MEMORANDUM

Date: April 25, 2008

To: Steve Gittings

From: Mike Barnes and Wyatt Troxel

Subject: Managed Asset Condition Problems at Transition Date
RWCF and Remote Pump Stations

GENERAL

Following is a description of the managed assets at the RWCF and remote pump stations that needed work as of March 1, 2008, the date of transition back to MUD operation and maintenance.

The description the work needed is based on site visits and reviews made by WBA, discussions with MUD staff, and information provided by MUD staff. This is not necessarily an all inclusive list of all work needed, but it does capture the major work needed. The work is listed by RWCF liquid treatment processes, RWCF solids treatment processes, and then the remote pump stations. After this, we have listed general issues that need to be resolved.

RWCF LIQUID TREATMENT PROCESSES

Influent (Head) Gates. The head gates are used to isolate flow entering the plant from the influent sewers. These gates are inoperable and need to be repaired or replaced. Because there is no way to isolate the influent flow, developing a flow management plan to allow the work to be done will require careful planning. Engineering analysis will likely be required. The analysis for this could be combined with the grit system repair vs. replace analysis. While this is not an immediate concern, this should be repaired in conjunction with other work needed in the headworks. The lighting in this area has failed, and should also be replaced when the work if done.

Bar Screen Rag Removal Conveyors. The conveyors that carry the rags removed by the screens to the disposal bin need to be repaired or replaced. Parts of the conveyor are missing, some rollers are inoperable, and some components are squeaking badly. If any of the conveyors fail, the plant will not have rag removal until repairs are made. Without rag removal, pumps are very susceptible to clogging, thus jepardizing the plant's ability to treat the wastewater in addition to increasing costs and taking away time to maintain other plant equipment. These should be repaired in the next two years.

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Headworks Butterfly Valves (gates). 11 large butterfly gates (greater than 36-inches) are used to isolate the influent bar screens and grit channels. These gates are very old and corroded and should be replaced, preferably with sluice or slide gates. Concrete repairs will likely be needed due to the corrosive environment. A flow control plan needs to be developed to isolate flow to allow the repairs to be made. Overall, this will be an expensive repair, and headworks replacement should be analyzed to see if it would be more cost-effective.

Since the grit channels should be inspected each year, the butterfly gates need to be operated each year, and need to be leak tight. They are not. One gate was propped closed with a 2 by 4 to keep the frame in place, which is very unsafe since it could fail and let wastewater into the channel while someone is working there.

These gates should be replaced within the next two years if MUD decides to keep the current grit system design.

Grit System Rehabilitation. The grit system is poorly designed, and based on past experience, will need almost continuous maintenance. MUD should consider completing a repair versus replace analysis to determine whether a completely new grit removal system or headworks would be more cost-effective.

The grit channels were repaired just prior to the Transition after three of the six failed in a recent storm event. One of the collectors was missing four flights but the unit could be placed in service in case of an emergency. The grit ejector system is in poor condition, and it needs operator attention to make sure it is operating. The Environment Monitoring Panel for the headworks is not operational. Steve, what panel is this?

There is severe corrosion on much of the equipment in the headworks. Most of the equipment in the headworks needs painting. More worrisome is that several steel floor plates have corroded to the extent that they appear on the verge of failure, thus creating a safety hazard.

Successful grit removal is important to preserve the reliability of downstream equipment, piping and processes. Also, it is generally more cost-effective to remove grit from the system rather than incur the extra wear and tear costs that the grit can cause downstream. Unfortunately, the grit system was out of service for over a year during the Service Contract, and based on recent data, it appears that the lack of grit removal is impacting downstream items as follows:

- Raw Sewage Discharge Piping. In the past two years, two holes have occurred in this piping. The hole in the replaced piping for Pump #4 is in a location that indicates that grit abrasion could have caused the hole.
- Digesters. Grit is evident in samples of digester sludge, even from locations 12 feet above grade. This decreases the available digester volume and reduces digestion effectiveness.
- Sludge Lagoon. Grit is evident in the sludge lagoon. The sludge in the lagoon is typically pumped to the sludge dewatering building prior to disposal using the dredge. However, the grit should be removed separately from this sludge since the dredge and dewatering equipment is not suitable for handling sludge with excessive grit.

Overall, MUD needs to make sure that the grit system is operable to preserve system reliability and maximize the cost-effectiveness of operations.

Raw Sewage Pump Discharge Piping. The discharge piping for raw sewage pump #2 has three holes in it, and can't be used until it's repaired. However, in the past two years, a section of the discharge piping for Pump #4 had to be replaced. Because of this, all the raw sewage discharge piping should be inspected/tested using ultrasonic testing to determine the extent of the problem, and review whether the leakage is due to corrosion, or extra abrasion that could have occurred when the grit system was inoperable recently. The plant cannot operate without the raw sewage pumps, and unexpected failure of the discharge piping would be catastrophic. These pipes need to be inspected immediately, and repaired as needed to prevent unexpected failures. Emergency repairs are scheduled to start the week of April 28, 2008.

Primary Clarifiers. Two primary clarifiers were out of service at the time of Transition, although one could be used in an emergency. One of the units can be used but the scum sprayers are still out of service. The other unit is still out of service. Maintenance staff have been unable to complete the repairs due to other higher priority repairs. What are the repairs needed?

Biotowers

1. The Bull Gear on the #6 biotower failed and the tower was out of service for three days for repairs. At the same time gear failures resulted in limited down time for the other two biotowers. The temporary repairs to the #6 tower failed on failed on March 21st and the unit has been OOS waiting for parts, which has a lead time of 5-6 weeks (note; the unit could be used via hydraulic rotation of the rotary distributors). As of April 8, 2008, the #6 tower is still OOS. When did the failure occur? Were similar failures occuring during the Service Contract?

2. The biotower pump station has been full of snail shells and grease (several feet thick) for several years, which has prevented automatic operations of the pumps because the debris causes the wet well level indicator to read incorrectly (It reads 0 feet in the wet well.) OMI tried to vactor out the debris with no success. An operational control scheme has been developed by Wyatt Troxel to facilitate the removal of existing shells and preventing future buildups. This has not yet been tried.

3. One of the Biotower pumps is out of service and with the supplier for a cost estimate for needed repairs (broken pump shaft). The bid(s) I have will need to go to City Council for approval due to the amount. I don't follow. Is the pump with the supplier awaiting for approval to proceed with the repair? Was this supplier the low bidder? Repair cost is $48 K (repaired) or $52 K for replacement of the pump which will come with a warranty. The City has assumed responsibility of the repairs, which occurred prior to the Transition (approximately a year ago).

Secondary Clarifiers. One of four of the secondary clarifiers was out of service due to failure of the ____ pump. Which pump? Return Sludge? Stores did not have replacement parts in stores the clarifier remained out of service between ___ and ____. On the Transition date the secondary clarifier had turned septic and needed constant pumping and refilling to thin the settled sludge in order to pump it to an adjoining secondary clarifier, and reduce odors. Same clarifier that was out of service?

The collector mechanism for Secondary Clarifier #1 needs to be painted. It may also need repairs prior to the painting. The extent of the repairs will be unknown until after the surface preparation. This will likely require engineering assistance to develop the biddable plans and specs. This process is a representative example of painting that is needed.

All four clarifiers are needed when the plant flow exceeds _____ mgd, which occurs _____. If the flow exceeds the clarifier capacity, then extra solids flow to the tertiary process, where the solids are more expensive to remove.

Ponds

Pond #1. The backwash water and DAF float have been directed strictly to Pond #1 for a few years now, creating a large buildup of solids in the pond. The east side has so much sludge that when the pond levels are at moderate levels, dried sludge with cat tail growth is visible. The impact on treatment capability is unknown at this time However, the build up of solids could begin to present an odor problem, or worse a breeding area for mosquitos.

Many valve platforms on the ponds have deteriorated to the point that some have collapsed. In addition, the bridge over the re-circulating channel is unsafe due to collapsing wood.

Enhanced Wetlands. The enhanced wetlands were not maintained in accordance with the ____ during the Service Contract. In addition, there may be some design flaws that are contributing to maintenance issues. Consequently, MUD now has the following maintenance issues to resolve.

- There is continuous short circuiting around both the north and south wetland ponds. Staff reports that they are unable to get the design flow through the wetlands without overflowing, and that the overflowing causes the short circuiting. The overflowing has also “irrigated” unintended areas, thus causing vegetation growth which has increased the potential for mosquito development.
- Weeds are very thick around the perimeter of both wetlands, and were not sufficiently addressed during the Service Contract.
- There was no thinning of the wetlands last fall which has caused additional short circuiting. The vegetation growth has “fallen” over and has covered portions of water, which increases mosquito breeding areas. due to the dead brush covering pockets of water that had formed due to flows outside of the normal wetlands flow scheme.
- No viable Vector Control Program was provided to MUD staff prior to Transition.
- The road dividing the north and south wetlands is severely eroding away at one location.

It cannot be shown that the above issues are directly impacting the treatment capacity of the wetlands. However, they should be addressed in the very near future to reduce the potential for mosquito development. Addressing these issues sooner than later should also reduce the long term maintenance costs for the wetlands.

Nitrofying Biotowers (NBT). The standby? NBT pump has not worked continuously since WW-39 came on line. The pump failed in June 2006 and was rewired but has not worked for more than approximately 2.5 hours of continuous run time before overheating and tripping. The pump has approximately 20 total hours of run time. Without this pump (the only standby unit) plant capacity would drop to 25 MGD and flow only allows one NBT to stay on line. This limits plant capacity to 25 MGD and the current influent flow is 36 MGD and effluent flow averages 35 MGD. Confirm number of NBT pumps. Only two pumps?

During the week of April 14th the unit has become operational. MUD staff will have an outside evaluation of both the AFD and motor to determine long term reliability.

72-inch DAF Influent Pipe. The 72" filter (DAF?) influent line has been leaking since the NBT bypass line was tied into the structure. Video inspections in 2007 showed separation of the pipe joints but OMI did not make the necessary repairs. The leak on this pipe needs to be designed and permanently repaired. Steve, it seems like the repairs below are temporary. Is this the intent?

a. MUD staff is in the process of obtaining a contractor that will re-caulk the leaking pipe joints.
b. Repairs to the 72" DAF line are now scheduled for completion the week of May 5, 2008.

DAF Rehabilitation. Two of the DAF's need new collector mechanisms and concrete repairs. The other two need somewhat less work. Two DAFs should be repaired this year, although which two should be reviewed. Fermin reports that #4 is completely inoperable. #2 is currently out of service and needs work, but may be operable if needed. #1 and #3 are operating now, but also need work. 2 DAFs are adequate for operations in the winter, but three are needed for the summer. The failure of two of the DAFs is immenient. Failure would increase the loading on the tertiary filters, which greatly increases the likelihood of a permit violation due to turbidity.

One of the four (4) DAFs is OOS and one of the two existing in service units regularly goes off line due to a failure of the shear pin.

Chlorine Contact Channel.

- The CCC was not set up for washing and MUD staff has devised an operational scheme to allowing hosing of the structure with Title 22 Water.
- The CCC walls have leaked ever since the wall height was increased. Contractors have been on site many times for grout pressure injection to stop side wall and joint leaks. Grouting early this year seems to have considerable slowed any leaking and the area around the CCC has dried up. It's unknown how these repairs will perform over time.

- The CCC leaks were so bad that a French Drain System was installed to divert leaks back through the process and prevent localized flooding. This will potentially require continual maintenance.
- Carollo determined that the walls do not meet seismic requirements for the 07 Building Code.

Sulfur Dioxide Storage Tank. The new SO2 tank was commissioned the first part of April 2008. Steve, any negative impact from this? If not, then I don't suggest we list.

Ammonia Analyzer. The Ammonia Analyzer has never operated correctly since it was installed at the SO2 building. The negative consequences of this are_____.

Sludge Thickener #1. Replace the collector mechanism and make concrete repairs. The collection mechanism will take 4-6 months to procure. Will then need field painting. This will require biddable plans and specs to complete the work. With current operations, the thickener is needed to preserve digester capacity.

Gravity Belt Thickener. It has a partially plugged discharge line at the time of Transition. It appears to be an accumulation of grease (possible struvite).

Digester Cleaning. Digesters 4 and 5 are over ten years old and have never been cleaned. Furthermore, the grit system was inoperable for over a year, which likely added grit to the debris within needing removal. Taking a digester out of service presents a capacity problem because both digesters are needed at all times, and there is no standby capacity, so this needs to be carefully planned. It's conceivable that one of the older digesters would need to be rehabilated and placed into service to ensure that sufficient digester capacity is available while each digester is cleaned. An engineering and operations analsis will likely be needed. If one of the older digesters needs to be rehabilitated, then this digester could potentially be used as a secondary digester, which could eliminate the need for the sludge lagoon. This approach would also make it easier to control sludge dewatering. Operations staff reports that they have cleaned Digester C, and that it would be the least expensive digester to rehab. It would need a new mixing system and a new sludge recirculation pump. In addition, the digester gas pressure capability of Digester C must be reviewed to make sure that it can work with the pressure of the digester gas system.

Loss of digester capacity will mean that the sludge cannot be stabilized, which is ultimately necessary for landfill disposal. Failure to completely stabilize the sludge also leads to unsafe, hazardous conditions in the dewatering process, where digester gas will be produced in an environment that is not designed for this. Loss of digester capacity also means that less digester gas will be available to produce energy for the plant, thus increasing energy costs. It's difficult to predict when the digester capacity will decrease, although it's likely to happen soon. However, if it occurs unexpectedly, it will cause the above mentioned problem, and take months to fix. Overall, will cost more and cause safety problems if not corrected in a planned fashion.

Digester Roof Inspection. The insulation on the roofs of Digesters 4 and 5 has failed. If the covers are concrete, then the insulation would not necessarily need to be replaced. An engineering analysis could determine the cost-effectiveness of this. If the digester covers are steel, then repairs will likely be needed to repair corrosion damage that may have occurred due to the failed insulation. This inspection needs to be completed immediately to determine the extent of the problem. If a digester roof fails, it will take months to make temporary repairs. If damage is extensive, it will take years to replace the cover.

Digester System Inspections. All steel components in contact with digester gas are subject to corrosion. If the corrosion results in leaks, then an unsafe, potentially explosive environment would exist. A firm specializing in ultrasonic testing of steel should be retained to inspect and test the digester gas piping, waste gas burner, digester gas storage tank, and digester covers if they are steel.

Dredge (Pit Hog). At the Transition date of Saturday, March 1, 2008, the dredge (Pit Hog) was still out of service. On Tuesday afternoon, March 4, 2008, staff had the Pit Hog back in service and dewatering operations was restarted. Since the Pit Hog is the only method to withdraw sludge from the lagoon, it needs to be available all days that sludge dewatering is needed, which is all normal work days. A repair versus replace analysis is needed to detemine the most cost-effective method to get the dredge in a condition so that it will be available to meet dewatering needs.

Sludge Lagoon. The sludge lagoon has not been pumped down for several years, approximately 5-6 years per John Sigman (dredge Operator / Mechanic) due to staff shortages even prior to the OMI transition due to Operators leaving and to equipment failure with either the Belt Press or the dredge.

On March 1, 2008, the **lagoon** was full and decanting into the primaries, which had turned black due to the recycled digested sludge entering the primaries. During the first part of March the effluent TSS started to rise possible due to the month down time for solids dewatering.

In addition, there is a large accumulation of grit in the lagoon due to the grit system being down for over a year during the Service Contract. The North Side of the sludge lagoon was almost full of solids and grit just prior to the Transition.

Finally, geotubes were left by OMI in the old sludge lagoon for MUD staff to remove. An rough cost estimate to remove is $150K.

Painting. The plant needs extensive painting. No general plant painting was completed during the extent of the Service Contract. It will take an extensive work effort to catch up on painting, and outside contractors will be needed to complete this effort. Engineering assistance will be needed to develop biddable contract documents to define the scope of work and include technical specifications. Work can only be done in the dry weather season, so the contract documents would need to be completed as soon as possible to be ready for 2008. While painting can be

delayed, regulators and others have used plant appearance as an indicator of the condition of the plant. Until appearance is improved, the plant will be perceived to be in poor condition even after improvements are made to the equipment. In addition, delaying painting increases the potential for more costly future repairs due to equipment degradation.

Cathodic Protection. JDH Consultants recommended $152,000 of repairs to the cathodic protection system as documented in the Independent Evaluator Report. This is specialty work that few firms can complete. While the work could be bid, it may be better to select via a RFP process, assuming it can be called a service contract. Engineering assistance would be needed if the maintenance staff cannot develop the contract and manage the work. If this work is not completed soon, the metallic pipelines and other assets being protected will corrode, and eventually failure due to corrosion. This is particularly serious where a single pipeline is carrying flow. An example is the river crossing, which would be a catatrophic failure since it would result in an immediate permit violation.

Scum Dewatering Structure. This structure needs to be replaced. Engineering assistance would be needed if the maintenance staff cannot develop the contract and manage the work. This structure is desirable because it removes water from scum prior to discharge into the digesters, thus preserving digester capacity.

Cogen Enginer #1. This engine needs to be rebuilt, and was not operating at the Transition date. (It cannot meet emissions requirements when running on digester gas; it can only run on natural gas and still meet emissions requirements.) Fermin reports that MUD incurs an extra monthly demand charge of $12,000 during the summer months when this is inoperable. This does not include the added electricity usage cost. MUD is currently seeking proposals for rebuilding this engine/generator.

Emergency Generator (Black Start). The Black Start diesel engine has a leaking radiator that has been leaking prior to the Transition. No efforts were expended to make any permanent repairs. MUD staff is in the process of obtaining quotes for a new radiator and rental fees for a temporary Black Start engine (emergency power).

OUTLYING FACILITIES

1. Somerset Storm Station – Needs a second pump installed as originally discussed since the installation of the new subdivision. Currently, there is only one pump.
2. Mission & Del Rio Sanitary Pump Station – OMI replaced the original 4" pump with a 3" pump suspended by a cable. Should have a back-up pump since ragging and/or pump failure of this lone pump could result in SSOs.
3. I-5 & Brookside Sanitary Pump Station – Need to purchase a back-up pump to allow rebuilding of #2 RSP that is in need of a rebuild. Currently, there are only two pumps and both need to be on line.
    a. Staffing has purchased another pump that has just arrived. When installed the #2 RSP" will be sent out for rebuilding.
4. Blossom Sanitary Pump Station – Needs chemical feed station due to heavy grease build-up in the sump.

5. Don Avenue Sanitary; Thorton; and Davis Sanitary Pump Stations – These are small canned pump stations that have severe corrosion and new to be rebuilt and/or redesigned due to safety and reliability concerns.

6. The force main Air Release Valves (ARVs) were never cleaned during the life of the contract.
    c. The City is seeking a contractor to assist MUD staff with the cleanings.
    d. OMI provided an inspection report that the vales were not leaking but never had them cleaned during the term of the Service Contract.
    e. Regional Board staff want the ARVs removed, cleaned and repaired/replaced not just inspected that they are in place and not leaking.

General Issues

1. The Avantis CMMS is still not functional on a practical basis the PM's need to be organized to match the actual plant equipment.
    a. A valve exercise PM listing needs to be developed.

2. Stores has been depleted to such an extent that when Maintenance staff needs repair parts (such as the failed secondary clarifier pump) it requires several weeks in lead time to obtain the necessary repair parts. The #6 biotower bull gear is another example of needing spare parts that require long lead times but the equipment is not readily available.

3. Some of the safety programs are not current (PSM is one and I will look for some other examples).
    a. Operations did not have any personnel trained on the 40-hr HAZWOPER at the time of the transition.

4. **The SOPs** need updating and the ones for the Tertiary Plant need to be developed. Some of the safety manuals are out of date, such as the PSM. The reason it was left uncompleted as per OMI was to include the new SO2 and Chlorine systems.
    a. The O&M Manual is outdated but a draft has been submitted by OMI shortly after Transition for staff review.

    f. The Environmental Monitoring Panel for the Odor Control Building are not working right or at all. Is this the control panel for the odor control system?