Updated January 31, 2014

Questions and Answers Regarding Eastman's Assistance in the Emergency Response to the Spill of Crude MCHM in Charleston, West Virginia

What is the purpose of providing this Question and Answer document?

Eastman's focus since learning of the spill has been to work with local, state and federal agencies and emergency responders to provide information and assistance to address their immediate needs in responding to the Freedom Industries' spill. In an emergency situation, Eastman believes that emergency responders should be the initial source of information to the public regarding response efforts. While Eastman provided full information to emergency responders, Eastman decided to provide only high-level information to the public until the immediate response efforts were complete. This helped to avoid any potential for confusion that might occur as a result of the manufacturer of the product releasing information to the public at the same time that emergency responders were attempting to release information to the public. The purpose of this Question and Answer is to provide information to the public and to respond to certain news reports that Eastman has reviewed regarding the Freedom Industries' spill.

When did Eastman learn of the spill and how did the company respond?

Eastman first learned of the release of Crude MCHM from a Freedom Industries' storage facility at approximately 7:30 PM on Thursday, January 9, 2014, from emergency responders in the Charleston, WV area. Eastman immediately began working with emergency responders by providing information and expertise. Initially, Eastman provided the most current Safety Data Sheet (2011) and made its experts available to discuss the toxicity and chemical properties of the product with the emergency responders.

Emergency responders also asked Eastman for information on detecting Crude MCHM in water. During the next few hours, Eastman's internal experts provided a proprietary test method and collaborated with internal experts at another chemical company to accelerate the development of an analytical test to determine the level of MCHM in water. That method for detecting the level of MCHM in water is the one in use by emergency responders. The next day, Friday, Eastman had additional discussions with a number of federal agencies who were working to evaluate the safety of water in the area. Eastman provided complete copies of its toxicity studies to agencies and emergency responders who requested the information. Eastman continues working with agencies and emergency responders to aid in the spill response and to support their evaluation of water quality.

What is Crude MCHM and what is it used for?

Crude MCHM is a mixture of the chemicals identified in Eastman's Safety Data Sheet. The largest component of the Crude MCHM product is MCHM. Crude MCHM is intended solely for use in industrial applications in a controlled industrial setting. One industrial use of the product is as a coal or other ore flotation chemical. A second and less significant use of the Crude MCHM product is as an additive to certain fuels. The physical and chemical properties of Crude MCHM are found on the Crude MCHM Safety Data Sheet. Crude MCHM does not require any unique type of handling or storage facility that differs from those required for most industrial chemicals. In the past decade, Eastman has produced between 5 million and 10 million pounds of the Crude MCHM product annually. By volume, that is equivalent to approximately 10 - 20 tanker truck loads per month.

What is Eastman's relationship to Freedom Industries?

Eastman has sold Crude MCHM to Freedom Industries since at least 2000. Eastman was

aware that Freedom Industries used the product for coal flotation which is a recognized use. Freedom Industries purchased Crude MCHM at Eastman's Kingsport, Tennessee facility. A common carrier transported the product for Freedom Industries to its designated facility. Eastman's last sale to Freedom Industries occurred on January 4, 2014. Contrary to some media reports, Freedom Industries was not a distributor for Eastman.

What does Eastman know about the cause of the spill?

The Freedom Industries spill into the Elk River appears to have happened for two reasons: failure of the Freedom Industries storage tank, and; failure of the retaining wall that should have contained the spill. In addition, it appears that Freedom Industries either did not have or failed to execute a Spill Response Plan that would have alerted the nearby water plant to close its intake systems and provide timely notification to local public health and safety agencies.

Crude MCHM does not have any unique storage or handling requirements beyond those required for most industrial chemicals.

Has Eastman been contacted by any governmental agencies before the spill about Freedom Industries?

On June 19, 2013, a representative of West Virginia Department of Environmental Protection, Division of Air Quality, located in Charleston, WV contacted Eastman through Eastman's Customer Care web portal to request information on Crude MCHM in response to a citizen's complaint of objectionable (licorice-like) odors associated with Crude MCHM occurring during tank filling operations. The inquiry asked for information regarding component vapor pressure. The inquiry did not identify which Freedom Industries' facility in the Charleston, WV area was involved.

Has Crude MCHM been involved in any other spills?

Crude MCHM is an industrial chemical intended for use in a controlled industrial environment. To Eastman's knowledge, the release of Crude MCHM from Freedom Industries' storage facility is the first environmental incident involving the product.

What toxicity studies does Eastman have?

Eastman performs a regulatory and toxicity review of all products to determine whether the product complies with all applicable laws and whether the products are safe for their intended use. Commercial uses of Crude MCHM have been explored since the 1970's. A potential commercial application of pure MCHM was considered in the late 80's and in 1990, as part of its ongoing review process, Eastman, again of its own initiative, conducted toxicology studies on pure MCHM. Then, in 1996, Eastman commercialized the use of Crude MCHM to clean coal and other ores. In 1997, prior to marketing Crude MCHM for this application, Eastman voluntarily conducted further studies on the Crude MCHM product.

Eastman's studies were performed by reputable laboratories under established standards. Generally speaking, Eastman's toxicity studies were designed to evaluate the risk of the product in its intended use in an industrial environment. These studies evaluate acute (short term) risk to workers. From these studies, Eastman made recommendations for worker safety measures that are found in the Safety Data Sheet. Additionally, toxicity studies were conducted to evaluate the risk to the environment. Toxicity studies are technical documents written for trained professionals. Specialized scientific training is needed to use the studies to evaluate the risks to humans based upon animal testing results. Additionally, toxicologists can use toxicity data for

structurally similar chemicals (chemical cousins if you will) to evaluate the risk of a chemical that is being reviewed. This process is known as a "read-across". Eastman employs toxicologists, industrial hygienists, physicians and other experts to assist in evaluating the need for data and to interpret the data.

What type of toxicity information does Eastman have for Crude MCHM?

Eastman has an internal process to ensure that its products are safe in its intended end use. Crude MCHM is an industrial chemical intended to be used in a controlled industrial setting. Eastman's toxicity studies were performed to evaluate the acute (short term) risk to workers in an industrial environment and the risk to the environment. Based on these studies, Eastman provided recommendations in its Safety Data Sheet for precautionary measures to be taken by workers. The Safety Data Sheet also provided a precaution to avoid release to the environment and to prevent any spill from reaching a drain, sewer or stream.

Why are the studies proprietary?

Simply stated, Eastman, at its own initiative, invested a substantial amount of money to have the studies performed, and we do not want our competitors to have free access to the information that they did not help fund. As we did in response to Freedom Industries' spill, Eastman does not hesitate to provide all requested information, proprietary or not, to local, state and federal agencies and emergency responders to aid in emergency response efforts.

Why did Eastman wait to provide its toxicity studies to the public?

The results of Eastman's toxicity studies are included in Eastman's Safety Data Sheet for Crude MCHM, which is publicly available. Eastman believes that individuals should look to designated emergency responders to receive the most current information during the initial stages of an emergency situation.

After learning of the spill on Thursday evening, Eastman provided a copy of its Safety Data Sheet to emergency responders and explained the physical and chemical properties of the product and all toxicity data known to Eastman about the product. Conversations with emergency responders and governmental agencies continued the next morning. Eastman did not hesitate to provide complete copies of its studies to emergency responders. The responders have been using Eastman's information since that time to provide additional information to the public.

Eastman's studies are proprietary documents. Beyond the concern about Eastman's confidential business information, Eastman decided not to release its studies to the public to avoid any potential confusion that might be caused if the manufacturer of the product is releasing toxicity information at the same time that emergency responders are making critical emergency response communications.

Where can I find Eastman's toxicity studies?

Eastman recognizes that the public is interested and has made the toxicity studies available on www.eastman.com. Toxicity studies are technical documents written for trained professionals. Specialized scientific training is needed to translate the results from these studies into hazard warnings, workplace precautions or risks to humans. Eastman is not in a position to respond to questions from the public regarding the toxicity studies but will continue to work with emergency responders and local, state and federal agencies as needed.

Eastman encourages individuals to contact emergency responders and local, state and federal agencies for information related to spill recovery efforts and with any safety or health concerns.

If an individual has concerns about his or her health, Eastman encourages individuals with health concerns to contact a medical professional immediately. Eastman does not provide medical advice to individuals.

What are the effects of this chemical on human health?

Eastman encourages individuals to contact emergency responders, local, state and federal agencies or medical professionals for information related to human health concerns. The effect of a chemical on an individual depends upon a number of factors including the toxicity of the chemical, the amount of the exposure and the sensitivity of the individual who was exposed. Toxicity studies like the ones conducted by Eastman assist professionals in determining the toxicity of the chemical. Eastman provided all of its toxicity studies to governmental agencies and emergency responders shortly after learning of the Freedom Industries' spill. Eastman has worked with these agencies in their efforts to understand the toxicity of the chemical. Eastman does not have information necessary to determine the amount of exposure. For example, Eastman does not know the amount of the chemical that spilled or the concentration of the chemical in the water system before the order to stop using the water was issued. As a result, Eastman cannot provide any information on the effect of the spill on human health beyond what it has already made available.

Eastman agrees with the government agencies' announced determination of a safe level for MCHM in water.

If an individual has concerns about his or her health, Eastman encourages them to contact a medical professional. Eastman does not provide medical advice to individuals.

What is the difference between Crude MCHM, 4-methylcyclohexanemethanol and MCHM?

4-methylcyclohexanemethanol is an eight carbon alcohol. In chemistry, an alcohol is an organic molecule with a hydroxyl functional group bound to a carbon atom (typically represented as an –OH group on the chemical structure). The abbreviation MCHM is simply the short hand way to identify 4-methylcyclohexanemethanol.

Crude MCHM is a product that is comprised of several chemically-similar substances in which MCHM is present at the highest concentration. As provided on the Safety Data Sheet, Crude MCHM contains the following seven constituent at their respective percentage ranges:

4-methylcyclohexanemethanol (MCHM)	68-89%
4-(methoxymethyl)cyclohexanemethanol	4 - 22%
water	4 - 10%
methyl 4-methylcyclohexanecarboxylate	5%
dimethyl 1,4-cyclohexanedicarboxylate	1%
methanol	1%
1,4-cyclohexanedimethanol (CHDM)	1-2%

With each shipment, Eastman provides a document known as a Certificate of Analysis (COA) which provides the percentage of MCHM and certain other components. During the response efforts, Eastman provided the COAs for its recent shipments to assist emergency responders and local, state and federal agencies in estimating the amount of each component that may have been released to the environment during the spill.

It has been reported that another chemical called PPH or propylene glycol phenyl ether

was also present in the chemical spill, does Crude MCHM also contain PPH?

No, Eastman's Crude MCHM does not contain PPH. Eastman is not a manufacturer of PPH nor do we have any information about its presence in the material spilled at the Freedom Industries' facility.

Some reports indicate that Eastman only has one study for pure MCHM – what about the toxicity of the other components in Crude MCHM?

Any suggestion that Eastman failed to test a component found in the product is untrue. Eastman voluntarily conducted over 12 tests on Crude MCHM. Crude MCHM contains 7 distinct components and by testing the Crude MCHM product itself, Eastman tests the product's components.

The studies on the Crude MCHM product included an acute oral toxicity study and an Ames Assay. The acute oral study evaluates the short term effects from ingesting (swallowing) the product. Based on the results of this study, the product is considered "slightly toxic" and carries the hazard warning "harmful if swallowed" on the Safety Data Sheet. An Ames Assay was conducted to help evaluate the cancer risk from the product. An Ames Assay may determine if a chemical is a mutagen – 90% of known carcinogens (cancer-causing agents) may be identified by this test. For Crude MCHM, the Ames Assay indicated that Crude MCHM and its components are not likely to be mutagenic, and therefore, not likely to be a carcinogen. Any suggestion that Eastman knew that the product causes cancer is untrue.

The second largest component of Crude MCHM is 4-(methoxymethyl)cyclohexanemethanol. This component is structurally very similar to MCHM. While Eastman did not individually test this component, the component was tested when Eastman conducted tests using the product mixture. Because this component and MCHM are structurally similar, both are expected to have the similar toxicity profiles. In other words, a safe level for MCHM would also be expected to be a safe level for this component.

The third largest component of Crude MCHM is water, which is not toxic. Together, these three components typically comprise over 90% of the Crude MCHM product.

If Eastman paid for the studies, how can we trust the data?

Industry relies on commercial and internal laboratories to perform toxicity testing. For MCHM and Crude MCHM, Eastman paid such laboratories to perform toxicological tests to ensure that our employees and those of our customers who come into contact with the products are able to work safely. In performing a toxicity study, laboratories must follow standards known as Good Laboratory Practices and conduct the test in accordance with OECD Guidelines. Good Laboratory Practice is a framework for conducting laboratory tests set forth in federal regulations administered by the EPA and FDA. Good Laboratory Practice sets minimum standards and tells the laboratory how to organize study personnel; maintain the testing facility, equipment and samples; establish a study plan; record and archive data; etc.

The Organisation for Economic Co-operation and Development (OECD) Guidelines for the Testing of Chemicals are a set of internationally agreed test methods to determine the safety of chemicals. These Guidelines tell the laboratory how a particular study should be performed; for example, the Guideline will define the type and number of animals to use, how to set dose levels, study duration, what endpoints should be measured and more. Importantly, the OECD Guidelines define the role of a study sponsor (like Eastman) and the role of the laboratory performing the studies to ensure appropriate independence and that sound quality control and quality assurance practices are followed. Eastman's studies for Crude MCHM were conducted by reputable laboratories and conform to these standards.

The 1990 testing of pure (distilled) MCHM was conducted during a period of time in which the Eastman facility in Kingsport, TN was part of the Eastman Kodak family of companies. At that time, the laboratory located at Kodak Park in Rochester, New York conducted the studies. In 1994, Eastman Chemical Company was spun off from Eastman Kodak. In 1997 when many of the studies were conducted by this laboratory, the laboratory was independent from Eastman Chemical Company. Additionally, the Ames Assay was conducted a third party laboratory that had never been part of the Eastman or Eastman Kodak family.

Eastman sponsored studies for Crude MCHM to develop the hazard information provided on the Safety Data Sheet for use of the product in a controlled industrial setting. While study results are provided on the Safety Data Sheets, the studies themselves were considered proprietary. If the spill at Freedom Industries' facility had not occurred, it's unlikely that anyone outside of Eastman would need or desire to review the studies.

What are the effects of this chemical on human health?

Eastman encourages individuals to contact emergency responders, local, state and federal agencies or medical professionals for information related to human health concerns. The effect of a chemical on an individual depends upon a number of factors including the toxicity of the chemical, the amount of the exposure and the sensitivity of the individual who was exposed. Toxicity studies like the ones conducted by Eastman can assist professionals in determining the health effects of a chemical. Eastman does not have information necessary to determine the amount of exposure to any of the chemicals spilled at the Freedom Industries' site and cannot provide any information on the effect of the spill on human health beyond what it has already made available.

Eastman agrees with the government agencies' announced determination of a safe level for MCHM in water.

If an individual has concerns about his or her health, Eastman encourages individuals with health concerns to contact a medical professional immediately. Eastman does not provide medical advice to individuals.

What is Eastman's position on TSCA reform?

Eastman supports legislative reform that incorporates sound, risk-based principles and appropriate protection of confidential business information, and is willing to work with members of Congress to enact meaningful reforms. As a responsible company, Eastman evaluates whether its products are safe for their intended use. As part of this review process, Eastman often performs toxicity testing that goes beyond that required by governmental agencies. Eastman's additional, voluntary testing on Crude MCHM and its components during its product reviews enabled emergency responders to evaluate safe levels in water. Eastman has no objection to any requirement for testing or restrictions that are appropriate for the risk presented by a given chemical or its intended use.

What should I do if chemicals from the spill are in my home plumbing or hot water heater?

Eastman has received questions from citizens affected by the spill on how to flush water containing the chemicals from residential plumbing and hot water heaters. Eastman manages MCHM in an industrial setting which is very different than the typical residential setting. We recommend that citizens needing information or assistance in flushing their household plumbing contact their local utility company or water provider. Eastman is not able to comment on the effectiveness of any instructions provided by the authorities for flushing Crude MCHM or other chemicals involved in the spill from your residence. From the moment we learned of the spill,

Eastman has worked with the first responders and regulatory agencies in WV and we continue to be available to assist them with information about Crude MCHM.

Why does the phrase "No Data Available" appear so many times on the Safety Data Sheet?

The format of a Safety Data Sheet is governed by the Occupational Safety & Health Administration's Hazard Communication Standard. OSHA recently adopted the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). This link provides an overview of that standard. Although compliance with GHS is not required yet in the United States, Eastman adopted the standard early in the transition period. Additionally, the requirements in the United States vary slightly from those in the European Union. As a global company, Eastman adopted the higher level of disclosure required by the European Union. In essence, if Eastman had chosen to do so for this product, we could have simply not included the "no data available" entries under the United States standard and simply disclosed the data that did exist.

Crude MCHM is a mixture of the seven chemical substances identified on Eastman's Safety Data Sheet. GHS requires that Eastman include data on both the product mixture (Crude MCHM) and each of the seven chemical substances, one of which is water and four of which are present at 5% or less in the mixture.

The form of GHS adopted by Eastman requires that the SDS include a defined set of toxicological studies, regardless of whether that study is necessarily relevant to the chemical or the risk posed by the intended use of the chemical. Additionally, under each toxicity test type, an entry must exist for the product (Crude MCHM as a mixture) and each of its seven components (8 entries in total per study type). The term "No data available" is a required placeholder. For example, under each toxicity test, Eastman has an entry for "water" even though water is recognized as not being a toxic chemical substance. As required by the GHS standard, Eastman has entered "no data available" on 9 different occasions to reflect that it was not aware of any toxicity data available for water for those 9 different types of toxicity tests. In some instances, a particular type of toxicity test may not be required because a screening test determined that the test was not needed. Or, a test might not be required because other data is available. In other words, there are a variety of explanations for why "no data available" entry might occur on an SDS.

As reflected in our Q&A and toxicity testing disclosures at www.eastman.com, Eastman tested the mixture Crude MCHM for its intended use as an industrial chemical in a controlled industrial environment using a variety of toxicity tests. Eastman was not required to test Crude MCHM. However, Eastman voluntarily conducted 18 toxicity tests on the product Crude MCHM and its major component MCHM to evaluate the risk of exposure to workers in an industrial environment and risk to the environment.