Summary of the
August 29, 2012 Meeting of the Molybdenum Ad hoc Workgroup of the
Water Resources Advisory Committee (WRAC)

This special Ad hoc workgroup meeting of WRAC was called to order at 9:40 a.m. by Chairperson Don Bluedorn on Wednesday, August 29, 2012 in Room 105 of the Rachel Carson State Office Building, Harrisburg, PA.

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The following committee members were present:
Myron Arnowitt, Clean Water Action
Gary Merritt, NSG
Chuck Wunz, Wunz Associates
Don Bluedorn, Babst, Calland, Clements, Zomnir, P.C.

The following DEP staff members were present:
Duke Adams, Office of Water Management
Sean Gimbel, Policy Office
Michelle Moses, Bureau of Regulatory Counsel
Tom Barron, Bureau of Point/Non-Point Source Management
Rod Kime, Bureau of Point/Non-Point Source Management
Bonita Moore, Bureau of Point/Non-Point Source Management

The following guests were also present:
Tad Macfarlan, K&L Gates
Jim Richenderfer, SRBC
Dr. Gary Van Ripen, LMC
Josie Gaskey, PCA
Bob Dorfler, Langeloth Metallurgical
Scott Schalles, IRRC
Jeff Shanks, Waste Management
Mark Hartle, PFBC
Richard Fox, Senator Yudichak's office

Overview of Workgroup Objectives: Don Bluedorn and Duke Adams

After some brief discussion, it was agreed that the workgroup would attempt to develop a "consensus position" but, if that was not possible, the workgroup instead would prepare a summary report of the discussions for the broader WRAC membership.

DEP overview of public comments received: Rod Kime & Tom Barron

DEP received comments on Molybdenum (Mo) from 15 commentators. The comments were separated into human health criteria and aquatic life criteria. It was noted in the

comments that DEP is proposing the same criterion that was previously rejected by the Independent Regulatory Review Commission (IRRC) during the previous triennial review. Other comments noted that the human health criterion is being based on a single and outdated study and not more recent studies. Additionally, it was noted in the comments that the Fungwe study was for the purpose of establishing recommended daily allowances of Mo, and was not appropriate for the development of a water quality standard. The results of the Fungwe study were flawed and could not be replicated. Finally it was noted the ATSDR study was not appropriate for developing human health criteria.

There were four specific comments on the aquatic life criteria. The Tetra Tech study is inadequately protective of Pennsylvania for chronic criteria, but the acute criterion is protective and should be supported. There was a suggestion to utilize new data such as that proposed by Langleloth. It was also noted that the author of the Nevada study, Henry Latimer (Tetra Tech) is no longer supportive of his current criterion.

Langeloth Metallurgical Company Presentation: Bob Dorfler, Dr. Gary Van Ripen

Dr. Van Ripen noted that there is extensive quality and recent data available on Mo. The International Molybdenum Association (IMOA) is a clearing house for studies and articles on Mo impacts to human health and the environment. The IMOA sponsors broad based research and studies at highly respected labs and under strict QA/QC protocols targeted at Klimisch 1 and 2 rankings (see handout). Additionally, IMOA interfaces with regulatory agencies to provide sound science upon which regulations can be developed. In 2004 a thorough data gap analysis conducted across all compartments of environment and human health. Due to low toxicity on Mo, many gaps were noted and as a result an extensive program was undertaken to fill gaps with high quality studies. These studies were conducted in outside well known laboratories under the Organizations for Economic Cooperation and Development (OECD) protocols. All key studies either have been or are being submitted for peer reviewed journal publication. Dr. Van Ripen noted the spreadsheet that was provided that identifies multiple studies on Mo in various study areas such as freshwater, marine, soils, human health and others.

Dr. Van Ripen first discussed the aquatic acute and chronic proposed standards, noting that DEP utilized a similar methodology as Nevada to develop those criteria. The Nevada criteria were developed by Tetra Tech based upon 2007 data. Tetra Tech has evaluated recent studies such as De Schamphelaere et. al., to determine impact on chronic criteria using EPA protocols. The Tetra Tech analysis yields a chronic criterion of 30.8 mg/L. Dr. Van Ripen believes that the significant number of recent chronic studies allow chronic criteria to be developed directly rather than be extrapolated as was done in Nevada via Acute to Chronic Ratios (ACR). Dr. Van Ripen further explained the methodology used to develop the criteria of 30.8 mg/L.

Dr. Van Ripen noted that DEP's current proposal is based upon the Fungwe study of 1990. He believes that critical evaluation of this study has shown that it is not of suitable

quality to be used for regulatory development. He identified a recent 90 day OECD compliant repeat dose toxicity test designed to approximate the Fungwe study which showed none of the findings of Fungwe. As a follow up to the 90 day repeat dose rat study, a Developmental Toxicity Evaluation was conducted at RTI International.

Dr. Van Ripen concluded that:

1. Recent, high quality studies suggest that freshwater aquatic chronic criteria should be 30.8 mg/L. This demonstrates that exiting state waters are fully protected from an aquatic standpoint

2. The Fungwe data (upon which the proposed human health criteria of 0.210 mg/L is derived) cannot be replicated and high quality recent studies yield a criteria almost 20 times this level. Ambient water bodies in the State appear to be well below this level.

DEP staff noted that the chronic study that was presented was a quality study, but studies that DEP can rely on must include organisms that would be representative of Pennsylvania native organisms. This eliminates some of the data that has been provided. Additionally, with relation to the human health study, DEP has done a cursory review of the IMOA studies. There are concerns with the delivery of Mo to the test subjects via food or water and the difference in absorption rates of these two delivery methods. This does not allow for an appropriate comparison. Dr. Van Ripen noted the feeding methods and delivery of Mo via food twice a day, and the retention of the MO in the organism's system.

There was some discussion about the use of molybdate in studies but the regulation of molybdenum in the environment and if the regulation should look at the ionic forms. DEP noted that while there may be changes in form under different environmental conditions, we have identified the discharges are of molybdenum. Dr. Van Ripen concurred that if there is to be a criteria, molybdenum would be the appropriate parameter.

There was also discussion with relation to sodium molybdate which was used in the studies and in relation to the sulfates discussion and the calcium dominated waters of Pennsylvania. Dr. Van Ripen noted that he did not believe there would be any variation in the results of the studies by using calcium molybdate or sodium molybdate.

There was also some discussion about what the other states are doing with relation to Mo. There are seven other states with Mo criteria. EPA noted that Mo is not on the Priority Pollutant list and therefore it is up to state to decide how to proceed. Ohio has a standard of 120 ug/L.

Conclusions and Path Forward: Don Bluedorn and Duke Adams

After some discussion, it was determined that the workgroup could not agree to a "consensus position" and that a summary report would be prepared for the broader WRAC membership.