 730 17th Street

 Suite 340

 Denver, Colorado 80202

 Office: 303-534-0488

 Fax: 303-534-0487

 Toll Free: 1+866-372-5890

 E-mail: info@vesselscoalgas.com

### Ms. Mary Nichols

### Chairman, California Air Resources Board

### 1001 I Street

### Sacramento, CA 95814

Re: Vessels Coal Gas, Inc. support for the adoption of the Mine Methane Capture Protocol in the 2013 Proposed Amendments to California Cap on Greenhouse Gas Emissions and Market Based Compliance Mechanisms.

Dear Madam Chair,

Thank you for the opportunity to comment in support of ARB’s adoption of the Mine Methane Capture Protocol as an amendment to the ARB’s current Cap and Trade Program to be heard at your October 25th Board Meeting. Vessels Coal Gas has been a project developer of mine methane capture since 2003.

Fundamentally ARB’s Mine Methane Capture amendment will attribute some value to a waste by product, methane emissions from mining activity, where before there was little or no value. This will encourage and accelerate the capture of mine methane and may add momentum to reduce methane emissions generally. This event resembles the beginning of the natural gas industry. Natural gas, the primary constituent of which is methane, was originally itself a waste by product oil.

Prior to adopting Mine Methane into ARB’s Cap and Trade Program this waste product only has an economic value if local conditions provide a cost benefit to use the gas. Mine Methane is not natural gas but rather a constituent of mine gas which includes highly variable concentrations of Nitrogen, methane, carbon dioxide and other gases. There have been some advances in methane capture that have occurred anticipating an eventual incentive to capture mine methane. That these developments occurred in the absence of any significant incentive leads us to believe that the pace of mine methane capture will accelerate with the adoption of the Mine Methane Capture Protocol by ARB.

Although the scientific consensus is that that methane emissions and soot are the two most important substances to control to slow global warming little has been done in the area of policy or regulations to incentivize and accelerate methane capture. Economic incentives that have been put in place have been very effective in effecting change in emissions, such as in Germany for example.

The ARB Protocol may raise awareness generally of the benefits of reducing emissions and encourage where feasible the waste product to be used as an energy source. This hopefully will lead to adoption of regulations by federal, state and local governments that can stream line the permitting processes to shorten the time it takes to bring the projects into operation. We have proven by the few projects we have done how difficult it is to get permits under regulations that did not anticipate capturing mine methane and oxidizing the methane to reduce emissions. The process of obtaining variances and exceptions from conventional permitting requirements take up time and financial resources to be satisfied.

For example the mine methane capture project from an active mine in Colorado was put into service with no carbon reducing incentives in place and took us over six years to complete. Finally when the local electric utility would not pay an economic price for the electricity we were assisted by a friendly electric cooperative four grids away. That electric coop had an agenda to show case greenhouse gas emission reduction projects by providing us an electricity price that made our first project economic. A local environmental and conservation group, The Conservation Center, strongly supported us and gave us and the coal mining company we worked with an award for our accomplishment. The press became aware of the novel nature of this project and spread the word. There is much more potential to expand the mine methane capture in this state and others. The ARB Protocol can shorten the six year time frame we have just endured. News of the Mine Methane Capture Protocol can encourage citizens to request more of these kinds of projects to be pursued and support adoption of constructive policies and regulations. As communities begin to understand what a carbon offset is and the beneficial effect of both capturing methane and putting the methane emission to beneficial use those communities could begin to advance similar goals to those of ARB. This could add momentum to other states joining the Western Climate Initiative or do something else constructive to capture methane or otherwise reduce greenhouse gas emissions.

Developments that have occurred in methane capture prior to adoption by ARB are briefly listed below.

**Prior to ARB adoption:**

**Mine Methane injection into natural gas pipelines**

Beginning roughly in the 1970s mine methane from **active mines** began to be recovered and treated for injection into natural gas pipelines. Natural gas prices rose to historic levels peaking in 2008 over $13 per thousand btus of natural gas and stimulated innovations in small scale nitrogen removal to concentrate methane to meet pipeline quality specifications. Last year the price of natural gas fell to $1.60 per million btus and have risen recently to over $3.00. At these current gas prices the economic incentives can be expected to have less of an impact and we know of no new recent projects.

**Distributed Electric Generation**

As of this date we know of two distributed electric generation facilities in the USA using mine methane as fuel with a total capacity of around 4.5 Mega Watts. These generators are European built low methane concentration reciprocating engines with computerized controls to optimize clean burning to reduce Nitrous Oxide emissions and most efficiently run to produce the most electricity. We understand there are at least two suppliers of 5 Mega Watt gas fired turbine electrical generation models. We know of none in use on mine gas currently. Electricity markets typically run from less than 3c per kilowatt hour to over 4c depending on local conditions. These prices are not sufficient to stimulate significant growth or the growth would be manifest.

**Ventilation Air Methane Oxidation**

Three different manufacturers have placed at least one each of their particular products in operation as pilot projects to oxidize and thus avoid methane emissions from Ventilation Air Methane (VAM) systems in the USA. VAM has less than 1% methane. The technology exists to take the heat from these generators and heat boilers for steam generated electricity. To our knowledge this has not been accomplished in the USA and present electricity prices would not support such projects.

**Thermal Oxidation of vent methane.**

Currently we know of only two of the fifty active mines in the USA that have methane thermal oxidizers or incinerators to oxidize methane before it is released to the atmospheret. The largest has a capacity to oxidize 3,700 mcfpd of methane. The manufacturer is European. This equipment does not provide any beneficial use but have wide operational flexibility and can operate over a wide range of methane volumes and concentration. They have a 15 year life and are specially designed and equipped to measure methane oxidiation efficiency.

.

**Detection, measuring and monitoring of methane.**

There is some existing technology used infrequently to measure small volumes of methane emitting from the ground or from old vents, fractures etc. that are difficult to detect by the naked eye alone. Methane is odorless and colorless. Some of the methods are expensive such as flying instruments over historic coal fields. There are available measuring devices that can measure emissions coming from the ground. An array of such can begin to outline methane emission concentrations from a mine.

**Software and computerized controls**

The facilities referred to above can be monitored on smart phones and be controlled by lap top computers.

**Potential Developments that could occur post Protocol Amendment Adoption**

**Mine Methane Injection into natural gas pipelines**

In this Protocol pipeline injection is eligible from abandoned mines innovation could restart as new facilities are installed and variable gas compositions are handled to treat gas to natural gas pipeline specifications.

**Distributed electric generation**

Gas Turbines could be installed on some projects with less maintenance and more efficient electric generation. This can come after enough experience with a methane source so the methane concentration is known. Turbines work best when the gas quality stays fairly constant. The addition of carbon offsets to Electric generation revenue could add sufficient value to encourage development of new equipment packages. Our company has an expectation of being able to develop 30-50 MWs of electricity generation ourselves if the economic benefits are sufficient.

**Ventilation Air Methane**

The technology exists to avoid a significant amount of Mine Methane emissions from Ventilation Air Systems. We know of a few project developers and mining companies that are studying how they would oxidize VAM. Some novel uses of VAM in plant and mine processes is being considered. This would not result in any beneficial use but once they are installed they produce a great deal of heat and that could lead to the use of the waste heat for some beneficial purpose.

**Thermal Oxidation of vent methane**

If the ARB Cap and Trade Amendment including Mine Methane Capture is adopted many more Thermal Oxidizers are likely to be installed and the waste heat they generate would be available for use. New products are being developed to oxidize the methane and capture the heat for electric generation if such an investment is economic.

**Detection, measuring and monitoring of methane.**

If venting mine methane has value then it is reasonable that we and others will expend greater effort in the hunt for such. That is likely to result to further innovation in the field of instruments designed to detect methane.

Thank you again for the opportunity to offer our support for the adoption of the of the Mine Methane Capture Protocol in the 2013 Proposed Amendments to California Cap on Greenhouse Gas Emissions and Market Based Compliance Mechanisms.

Thomas J. Vessels

President of Vessels Coal Gas, Inc.