unfortunately, there are many unknown details as to how they are able to do this. The principle goal of this research is to understand how these two unrelated soil bacteria are able to respectively degrade propane and propylene. Ongoing studies with hydrocarbon degrading bacteria may lead to new applications of biotechnology that will facilitate environmental clean-up and the environmentally friendly manufacture of important chemicals.