



Biosolids EMS Internal Audit Report

Camden County Municipal Utilities Authority
Camden, New Jersey

Audit Report Date: January 14, 2014

Audit Conducted by:

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Audit Dates: August 9, 14 and 15, 2013

Audit Report Prepared by: Janet Miles, Douglas Burns and Chris Waldron

1. SUMMARY

The CCMUA conducted an internal audit of its Environmental Management System on August 9, 14 and 15, 2013. The focus of the audit was the new Sludge Drying Facility, response to odor complaints and two minor nonconformances from the 2012 interim audit.

The audit identified two strengths including CCMUA's significant reduction in the volume of biosolids generated at the wastewater treatment plant. The audit found that CCMUA is fundamentally meeting the Biosolids Management Policy with some exceptions, specifically there was one item needing correction and one opportunity for improvement. A corrective action plan has been developed for the item needing correction. The opportunity for improvement will be considered during the annual Management Review meeting.

2. SUMMARY OF AUDIT FINDINGS

The internal audit identified a number of strengths in CCMUA's program, one finding needing correction and one opportunity for improvement which are summarized in detail below. Corrective action plans have been developed for the items needing correction. The opportunity for improvement will be evaluated during the annual Management Review meeting.

A. EMS Strengths

1. CCMUA has reduced the volume of biosolids generated at the wastewater treatment plant by 75%. CCMUA's production of biosolids has decreased from 160 tons per day to 40 tons per day, thereby reducing disposal costs.
2. Odors have been significantly reduced as a result of the operation of the Sludge Drying Facility. The reduction of odors is due to the decrease in the quantity of trucks hauling biosolids within and from the CCMUA plant (from 7 trucks per day to 1-2 trucks per day). In addition, the dried biosolids have significantly less odor potential than untreated dewatered biosolids and are hauled out of the facility in one of two types of enclosed trucks.

B. Findings Needing Correction

1. Improve communication between CCMUA Management staff and EMS team. The EMS team was not notified of the odor complaints beginning in May, 2013 and the ongoing investigation of odor source and corrective actions until August.

C. Opportunities for Improvement

1. Procedure for Spilled Polymer. As a matter of good housekeeping, the polymer should be cleaned up when spilled. The supervisor should be notified and the polymer cleaned up by the end of the shift.

3. AUDIT DETAILS

Audit Scope and Methodology

The Executive Director, Andrew Kricun, selected three individuals as Internal Auditors that are not directly involved in the day-to-day operation of the plant - two CCMUA staff members and a consulting engineer, DB/Guarino Engineers. The Auditors were qualified to conduct the audit because they are familiar with the facility and the treatment process and they were approved by the CCMUA Executive Director.

The internal audit consisted of interviews with CCMUA staff, representative of Synagro, the contract operator for the Sludge Dryers and the CCMUA's consulting engineer. The following is a list of the individuals interviewed:

Andrew Kricun, Executive Director/Chief Engineer,
Robert Cornforth, Director of Operations and Maintenance
Jack Connolly, Assistant Director of Operations and Maintenance
Alan Parry, Site Manager, Synagro
Gayle Pagano, Regulatory Compliance Officer
Steve Foster, Operator
Oleg Zonis, DB/Guarino Engineers

Following the interview with Alan Parry, the Auditors went to Synagro's office at the Sludge Drying Facility to review their records. The Auditors also toured the areas in the plant where there were previous non conformances, included the Dewatering Building and Gravity Belt Thickener Room. The Auditors later toured the silo area, truck loading facility and the emission stack, all at the Sludge Drying Facility.

Records reviewed included:

- Synagro's daily shift log containing operational data, start and stop time; hourly dryer temperature log; scale readings every hour
- Log, spreadsheet, email of daily Hydrogen Sulfide (H₂S) readings, odor control and plant parameters.
- CCMUA's daily spreadsheet containing process control data from the lab and shared with the operations department.
- The O&M Manuals for Sludge Dryer
- Air Permits for the Biofilter and the Sludge Dryer
- Safety and training records
- Synagro's SOP's for operating the Sludge Drying Facility

The following operational controls were verified during the audit:

- Every shift a CCMUA operator contacts Synagro to provide daily operational data needed for the sludge dryer operation.
 - It is understood that both CCMUA and Synagro will notify each other immediately if there is a problem or emergency.
 - Alan Parry or a designated operator from Synagro attends CCMUA's "Morning Meetings" as another method to communicate information. Attendance by Synagro at these meetings has improved and is now satisfactory.
 - The SOP entitled "Coordination with Synagro" now reflects CCMUA's procedure for providing daily information and coordination with Synagro and procedures for the transfer of dewatered sludge cake to the Sludge Drying Facility.
 - In response to the failure of the biofilter and carbon filter at the Sludge Drying Facility from May, 2013 through July, 2013, Synagro has implemented numerous changes to their sampling and reporting to CCMUA. Formerly, Synagro reported verbally to CCMUA if the carbon stack was within permit limits (<5 ppm). Synagro's sampling and reporting changed in August to include monitoring the Biofilter inlet and outlet, Carbon Seabox Outlet and Old Carbon inlet and Stack and recording the numbers in a new spreadsheet. The odor control readings and plant parameters are emailed to CCMUA staff each morning.
 - At the time of the audit one of the three dryers was out of service, Synagro was processing almost 100% of CCMUA's dewatered cake with two dryers. CCMUA trucks hauled dewater sludge to ACUA for disposal in the incinerator and other sites. When CCMUA's contract with Synagro becomes effective, Synagro will be responsible for disposal of the dewatered sludge cake.
 - Sampling and analysis of dried product is conducted to demonstrate compliance with applicable standards. CCMUA supplies sample collection bags and instructions with collection dates to Synagro at the beginning of every month. Synagro delivers the samples to CCMUA laboratory when completed.
 - Trucking manifests for the dried product are supplied to CCMUA so they can be entered into their computer system for regulatory reporting. The dried product is either delivered to Lehigh Cement for beneficial reuse (fuel for kiln) or to Waste Management's Landfills, Grows / Tulleytown, PA. This is considered one facility with two separate entrances, hence, one final destination for the waste which was confirmed by Jeff Wilson, Sludge Distribution Coordinator and Woody Minner, Coordinator of Safety Programs, CCMUA when they both visited the facility on 8/28/2013.
 - The totes containing odorous "nuggets" which had been stored in the basement of the Sludge Drying Facility and was observed during last year's audit were relocated to the Sludge Storage Building for further
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disposal. These were stored until recently when the de-lumper was returned to service. Totes were a noted source of odor in the building. The de-lumper was taken out of service last year due to a possible ignition problem. The de-lumper is now fixed and reinstated downstream of a new screening system. A new fire suppression equipment was also installed to monitor the screening and de-lumper equipment for any sparks and automatic fire suppression, in case sparks were detected. Training on the new equipment and procedures has been completed.

- An average of one truck leaves the Synagro facility each day. The trucks are sealed with tarps, reducing potential of odors from trucks through the neighborhood. Synagro instructed their haulers to exit the CCMUA plant via the back gate, due to the fact that the trucks cannot clear the rail bridge at the front entrance. The trucks follow the trucking route south to Morgan Blvd.
- CCMUA has conducted the annual inspections of its two biosolids contractors to verify compliance with the EMS and their contract with the Authority. Jeff Wilson and Woody Minner both visited the GROWS North Landfill and Tullytown Resource Recovery Facility on 8/28/2013. Photos of the site and a copy of their Solid Waste Disposal permit were obtained. This is considered one facility with two separate entrances, one final destination for the waste. Jeff Wilson and Woody Minner also both visited the Lehigh Cement Facility on 8/23/2013. They followed the waste hauling truck in their vehicle from our treatment plant to the Lehigh Site. A copy of the Lehigh Cement Facility Permit to Construct and Bio-Solids System Operation & Dust Controls was obtained. Photos of the facility were taken during their tour.

A. Odor Complaints

CCMUA began receiving odor complaints in May, 2013. The complaints were received directly by Andy Kricun, Executive Director. He contacted the person making the complaint and followed up with O&M staff. When the complaints began, the odor could not be detected at the plant. Documentation of the complaints are contained in the May, 2013 EMS Report. The staff was not able to track the complaints back to any source at the treatment plant. Specifically all of the odor control systems were reported as working, no doors were left open or anything else that would suggest odor emissions from the treatment plant. A meeting was held with CCMUA's O&M Department, Synagro and D&B to look for possible odor sources. Camp, Dresser and McKee, CCMUA's odor control consultant was called out to the plant site to conduct updated odor survey at the plant and beyond the plant's boundaries. This survey took place on June 11 and 12, 2013.

CDM's full odor report determined that there were three problems at the treatment plant that contributed to odors. These problems are summarized as follows:

1) Sludge dryer. The sludge dryer facility has two odor control systems that work in series, a biofilter followed by a carbon filter. CDM has reported that the biofilter is designed to receive a maximum of 25 parts per million (ppm) of hydrogen sulfide and other odorous compounds. CDM took stack measurements at the Biofilter and the carbon filter at the Sludge Drying Facility. CDM measured high concentrations of hydrogen sulfide at the carbon filter. It was discovered that the numbers used for design of the Biofilter and laboratory samples of existing drying equipment were misinterpreted leading to an under-designed system. This was not discovered right away because the second odor control system, the carbon filter, worked “extra duty” to handle the odors, thus shortening the life of the system and leading to unexpected odor discharges (the design life was 5 years but actual useful life was < 2 years). CDM discovered that the carbon filter had reached its useful capacity and needed to be replaced immediately. This problem is the main source (70%, according to CDM) of the odors coming from the plant and explains the sharp increase in odor incidents and complaints. The problem was exacerbated by the recent success of the sludge dryer (more sludge going into the system than before, so more odors to treat).

From May through June, Synagro reported verbally that the stack readings were within permit limits (5ppm). In July, Synagro noted that the stack readings began increasing from 0.01 ppm to 2 ppm hydrogen sulfide. Elevated H₂S readings taken by Synagro were not initially reported to the Authority Management because Synagro did not find it necessary since they were still within permit limits. Synagro now submits a daily email to CCMUA staff with odor control readings and plant parameters.

The Authority had replaced the permanent carbon filter in September. The permanent solution is to also supplement the under designed biofilter with a bio trickling filter to meet the removal requirements of the sludge dryer facility. The Authority has requested a quote for the bio trickling filter and has been ordered and is being constructed. The estimated start time for the bio trickling filter is the end of November. In the meantime, a temporary carbon filter was installed downstream of the biofilter to reduce hydrogen sulfide loading to the main carbon filter. Synagro has been directed to add water upstream to damp down the hydrogen sulfide as a temporary, manual, method of abating the odors.

2) Sludge handling facilities. The CCMUA installed a biofilter to treat the odors from the Sludge Storage and Handling facilities. That has worked very well for the three years it has been in operation. However, CDM identified it as the source of 20% of the odors from the plant. The manufacturer (Bay Products) has been called in to do an inspection of the system. The inspection showed that the biofilters were not a source of the odors. The further review of CDM’s report by both the manufacturer and engineer pointed out potential error in the calculations in the CDM report was noted. The manufacturer also offered additional improvement to its system to increase the effectiveness of the system beyond the original design parameters. These improvements are being implemented by both the manufacturer and O&M staff.

3) Miscellaneous.

- a) CDM noted that the door to the sludge storage building had been damaged and did not close with a complete seal. Our O+M staff was aware of that and had ordered a repair. That repair has since been accomplished. In addition, CDM noted that the exhaust to one of the ventilation systems was clogged. That has also since been corrected by our O+M Department.
- b) A temporary carbon filter has been installed to make up for the failed system. This restored the odor control system to its former high level of performance, less than one part per million of hydrogen sulfide going out the stack. A new permanent carbon system plus an additional bio scrubber are being installed to ensure that this problem does not recur.
- c) A more vigorous daily reporting regiment, both from the O+M Department and Synagro, has been implemented. This is to make sure that all of the important sludge processing and odor control parameters are continuously monitored by the Executive Director, O&M and Synagro, so the problem will not occur.

B. Reviewed Corrective Actions Taken on Previous Nonconformances

The Auditors conducted a tour of the areas of the Dewatering Building and Gravity Belt Thickener Room where previous nonconformances were noted. The tour was led by the CCMUA Safety Director, Woody Minner.

The following was verified during the audit:

- The Auditors visited the GBT area and noted that the GBT doors were closed on all three GBTs (#2 was operating). The area was in good condition, no housekeeping issues were noted.
- Nonconformance (Item #2 on the Internal Audit Report) was identified during the August 21/22, 2012 Biosolids EMS Internal Audit. The Auditors had identified that Synagro has stored solid material “nuggets” in totes in the basement of the Sludge Drying Facility due to a piece of equipment being down (de-lumper). Totes are a noted odor source in the Sludge Drying Facility. The de-lumper is now fixed; new fire suppression equipment is in place. Training on the new equipment and procedures has been completed. The totes have been eliminated.
- Minor nonconformance (JS 12-02/11) identified during the September 6, 2012 Interim Audit. The Auditor identified that the Emergency plans being used by Synagro for their operation in the wastewater plant have not been coordinated with CCMUA Emergency Plans in the plant. The NBP EMS Element 11 requires the organization to require contractors to establish and maintain emergency preparedness and response plans and procedures. Synagro's Emergency Response Plan has been added to the

Authority's Emergency Response Plan. The CCMUA's Emergency Response Plan is currently being updated to further incorporate Synagro's ERP. On 8/30/2013, the Synagro staff conducted an emergency evacuation drill of the sludge dryer site. A report of the drill has been received by the auditors.

- Minor nonconformance (JS 12-04/16) identified during the September 6 2012 Interim Audit. The Auditor identified that the CCMUA has not conducted an onsite assessment of the use of their biosolids and consistency with their Biosolids Policy at the Lehigh Cement facility. On 8/23/2013 CCMUA staff visited the Lehigh Cement facility to conduct an onsite assessment of their operation in an effort to meet the biosolids management policy.

C. Complaint about Polymer Spill.

A complaint was received from a staff member concerning spills of polymer. It was described as a safety issue since the polymer is slippery and can cause a fall.

The Auditors visited the polymer storage areas and the Press Room. The Press Room was being hosed down during the Auditors visit. It had wet floors and appeared to be slippery during the course of normal operation. The polymer is very slippery when spilled. New materials and new surfaces for the areas have been tried in the past and were ruled out as not an effective improvement. There were reports that the polymer is difficult to clean up and may be just left in place for others to clean up.