Technical Memorandum No. 3

MISSOULA ODOR CHARACTERIZATION STUDY

CORRECTIVE ACTION PLAN

City of Missoula

PREPARED BY: **Craig Henrikson, P.E. – Morrison-Maierle**
Bob Bowker, P.E. – Bowker & Associates, Inc.

REVIEWED BY: **Scott Murphy, P.E. – Morrison-Maierle**

DATE: Draft – November 13, 2009
Final – November 19, 2009

1. INTRODUCTION

This Technical Memorandum (TM) documents the proposed plans to mitigate odors at both the Missoula Wastewater Treatment Plant (WWTP) and EKO Compost site. This TM shall serve to outline the "corrective action plan" as required by the Administrative Order from the Missoula City-County Health Department issued on December 1, 2008. This TM is developed from the discussion and recommendations presented in *TM No. 2, Odor Identification and Evaluation*.

2. CORRECTIVE ACTION – SHORT TERM

As required in the Administrative Order, under section "Order to Take Corrective Action", 2 (C) Information Analysis, the following operational improvements have been made or are being made for immediate odor mitigation that does not require major investment:

Missoula WWTP

- **TWAS Tank Odor Mitigation**

  A pilot odor control unit was installed in early May, 2009 to treat odors from the thickened waste activated sludge (TWAS) tank. This unit is referred to in *TM No. 2* as the photoionization pilot unit. The results of this evaluation will be used to design and size a permanent odor control unit (or units) that will be used in the

longer term capital spending plan for odor mitigation. The pilot unit in service has provided approximately an 80 percent reduction in odors during the evaluation period from this source. Without this temporary unit in place, higher emission rates would have occurred during the summer of 2009.

- **Manhole Sealing**

  As part of the ambient odor survey work, a manhole on Davis and Wyoming was identified as a significant odor source in this area. This particular manhole has a large number of open holes in the lid and was sealed from below by WWTP staff to prevent odor leaks at this location. Figures 3 and 4 in *TM 2* document this work further. The City will continue to look for similar situations in the collection system and remedy them in similar ways, as possible.

  The City has sealed several manholes on the WWTP site that are connected to a drain line that directs liquid centrate from the Solids Handling Building to the Headworks.

EKO Compost

- **Pre-mix Piles**

  During the summer of 2009, the large pre-mix pile has been worked down, significantly reduced in volume, and this material put up into new aerobic piles. This effort has required additional labor and equipment at significant expense. EKO estimates they have reduced the size of their pre-mix piles by 50 percent from earlier in the year.

3. CORRECTIVE ACTION– LONG TERM

As required in the Administrative Order, under section "Order to Take Corrective Action", 2 (C) Information Analysis, the following capital improvement projects are planned that require major investment.

Missoula WWTP

The City is currently engaged in the design of a Headworks and Odor Control Improvement Project. This project will address the following project elements as it relates to the finding of this study:

- The existing Aerated Grit Chambers will be replaced with a vortex-type grit removal system. This will significantly reduce turbulence and off-gassing of the H_2S load from the WWTP.

- Active air collection and odorous air treatment is being incorporated into the new Headworks Building. Air will be collected from all odor-generating areas of the building, including the influent wet well, screenings room and grit/screenings storage

room, and directed to a new odor treatment system similar to the type pilot tested on the TWAS tank in the summer of 2009. This project will eliminate existing Headwork's building and influent wet well odor emissions.

- TWAS Tank Permanent Odor Control. A permanent odor control system will be designed and installed as part of this project.

- Solids Handling Building. Odor mitigation plans will be developed which will include minimizing the exhaust volume from the sludge auger and sludge conveyor. The foul exhaust air will likely be treated by the same odor control system installed for the TWAS Tank. The specifics of minimizing the air volume for treatment and ducting from this facility will necessitate further evaluation and design.

Schedule. The Headworks Project is scheduled for design completion in 2010 and construction during 2011 and 2012. A wastewater utility rate increase is necessary to provide funding for this project. A utility rate increase, in the amount of 5 percent/year for four years was passed by the City Council on November 9th, 2009 and will become effective January, 2010.

Based on the work completed as part of this odor characterization study, it is anticipated that more than 85 percent of the current WWTP odor emissions load will be addressed through changed management practice, new facilities, and odorous air containment and treatment discussed above and in *TM No. 2*. Emissions data collected during this study and used in dispersion modeling suggest that when these actions are taken, chronic off-site detection of odors originating from the WWTP will be significantly reduced. The primary issue of concern and unknown; stems from the fact that the Headsworks/Grit Chamber replacement will substantially change emissions location and rate potential and that future "downstream" emissions could increase. In particular, the emissions potential of the primary clarifiers could increase. Under current conditions, off-site migration of emissions from the primary clarifiers is not thought to be detectible. It is possible that this situation could change with dramatically lower emissions from the upstream grit chamber process, and thus more H_2S being present and available for off-gassing at the primary clarifiers. The City of Missoula plans additional evaluations as described below in order to better assess this situation.

Additional Evaluations. Pending the completion of the Headworks Upgrade Project, during the summer of 2012 the WWTP will develop a follow-up odor characterization and sampling plan to confirm new emission levels. This plan will focus on whether the elimination of the aerated grit chamber has resulted in increased off-gassing from the primary clarifier splitter structure and primary clarifier launders. A determination will be made as to whether odor control for these units could be needed to mitigate off-site odors. Additional downstream sources such as the bioreactors may also be retested to confirm odor emission rates from these sources. As needed, additional air collection and treatment capital improvements will be designed in 2012 and constructed in 2013.

EKO Compost

- Pre-mix Pile Management. EKO Compost will continue to work through the existing inventory of "old" pre-mix piles. Additionally, a new O&M plan will be developed and submitted for approval to Montana DEQ as operational changes are under their sole authority. The proposed O&M plan will address pre-mix pile inventory and also detail sludge handling during the winter which does require both green waste and pre-mix pile inventory in order to properly manage the sludge. These plans will help prevent the large surface area of piles from being a significant odor source.

- Aerobic Pile Biofilter Design. EKO Compost will develop an improved biofilter design to treat the exhaust from the aerobic compost piles. This design will incorporate appropriate contact times necessary to achieve odor mitigation. Consideration will be given to both a single large biofilter and smaller units and the alternative selected will be the one which provides EKO Compost the greatest flexibility and operational efficiency. EKO Compost will also consider in this evaluation, any biofilter design currently in operation at other EKO Compost sites.

Schedule. EKO Compost will submit to Montana DEQ for approval, new O&M procedures which address operational improvements targeting odor mitigation by June 1, 2010.

EKO will have in place (at least) a single temporary odor control unit for a portion of the aerobic compost piles to evaluate its' odor removal effectiveness by June 1, 2011. The exact details of this temporary unit will be developed as the decision is made to go with a single larger unit (s) or more numerous but smaller units. This will allow a full summer evaluation during 2011 which must include removal efficiency performance as part of this evaluation.

By June, 1, 2012, EKO will have in place a permanent odor control unit or units treating all aerobic compost piles on site. They shall also have adopted testing procedures to insure adequate removal efficiency.

City/EKO Compost Cooperative Actions

Study and evaluate options for controlling and mitigating odors from the sludge conveyor and sludge collection area. A joint recommendation should be put forward with a plan and schedule to address this odor source. The study and plan will be completed in 2012, with subsequent design and construction to occur thereafter.