



# LANGELOTH METALLURGICAL COMPANY

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March 19, 2008

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ENVIRONMENTAL QUALITY BOARD

Kathleen A. McGinty  
Chairperson  
Environmental Quality Board  
PO Box 8477  
Harrisburg PA 17101-2301

Re: Notice of Proposed Rulemakings (Water Quality Toxics Management Strategy-Statement of Policy-39 Pa.B.258; Triennial Review of Water Quality Standards-39 Pa.B.236), Comments of Langeloth Metallurgical Company ("LMC").

Dear Ms. McGinty:

LMC submitted a preliminary set of comments concerning the above referenced Rulemaking(s) on February 8, 2008. At that time LMC indicated that it had requested from DEP the information relied upon to justify the Rulemaking(s) and the technical justification for the proposed drinking water quality standard ("WQS") for molybdenum. LMC finally received a portion of this information following submission of its initial comments. After reviewing this information, LMC still considers the Rulemaking(s) as a "solution looking for a problem." The "backup" data sets forth no information whatsoever, which would justify the conclusion that drinking water in the state of Pennsylvania is being, or will be, impacted by molybdenum, and that a statewide WQS to protect "drinking water" is required.

As stated in our previous comments, of particular concern to LMC are the proposals to modify Chapters 16 and 93 of Title 25, Pa.Code, to classify Molybdenum as a "toxic substance," to obligate the Department to consider the water quality impacts of Molybdenum ("Mo") on humans when calculating effluent limitations for NDPES Permits, and which establishes an "in-stream" water quality standard of .210 mg/L for Mo.

### Interest of LMC / Introduction To Comments

LMC is located in Langeloth, Washington County, Pennsylvania. It has operated in this location for close to 100 years, and currently operates a metals roasting facility, where among other activities, it roasts molybdenum ore to produce molybdenum-based products for use by others. LMC employs 152 local residents, including over 120 of whom are members of the United Auto Workers of America in high-paying, skilled jobs. LMC also supplies molybdenum products to other Pennsylvania businesses.

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INDEPENDENT REGULATORY  
REVIEW COMMISSION

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Over the past 14 years, LMC has invested over \$40 million in capital improvements and over \$60 million in ongoing maintenance and major repairs. All money was spent with the environment and local community welfare in mind. Nearly 30% of the monies were directly related to sustaining a good environmental influence within the County.

### Specific Supplemental Comments

#### **1. The Use Of An Uncertainty factor Of 30 To Calculate A WQS For Mo Is Not Supported By The Science And Literature and Is Unjustified.**

In development of the proposed drinking WQS of 0.210 mg/L for molybdenum, it appears as if DEP used an Uncertainty Factor (UF) of 30 in the equation to calculate the WQS, starting with a reference dose for an adult. The article that apparently was used to establish the reference dose was published by the Institute of Medicine (IOM, 2000). The specific study cited by the IOM review was an animal study carried out by Fungwe, et.al., at Texas Tech University (1990). In this study, the authors observed a no effect level of 5 mg/L Mo in drinking water fed to rats over an extended period of time. This 5 mg/L No Observed Adverse Effect Level (NOAEL) translates to a reference dose of 0.9 mg/kg-day for a human adult. Utilizing the equation presented on page 3 of the State's "Summary of Molybdenum Criteria Document," a WQS of 0.210 mg/L was then calculated. The equation on page 3 utilizes an UF of 30, which means that the actual WQS is set at a level that is 30 times lower than a WQS calculated using the NOAEL of 5 mg/L. Under certain conditions, use of an UF of this magnitude might be warranted, however, in this case, use of such a large safety factor is unjustified for two fundamental reasons.

First, molybdenum is an essential micronutrient for plants and animals, including humans. The application of a zero threshold level concept (i.e., that to avoid any toxic effect, concentration of the constituent must be zero), is not supportable in the case of molybdenum. Reducing molybdenum intake below its essential level in humans will in itself cause a toxic effect due to deficiency of molybdenum. The State has not addressed this issue and has not defined the level of molybdenum in drinking water below which deficiency in humans will result. This should be done prior to adopting a WQS for molybdenum.

The second very important consideration in selecting an UF, is that it should be made clear that the work by Fungwe et.al., was one of a series of studies conducted at Texas Tech under the supervision of Dr. S. P. Yang. These studies were focused on the anti-carcinogenic effects of supplemental molybdenum. All of these studies under Dr. Yang are peer reviewed and readily available to DEP and, if required, LMC can supply copies of same. One of the very important and critical findings of these studies was that at 5 mg/L molybdenum supplemented in drinking water, the severity and incidence of induced cancer in mice and rats was significantly reduced. Coincidentally, this 5 mg/L

supplement level, which was found to be very beneficial in reduction of cancer, is the same level that Fungwe et.al., established as a NOAEL in his 1990 study. The obvious conclusion is that dividing this beneficial level found by Fungwe et.al., by 30 times to arrive at a calculated WQS would effectively eliminate the documented beneficial anti-carcinogenic effect of molybdenum which might be contained in drinking water. When the beneficial effect of molybdenum is taken into consideration, a lower UF is clearly justified. Further evaluation of the important positive interaction of molybdenum and animals is an additional reason to table this proposal until such time as the State is assured that the proposed drinking WQS is technically warranted and not detrimental to human health.

**2. Given The Extensive Information Which Documents That Molybdenum Has A Very Low Aquatic Toxicity, There Is No Reason Whatsoever To Calculate A WQS for Mo Limit At the Point Of Discharge---Instead, Assuming Any WQS is Appropriate At This Time Effluent Limitations Based on Such WQS Should Be Determined At The First Downstream Point Where Water Is Being Used As An Actual Source of Potable Water for Humans.**

Molybdenum compounds have been tested extensively to characterize toxicity in aquatic systems and have been found to exhibit very low levels of toxicity in general to both fish and macroinvertebrates (i.e., "bugs"). For example, Bionomics carried out acute toxicity testing of sodium molybdate on Rainbow Trout, Fathead Minnows, Channel Catfish, and Scud.<sup>1</sup> No effect concentrations<sup>2</sup> ranged from 2,400 mg/L for bluegill to 7,500 mg/L for Channel Catfish. One specie of water flea was studied, *Daphnia magna* and one specie of Scud was studied, *Gammarus fasciatus*. No effect concentrations were 1,800 mg/L for both the *Daphnia magna* and the *Gammurus fasciatus*. Based upon these results, it is clear that potential discharges from LMC under current BAT standards (30 mg/L monthly average), as contained in its existing NPDES permit, have not, and will not have, an acute impact on such aquatic life as may actually exist in Burgetts Fork, the stream into which its discharge will eventually flow. Of course, there is little such "life" to protect in Burgetts Fork because it is already highly polluted by non-point source discharges, including mine drainage from numerous abandoned mines in the Langeloth area.

In addition, Euras, an independent and well respected firm in the European Union with a specialty in aquatics toxicology, under contract to International Molybdenum Association ("IMOA"), has recently completed a detailed assessment of available studies relating to aquatic toxicity of molybdenum compounds.<sup>3</sup> Euras first analyzed each available study and determined whether it was of high or low quality in terms of peer review, data handling, test protocols, etc. Each study was ranked as Q1, Q2, or Q3 level of quality. Q1 rated studies were of the highest quality, whereas Q3 studies were flawed and should not be used in establishing applicable standards or guidelines. After reviewing the Q1 and Q2 studies, Euras subdivided the chronic toxicity studies by specie, Algae, Crustaceans, Amphibians, and Fish. The most sensitive aquatic specie identified was algae

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<sup>1</sup> Bionomics, Inc. 1973.

<sup>2</sup> 96 hour test duration

<sup>3</sup> Euras, April 2007.

(*Pseudokirchneriella subcapitata*)<sup>4</sup> which exhibited a No Observed Effect Concentration (NOEC) at 3.4 mg/L, while the least sensitive species was *O. mykiss* with a NOEC of 750 mg/L. These results are consistent with the Bionomics acute studies and confirm that under chronic conditions, the current LMC discharge will also not have a chronic adverse impact on aquatic life even assuming that its receiving stream could sustain a normal health and diversified aquatic population.

There is simply no reason to calculate an "in-stream" concentration for molybdenum at the point of discharge because there is no basis to conclude that aquatic life are at risk from exposure to this substance. Although LMC does not believe it is necessary to adopt any WQS for molybdenum to protect "human health," if DEP proceeds with this unnecessary rulemaking, all effluent limitations based upon such the WQS for molybdenum should be calculated at first point of "use," i.e., the first downstream location where water is being used as an actual source of public drinking water.

**4. The EQB Should table the rulemaking(s) At Least until the International Molybdenum Association ("IMOA") completes its ongoing research program On The Environmental Impacts Of Molybdenum.**

LMC is a founding member of IMOA, which is located in Brussels, Belgium. One of the major activities of IMOA is to support the Molybdenum Industry in developing a sound and robust data base concerning the potential environmental and health and safety impacts of molybdenum products on workers, the environment, and down stream users. A major regulatory driver for this effort was the enactment by the European Union of a comprehensive TSCA-like program known as Registration, Evaluation, and Assessment of Chemicals ("REACH"). This program requires registration of all chemicals either manufactured or imported into the EU in quantities of over one metric ton per year. All major molybdenum compounds fall within this program.

One of the requirements for registration is development of a Dossier for each substance that will be submitted within the next three years – by the third quarter of 2010. This Dossier will contain extensive data on the known environmental impacts to aquatic species, sediment species, soil and marine species. Human health effects will also be evaluated.

LMC recommends that the EQB table the proposed rulemaking on setting Mo water quality standards in drinking water until the IMOA research and development program is complete, and more extensive, high quality data is available from which to make a more informed decision. Though the DEP justification for their proposed drinking WQS for molybdenum suggests that an extensive data base was reviewed in support of the standard, and that the standard represents the culmination and consideration of many studies, the fact remains that only two studies, one in 1990 on rats, and the much criticized Armenian report in 1961, form the entire basis for the rulemaking(s). LMC believes that setting a state-wide

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<sup>4</sup> Rodriguez, 2007

standard on such limited and dated studies is clearly not in the interest of the citizens of Pennsylvania.

The IMOA's research will include detailed studies on the effects of molybdenum on aquatic species (impacts to algae and higher plants, invertebrates, and fish) in soil (impacts microbial processes, a variety of plant species, and several invertebrate species); and in sediments.

Equally complete will be studies and reviews to characterize human health exposures via pathways analysis and risks of exposure.

These evaluation programs are part of a multimillion dollar expenditure by the Molybdenum Industry, and are being carried under auspices of the IMOA Health, Safety and Environment Committee. These studies will provide the industry and regulatory agencies a robust data base upon which to base sound and defensible regulations. It is therefore, recommended that the EQB table any rulemaking related to molybdenum water quality criteria until such time as the above referenced studies are complete.

### **Summary of Continued Objections**

After reviewing supporting information provided by DEP, LMC submits the following summary of its objections to the proposed molybdenum rulemaking, which are derived from its earlier comments and the above supplemental comments:

- There is not a need to develop a statewide WQS for molybdenum in drinking water, nor has the State demonstrated any such need;
- Molybdenum is not a "toxic" substance and science has clearly shown molybdenum to be an essential micronutrient in plants, animals and humans;
- The methodology utilized by the Department to establish Uncertainty Factors (UF) for calculation of a health-based standard can be manipulated to achieve any desired outcome for a WQS and DEP's use of an UF of 30 in this instance is excessive and unjustifiable;
- LMC has operated under an NPDES from the DEP for the past 25 years, a permit that has provided for discharge of molybdenum of 30 mg/L (BAT monthly average) with no negative impacts noted by LMC or by the State in the drainage area into which LMC discharges its treated waste water;
- The rulemaking represents a gross misuse of State and private (LMC) resources by proposing to adopt a statewide standard, when the State has

not demonstrated a clear need for such a standard to deal with issues that can be addressed on a site specific, localized basis under the existing regulatory program;

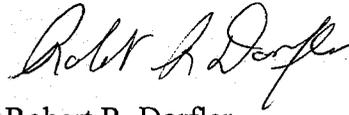
- The technical basis that might be support for the State's justification of a very restrictive in-stream molybdenum standard is very weak even as noted by EPA;
- The State has been made aware that there is not a technology available that will reduce molybdenum in its NPDES discharge to meet a WQS of 0.210 mg/L at the point of discharge;<sup>5</sup>
- Extensive information exists which demonstrates that aquatic toxicity is low for molybdenum;
- IMOA is engaged in a multi-million dollar research program to develop a more robust data base on the environmental and human health effects of molybdenum. This data should be available within three years. Given the paucity of current health related studies and the lack of any demonstrated historic negative impact associated with molybdenum in drinking water, the EQB would be fully justified in tabling this rulemaking until a more defensible data base is developed and a demonstrated need for such a standard is presented;
- The State's "Benefits, Costs and Compliance" discussion, Section F of the proposed rule, clearly shows that the State has not conducted any review or analysis of benefits versus costs, nor does the record suggest that any such review or analysis has been conducted.

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<sup>5</sup> In connection with a pending application to renew its NPDES Permit, LMC and DEP have investigated whether there exist technologies which can reduce the levels of Mo present in its effluent. Initially, DEP believed that an ion exchange treatment unit in use at another company's Washington County, Pennsylvania facility could be successful in reducing Mo concentrations (although not to levels sufficient to meet an in-stream water quality standard of .210 mg/L). However, after studying the effectiveness of the system, DEP eventually concluded that the system "showed little or no removal of molybdenum," and authorized Molycorp to suspend use of the treatment system being evaluated. LMC's own investigation of available treatment technologies also confirms that there exists no currently available technology which would remove Mo to levels sufficient to comply with the proposed in-stream standard.

If this standard is adopted, there will be a significant financial impact on LMC's ability to operate in Pennsylvania, and will place LMC in the untenable position of having to meet a discharge standard that is technologically not achievable given the state of current technology.

Respectfully submitted,



Robert R. Dorfler  
Vice President and General Manager

RD/la

cc: Senator Barry Stout, Representative Jesse White  
Tim Reed, Richard H. Shertzer, Gary Van Riper  
Himmel, Ondrejko, Smydo, Zofchak

