

Biosolids Management Program Performance Report

Appendix 15A – MSD’s Environmental Management System

Document #: 15002

Report Date: 4/10/2009

Approved by: Alex Novak, Operations Manager (Morris Forman Water Quality Treatment Center)

Introduction

MSD’s Biosolids Core Team consists of managers and administrators throughout the biosolids value chain from pretreatment to land application. This report summarizes performance and progress of MSD’s Biosolids Program in 2008. The last report of this kind was issued in March 2008. The Biosolids Management Program Performance Reports can be accessed at the following location.

W:\DATA\EMS\EMS Manual\5. Improvement and Communication E5,E6,E9,E14,E15,E16\
Biosolids Management Program Performance Reports

Biosolids Summary Information and Sales Agent Performance

The Monthly Solids Summary is used to track where the finished product, Louisville Green and any other biosolids such as wet cake, are distributed or land-filled.

The detailed summary is located at the address below.

W:\DATA\EMS\EMS Manual\4. Compliance E4\Annual Summaries\2008 Monthly Solids Summary

Year	Beneficial Reuse (tons)	Landfilled (tons)	% of Material Beneficially Reused	% of Marketable Material Distributed
2006	17,522(1,460mo avg)	10,413(868 mo.avg)	62.7	72.7
2007	24,360(2,030mo avg)	4,549(379 mo.avg)	84.3	94.2
2008	24,345(2,029mo avg)	3,629(302 mo.avg)	87.0	100

The difference between material beneficially reused and the marketable quality material distributed is product which is cleaned out of the process but still meets Exceptional Quality standards. Our sales agent is capturing this material in a waste lugger and distributing it in lieu of sending it to the landfill. In addition, newly machined crushers are proving to greatly enhance the operators ability to control recycle bin levels and to avoid the need for process vactoring/cleaning. In rare instances when product has not met state and federal requirements, the material has been land-filled.

Hazardous Materials and Pretreatment Program

The pretreatment program issues an annual program performance report to state and federal authorities every year as part of their regulatory requirements. The report is due on March 1st of each year. Copies of the report are available for 2008, and may be requested through the pretreatment administrator.

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Actions Taken as a Result of Input from "Interested Parties"

#1 General Public

Odor complaints from customers using Louisville Green have been non-existent in the last year, as this was not the case in years previous. This is largely due to better operation of dewatering and drying. Customers are very satisfied with product quality; however, dust in bulk loads is complained about periodically due to lack of oil on the product. Maintenance has installed a control dial to regulate oil flow. The truck loader can now see the oil delivery rate while loading and make adjustments to deliver more or less oil depending on the situation.

#2 Process Operators

An operator focus group met for approximately 18 months. The notes from these meetings were condensed into a current agenda dated May 5, 2007. The meetings were prior to this date. The three (3) items of particular interest to the operators were as follows:

Training, Communication, Dust Control (not necessarily in that order).

Conscious effort has been made to incorporate the operator's concerns into program goals and objectives that are consistently worked towards. See Progress Towards Goals and Objectives in this report.

In addition, Training and Communication approaches in critical areas are being investigated; so that, we can develop an approach that will best serve our needs. This has led us to look hard at our resources and to ask the question, "What is the best approach?" Involvement from our process supervisors, to provide SOP trainings to their individual people, is expected in the future. This will allow management staff more time to focus on developing the SOP's and keeping them current and allows the supervisors to implement them in the critical areas to meet their needs.

#3 Sales Agent, Farmers, and Fertilizer Blenders

Over the last two years, fertilizer blenders and farmers have expressed to our sales agent the need for the product to be dry and uniform. As a result, premium specifications of (94-96)% dry solids and a capture of 65% between to screens (1.7mm to 2.7mm) has been implemented and realized. **All product manufactured meets federal Class A and Exceptional Quality Standards (90% dry).** Approximately (70-80)% of the product manufactured meets the premium specifications.

Some farmers and blenders in particular who store the product voiced the desire for the product to be a minimum of 94.0% dry solids; so that, they can be comfortable storing it. The summer of 2006, we had problems with silos temps getting to 180degF which is cause for alarm. More accurate dry solids equipment was purchased. This allowed the operator to control the process much better allowing the operators to keep the material above 94.0% dry solids much easier than it had been in the past. In the summer of 2007, the silos averaged approximately 100 degF. This was a significant improvement for us as well as the end users who want to store it. In the latter portion of 2007 and in 2008, silo temperatures were not a problem of concern.

In 2009, specifications may be changed to a smaller size. Our sales agent and several customers believe that more of the 5-3-0 guaranteed nutrients will be delivered in the first year by making the product smaller and easier to break down. The customers will have to decide whether or not the faster nutrient delivery is worth the increased effort to spread the material.

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Public Participation

A list of all “interested parties” (Appendix 6A), procedures defining our public participation and communication program (Elements 6 and 9), and a record of public input and inquiries (Appendix 9A) are located at the following location.

W:\DATA\EMS\EMS Manual\5. Improvement and Communication E5,E6,E9,E14,E15,E16

Minutes/notes from related meetings are located at the same location.

Regulatory Compliance

All permit parameters for Louisville Green distributed for land application have been within State and Federal limits throughout 2008. Nickel in the product exceeded federal limits in November 2008 for about two weeks; however, the out of compliance product was tracked and landfilled appropriately before resuming distribution. Please see the document, **Louisville Green Data 2007 thru 2008**, for daily information concerning product compliance. It is located at the following address.

W:\DATA\EMS\EMS Manual\4. Compliance E4\Louisville Green - 503 Compliance Data

Morris Forman Laboratory

The MFWTP Laboratory performs the analyses for Louisville Green and all regulatory requirement analytical services for the following programs: KPDES, Pretreatment and Compliance, and MS4 Permit. In addition, it provides technical support and analyses for the Consent Decree Program. In 2008, the laboratory performed \$1.9 M of analytical services.

Laboratory Services has an extensive QA Program. The Data Quality System follows the criteria for the National Environmental Laboratory Accreditation Conference (NELAC). It participates in several Proficiency Testing Programs. Below, is the lab’s performance for the State and Federal required Discharge Monitoring Requirements Quality Assurance Program. The summary provides the acceptable performance percentages from 2005-2008.

Year	DMR QA	Total Points	Acceptable	Not Acceptable	Pass %
2008	#28	48	39	4	91.67%
2007	#27	45	40	1	97.78%
2006	#26	43	37	1	97.67%
2005	#25	29	23	1	96.55%
Totals		165	139	7	95.76%

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Progress Towards Goals and Objectives

Goals and Objectives as well as minutes from the weekly meetings are located at this address.

W:\DATA\EMS\EMS Manual\5. Improvement and Communication E5,E6,E9,E14,E15,E16\Meetings and Internal Communication\Louisville Green Core Team Meetings Goals-Objectives

#1 Sustain Regulatory Compliance (Air Emissions)

DIGESTER GAS CONTROL

In 2008, much work has been done by maintenance and operations at Morris Forman to revitalize the digester gas system for better control, easier operation, and to prevent odor problems in the future. Since the summer of 2008, our dryers have been burning a mix of natural gas and digester gas. The savings is approximately \$3,000 per month or \$1,000,000 per year. This represents a (25-35)% decrease in the use of natural gas.

Currently, a project has been bid to provide a condensate removal system that will increase functionality and protect the digester gas lines to the flare and dryer trains.

Digester gas is being used regularly. In addition, maintenance is adjusting the pressure regulating valves (PRV's) to better store the digester gas. This will make the system more reliable for operations, and should further reduce the amount of natural gas used.

DUST CONTROL

A contractor who specializes in dust removal was used to professionally clean four floors of the Main Equipment Building at Morris Forman. This is in efforts to manage our dryer related dust and ensure a safe working environment.

MSD's Safety Department has been helpful in providing input on how best to maintain a safe environment.

Dust Monitors have been purchased to monitor the working conditions. This is done as needed to verify safe conditions. Also, explosion-proof vacuums were purchased to aid in maintaining safe and clean conditions. Log sheets for both are being established.

OTHER CONTROLS

Media in the solids handling odor control (SHOC) Biotrickling Scrubbers was replaced; so that, the scrubbers can be used in lieu of the Fume Incinerator. Using biological air treatment in lieu of the fume incinerator results in significant electricity savings.

Media in the Regenerative Thermal Oxidizers (RTOs) was replaced in all four dryer trains to ensure proper dryer operation and to keep the discharged air clean. Preventative maintenance on the RTO's, and new media, is planned to extend the operational life as much as possible.

Sharon Worley, a senior engineer, has worked to organize our legal and other requirements concerning air emissions and the Air Pollution Control District (APCD). Air permits and reporting for all of the MFWQTC processes are much more organized than ever before and meeting APCD requirements.

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#2 Produce Marketable Quality Louisville Green

(Exceeds Exceptional Quality Standards)

DENSITY CONTROL

Operators control the product dryness more consistently since the switch to all CSC infrared moisture balances for % dry solids measurement. A halogen moisture balance was used for several months; however, it was not as reproducible as the CSC Infrared units.

RTO bricks were replaced on all 4 dryer trains. At first, the new bricks were thought to remedy the density/throughput issues all together. Process issues still exist even with new media. Joe Falleri and Jim Bridges have a plan to revise the Dryer Train Readings sheet; so that, the operational health of each train can be better understood.

Potable water is now being used on portions of the dryer process in lieu of using process water. The cleaner water can only help improve the operation of the dryer process and will hopefully remedy process problems in the dryer process.

Currently, Near-Infrared moisture analyzer is on loan and being investigated. Preliminary results show this instrument to be very accurate and measure % dry solids, minute by minute. It has the potential to save significant man hours and because it is PLC compatible, it could be used to trigger a switch in silo storage location if the product falls out of specification.

CAPTURE CONTROL

Mechanical shakers are being used for the capture test instead of being shaken by hand. This takes most of the human variance out of the test, and our operators are very satisfied with the equipment.

Operations believed for some time that the roller crushers were not working properly to crush seed pellets appropriately. This made it very hard to produce a consistent product and run the process effectively and efficiently. Thanks to our new dry-side maintenance supervisor, Larry Ramsey, all 4 dryer trains have had the roller crushers revitalized. Operators and supervisors have seen a huge improvement in product consistency and in the operation of the dryer process. It is believed that this improvement will help us to significantly reduce the amount of process waste pellets sent to the landfill because recycle bin levels can be controlled much better. The tonnage of process waste pellets going to landfill will be watched closely in 2009.

OIL CONTROL

Operators can view the rate of oil being applied while a truck is loading. Modifications by maintenance allows the loader to now adjust the flow of oil as needed. The amount of oil for each truck is recorded on a truck sample of material as well as the density and capture. All pertinent data concerning trucks is entered into the Louisville Green tracking spreadsheet. This allows the quality and consistency of the finished product to be monitored closely.

PERFORMANCE MEASUREMENT

The supervisor of our controls group, Jim Emily, designed a spreadsheet tool that allows transports (800 lb transfers to a silo) to be counted through the PLC computer. All Louisville Green manufactured meets EPA Class A / Exceptional Quality standards; Silo 1 is our premium silo (Exceeds Class A / EQ). Silo 2 is for everything that doesn't meet our premium specification. The spreadsheet not only allows the quantity of material manufactured on each

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shift to be measured; it also allows the quantity of premium product on each shift to be measured as well. This performance tool is located at....

W:\DATA\EMS\EMS Manual\6. Operational Control E3,E10,E13\Dryers\Transports

NUTRIENT QUALITY MONITORING.

After much investigation and performance testing of A&L Labs in Memphis, TN, A&L Memphis was proven to be inconsistent. At the same time, it was proven by using A&L Great Lakes Labs in Ft. Wayne, IN that they provide very consistent, reproducible testing. Since switching to A&L Great Lakes for our monthly AOAC testing, consistency and nutrient quality have not been a problem. Louisville Green meets the 5-3-0 nutrient guarantee easily.

503 METALS MONITORING

In November 2008, levels of Nickel higher than federal limits were detected in Louisville Green. Distribution was immediately halted. Approximately 1000 tons of product was landfilled because of the exceedence. None of the high nickel product was land applied. Data in the laboratory reports changes color and notes a warning or an exceedence. The laboratory notified operations of the exceedence immediately so that distribution could be halted. Operations watches the daily data for problems such as this; however, the laboratory made our line of defense that much more effective. The compliance spreadsheet for daily compliance monitoring of Louisville Green is located at the following address.

W:\DATA\EMS\EMS Manual\4. Compliance E4\Louisville Green - 503 Compliance Data

PROCESS IMPROVEMENTS

In December of 2008, the cleaning of Digester #2 at Morris Forman was contracted. The year before Digester #3 was cleaned. Considering both digesters had large amounts of sand, grit, and trash found in them, cleaning them increases their workable volume and will greatly enhance the digestion process, allowing more digester gas to be produced, and improve the quality of Louisville Green.

#3 Reduce Cost of Producing Louisville Green

DEWATERING CONTROL

A new dewatering management system is under investigation. Robert Bates is working with a contractor and running trials to prove whether or not the system uses polymer more efficiently and makes more consistent cake. The trials continue into the 1st quarter of 2009. There is money to be saved by optimizing polymer use.

UNPLANNED SHUTDOWNS ON THE DRY-SIDE

Joe Falleri is charting all the dry side process problems that cause unplanned shutdowns on the dry side of the plant. This includes slop outs that occur in dewatering which are messy and slows solids production. It also includes recycle bin overflows where material has to be vactored out of the recycle bin (API is the contractor) and sent to landfill (Waste Management is the contractor). Both slop outs and high recycle bins have always been costly problems.

Since Joe began charting these problems. Slop outs have become almost nonexistent in the plant. This is attributed to improvements in the polymer system. As part of studying high recycle bins,

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investigation ports at the crushers were used to study the crusher’s performance. The crushers were not performing consistently. This lead our maintenance group to revitalize the crushers on all four trains which has tremendously improved the operability of the dryers and product consistency. The tonnage of process waste product going to landfill and the use of API (vactoring contactor) will be watched closely in 2009 to determine how successful the revitalized crushers are at helping the operators to prevent high recycle bins.

#4 Improve Effectiveness of the Preventative Maintenance Program

Mike Gower and Rob Roy are the planners at Morris Forman. They coordinate all maintenance activities. In 2008, Rob Roy began keeping a spreadsheet tool for tracking corrective work versus preventative work. The tool also tracks % of preventative maintenance (PM) complete. This is in efforts to work smarter and hopefully reduce corrective work by improving PM effectiveness. The Corrective and Preventative Maintenance Spreadsheet is located at the following address.

W:\DATA\EMS\EMS Manual\6. Operational Control E3,E10,E13\Preventative Maintenance

Month by month, as more data is entered and more understanding is gained, the maintenance planners will relay information to the Core Team in 2009. Following is a summary of July through December 2008.

	<u>Corrective Work Orders</u>		<u>Preventive Work Orders</u>	
	<u>Issued</u>	<u>% Completed</u>	<u>Issued</u>	<u>% Complete</u>
JULY 08	262	98	300	79
AUG 08	261	98	344	81
SEPT 08	300	99	285	71
OCT 08	357	99	287	86
NOV 08	250	99	320	67
DEC 08	366	96	272	74

It is interesting to note that at the beginning of 2008, there was over 2000 open corrective work orders and over 1700 open preventative work orders. Currently, there are only 65 open corrective work orders and 200 open preventative work orders. This improvement demonstrates the much improved tracking system being used by the maintenance planners.

The planners are also evaluating the many uses of SAP (work order software) for scheduling and tracking maintenance activities. Rob and Mike are planning to attend SAP training in the future to learn more about its capabilities.

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#5 Increase Public Acceptance of Louisville Green

Our two largest customers of the product, Jerry Hardesty of Meade County, KY and Doug Hodges of Green County, KY distribute product to many smaller farmers in their respective areas. Dinners with their customers and other interested farmers have become more frequent with excellent turnout. Many farmers are very interested in purchasing Louisville Green because of the economic advantages and the value-added nature of the product. **The 3rd Party Auditor, Jon Shaver, who was here in the summer of 2008 was very impressed by the high level of positive public perception as he notes in his report.**

Also in 2008, Public outreach activities by Robert Bates included the Louisville Water Festival (educating young children) and a Master Gardeners Group at the Bon Air Library. Our sales agent, Clarke Fenimore, has regular booths at the National Farm Machinery Show and the National Turf Show as well as others. MSD had an elaborate booth at the Kentucky State Fair. The Pretreatment Group had a very successful booth at the Jeffersontown Gaslight Festival. Lastly, Alex Novak regularly attends the monthly Rubber town Community Advisory Council (RCAC) meetings.

In 2008, Louisville Green won a cotton growing contest that was part of research done by the University of Georgia. Higher yields were produced, and at the same time, there is a cost savings versus other chemical fertilizer products. Additional university research with Louisville Green will be investigated (ie. Cost versus benefit analysis)

In 2008, the Louisville Green and MSD Websites were updated to include the latest EMS information for interested parties. This includes the biosolids management policy, the legal and other requirements, the goals and objectives, the biosolids management performance reports, and results from any internal or 3rd party audits. The website was further updated to inform our "interested parties" of our intent to receive a 3rd Party Audit. This information is updated quarterly. In addition, the websites were updated with more recent pictures and information about our product.

In 2008, the biosolids core team worked to better organize its communication plan. The brochure was updated. The Louisville Green and MSD webpages associated have been updated. A-J Inc. is developing a Farmer Webpage that will be linked with MSD's web information. Special farmer flyers have been in use throughout 2008. Lastly, Sharon Worley is working to update the Louisville Green Bag, and new bags are to be printed in the Spring of 2009. All of these efforts are to synergize the communication plan.

Detailed information concerning Public Participation is included in the notes from meetings with our sales agent. These are located at the following address.

W:\DATA\EMS\EMS Manual\5. Improvement and Communication E5,E6,E9,E14,E15,E16\Meetings and Internal Communication\A-J, Inc. Meetings

Information concerning Public Participation is also documented in the Goals and Objectives.

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#6 Increase End Use Options for Louisville Green

It is important to note that in 2006 all marketable material was not distributed, only 72.7%. In 2007, this was up to 94.2%. Our sales agent, Clarke Fenimore, has done such a good job at marketing and distributing the product that this is no longer a goal. The demand for the product is now much greater than the supply. **100%** of the product made available for distribution has been distributed in the last 24 months.

To summarize, there is a huge demand for Louisville Green, and avenues for product distribution have not been a problem. Our sales agent has provided many avenues for distribution locally and in a number of states (KY, IN, IL, TN, AK, GA, SC, WI, and VA).

Currently, a license for distribution in North Carolina is being pursued because of the business potential there. We anticipate receiving this license early in 2009. 300 tons per year could be distributed there with the potential for much more.

As demand from customers buying in bulk has increased, so has the demand for bagged material in local hardware stores. Bagged material represents less than 1% of our distribution.

Our sales agent has stated that goals for public acceptance,#5, and for end use options, #6, have been realized from his perspective. His desire is that future goals be related to further improving process reliability and product quality; so that, Louisville Green will be worth more per ton to the end users. There is plenty of competition for the product.

Critical Control Points and Operational Controls

The list of Critical Control Points and Operational Controls (Appendix 3A) for MSD's entire biosolids value chain is located at the following address.

W:\DATA\EMS\EMS Manual\6. Operational Control E3,E10,E13

The Quality Assurance Procedure has been further developed and regulations are now tracked on a regular basis to ensure we stay current.

In addition, plans to make O&M Manuals and other work tools more accessible to the operators and provide them locations where these are more readily available is being discussed at core team meetings.

Legal and Other Requirements

A detailed list of all the Permits and Licenses held by MSD for Louisville Green (Appendix 4B) has been developed with all pertinent information. In addition, a timeline for fees and reports has been established (Appendix 4C). A complete list of Legal and Other Requirements (Appendix 4A) pertaining to Louisville Green has been developed. A tracking procedure for Legal and Other Requirements has also been defined. Appendices 4A, 4B, and 4C are located at the following address.

W:\DATA\EMS\EMS Manual\4. Compliance E4

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Standard Operating Procedures (Operational Controls)

A schedule for SOP development and implementation was created in November 2007 and is updated periodically. This is a priority list with defined dates for development and implementation.

We have very few written SOP’s. A list of all needed SOP’s in Critical Areas, and a timeline for implementing these SOP’s has been developed by the EMS Coordinator. He will be working with the Operations Manager as well as department heads and supervisors to coordinate this effort.

An SOP is being developed for dewatering. It is 90% complete. Once complete all operators will be trained on the SOP. An SOP for Digestion is being developed and is about 50% complete. Once complete all operators will be trained on the SOP.

SOP’s were developed and have been implemented for dryers and the capture test. Dryer operators have been trained on both of these. An SOP has been developed and implemented for the loading and weighing of Louisville Green including the application of the oil for dust control. Operators have been trained on this as well.

An SOP has been developed and implemented for working with our sales agent, and a series of documents that will be given to the customers and the haulers have been created. These documents are as follows: Material Safety Data Sheet for Louisville Green, Loading and Scaling Instructions for Haulers, a Bill of Lading with Best Management Practices for Hauling Louisville Green. In addition, A-J Inc. has agreed to supply an emergency plan (pending MSD approval) for the haulers of the product.

For SOP’s to be effective, all operations supervisors must be in agreement that the SOP is reflective of how work should be accomplished in the respective area. The implementation phase will be very management intensive and is to be given priority in 2009. In the future, process supervisors will be expected to train their individual people on the most current SOP’s.

Training Program

During 2008, the MSD Training Department provided the following courses for the Morris Forman facility.

Formulas and Calculations

Why Treat Wastes

Hazmat Training

Wastewater Biology

CPR/First Aid/Bloodborne Pathogens

Good Laboratory Practices

Sample Collection for Process Control

Disinfection and Chlorination

Preliminary and Primary Treatment

Secondary Treatment

Sampling during Treatment Plant Upsets

Waste Activated Sludge

Several of these courses are accepted by the Kentucky Division of Water as credit hours for maintaining wastewater licenses in the state of Kentucky. Additional courses to these are offered on a rotating schedule. In addition, David Roth, a senior trainer, tracks the progress of each operator at Morris Forman towards being qualified in particular areas of the plant and being certified as a wastewater operator.

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Management Review

Derek Guthrie, Marion Gee, and Saeed Assef conducted the Management Review (Element 17) of MSD’s Biosolids Management System in the spring of 2008 prior to the 3rd Party Audit. Derek Guthrie who was the Engineering Director has now retired. In his absence, Marion Gee and Saeed Assef have agreed to continue this yearly review of our biosolids program. Their next review is scheduled for the Spring of 2009.

Internal and 3rd Party Audit Results

The 2nd Internal Audit (November 2008) was very in depth, as the team strived to dig deeper into its understanding of the biosolids program. Their findings were very practical with all the nonconformances pointing to flaws that need attention, not only from employees at Morris Forman, but in other parts of MSD such as Metro Operations, Purchasing, and Safety. Detailed internal audit results are located at the following location.

W:\DATA\EMS\EMS Manual\5. Improvement and Communication E5,E6,E9,E14,E15,E16\Audits\Internal Audit\Internal Audit #2 November 2008

The 3rd Party Audit in May 2008 was a good experience for MSD. After correcting 3 major nonconformances discovered by the lead auditor, Jon Shaver, and an additional day of auditing in July 2008, MSD’s Biosolids Management System was certified by the National Biosolids Partnership on July 31, 2008. Another 3rd Party Audit of MSD’s Biosolids Program is scheduled for the summer of 2009. Likewise, detailed 3rd Party Audit results are located at the following location.

W:\DATA\EMS\EMS Manual\5. Improvement and Communication E5,E6,E9,E14,E15,E16\Audits\3rd Party Audit\Jon Shaver and Jeanette Klamm

Nonconformances

The Corrective Action Spreadsheet is located at the following address.

F:\EMS\EMS Manual\8. Nonconformance and Audits E12,E14,E15,E16

All nonconformances are documented on this spreadsheet including the ones from the November 2008 Internal Audit. In addition, root causes and corrective action plans and progress towards correcting each nonconformance are documented in this spreadsheet.