

Executive Summary

To: MSD Directors, EMS Core Team Members
From: EMS Internal Auditors
Date: July 27, 2009
Subject: Third Internal EMS Audit Findings

The Environmental Management System's (EMS) Internal Auditors conducted their Third Internal EMS Audit June 15-18, 2009. The objective of the internal audit was to evaluate the EMS, how it conforms to the National Biosolids Partnership (NBP) *Environmental Management System for Biosolids*, to provide suggestions for improvement and to prepare the system for the third party audit.

The results of the audit found the following nonconformances, as they relate to the Elements set forth by the National Biosolids Partnership.

Element 1 – EMS Manual

Major Nonconformance 01

- Waste Management is currently performing biosolids related duties without a contract in place. Therefore, EMS responsibilities have not been documented.

Element 2 – EMS Policy

Major Nonconformance 02

- The EMS Policy has not been communicated to all employees or contractors with biosolids related responsibilities.

Element 3 – Critical Control Points

Major Nonconformance 03

- Operational controls and environmental impacts at some critical control points need further development.
- Critical control points have not been reviewed or updated on a quarterly basis.

Element 4 – Legal and Other Requirements

Minor Nonconformance 01

- A procedure for tracking or incorporating new changes in legal or other requirements has been developed, however, there is no documentation to show it has ever been implemented.

Element 5 – Goals and Objectives

Major Nonconformance 04

- Some program goals and objectives do not adhere to the criteria of specific, measurable, achievable, relevant and time bounded.
- The action plan for the goals and objectives should be updated to include more frequent milestones for monitoring performance.

Element 7 – Roles and Responsibilities

Major Nonconformance 05

- The assigned roles and responsibilities are not clearly defined for the following areas: Blend Well, SOP's, and Thickened Sludge Holding Tanks.
- Waste Management is currently performing biosolids related duties without a contract in place, therefore, their related roles and responsibilities have not been documented.

Element 8 - Training

Major Nonconformance 06

- Training documentation is outdated or does not exist in certain areas.
- EMS policy training for new employees with biosolids related activities has not taken place.
- Waste Management is currently performing biosolids related duties without a contract in place, therefore, their related training requirements have not been documented.

Element 9 - Communication

Minor Nonconformance 02

- The communication program does not define the roles and responsibilities for contractors. B&H contractors have not been trained on EMS fundamentals.

Element 10 – Operational Controls

Major Nonconformance 07

- Standard operating procedures have not been developed or implemented for some areas.
- Operational controls have not been fully developed at all critical control points.
- Waste Management is currently performing biosolid related activities without a contract in place, therefore, operational controls have not been defined.

Element 11 – Emergency Preparedness and Response

Major Nonconformance 08

- Emergency preparedness and response plans do not exist for lower explosion level alarms (LEL).
- The effectiveness of the Blend Well LEL alarm is in question as it does not alarm to the computer room.
- Hydrogen sulfide monitors in the Main Equipment Building do not have a calibration schedule.
- WAS does not have operational hydrogen sulfide monitors.
- Waste Management is currently performing biosolid related activities without a contract in place, therefore, emergency preparedness and response plans have not been documented.

Element 12 – Documentation and Recordkeeping

Minor Nonconformance 03

- Some EMS documentation was not readily accessible, kept up to date, properly marked according to EMS requirements or maintained securely.
- Waste Management is currently performing biosolid related activities without a contract in place, therefore, document control and record keeping procedures have not been documented.

Element 13 – Monitoring and Measurement

Major Nonconformance 09

- Monitoring and measurement at some critical control points has not been fully developed.
- Waste Management is currently performing biosolid related activities without a contract in place, therefore, monitoring and measurement practices have not been documented.

Element 14 – Nonconformance and Corrective Actions

Major Nonconformance 10

- Corrective actions plans have not been effective at preventing reoccurring nonconformances.

Element 15 – Program Performance Report

Minor Nonconformance 04

- The program performance report does not contain summaries pertaining to contractor activities. The report has been made available to the public but contains internal network links to which the public does not have access.

Element 17 – Management Review

Minor Nonconformance 05

- The management review generated action items, however, no action plan has been developed and no person has been assigned to follow up on the action items.



**National Biosolids Partnership
Biosolids EMS Internal Audit Report**

**Louisville and Jefferson County
Metropolitan Sewer District
Louisville, KY**

Audit Report Date: July 27, 2009

Audit Conducted By:

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Audit Dates: June 15 – 18, 2009

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1. Summary

The Internal Audit Team, hereafter known as the “auditors”, conducted the third internal audit of the Biosolids Environmental Management System (EMS). The system is used by Louisville and Jefferson County Metropolitan Sewer District (MSD) in managing its biosolids program at the Morris Forman Water Quality Treatment Center (MFWQTC). The audit was performed June 15 through June 18, 2009.

The objective of the internal audit was to evaluate the EMS, how it conforms to the National Biosolids Partnership (NBP) *Environmental Management System for Biosolids*, to provide suggestions for improvement and to prepare the system for the third party audit.

1A. Audit Scope

The scope of the audit included the entire biosolids value chain as it relates directly to practices and activities that support or affect the biosolids operations. This includes the National Biosolids Code of Good Practice Principles of Conduct.

The scope of the third internal audit included but was not limited to the following areas in the biosolids value chain:

- Review of the EMS Manual and related documents
- Audit of each of the 17 Elements related specifically to the following areas:
 - Secondary Solids Thickening (WAS)
 - Thickened Sludge Holding Tanks
 - Anaerobic Digesters
 - Blend Well

The audit was conducted in two phases. Phase 1 was conducted June 15-16, 2009 and included a review of EMS documentation. Phase 2 was conducted June 16-18, 2009 and included interviews with key personnel with area inspections.



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1B. Summary of Audit Findings

EMS Strengths

The auditors noted the following strengths in the EMS approach.

- Management is committed to maintaining an effective EMS system.
- Monitoring and measurement tools are being implemented in each area in real time.
- Employee awareness of key areas continues to increase as it relates to the EMS.

EMS Outcomes

The auditors noted the following outcomes since the implementation of the EMS approach.

- Product specifications have remained consistent.
- Reduction in landfill occurrences and landfill costs.
- Employee involvement in biosolids production has increased.

Nonconformances

The auditors identified ten (10) major nonconformances and five (5) minor nonconformances as they relate to the required elements set forth by the NBP. These nonconformances are described in detail in Section 3 of this report.

Opportunities for Improvement

The auditors identified eight (8) opportunities for improvement. These opportunities are described in detail in Section 3 of this report.

1C. Agreements

The EMS Coordinator has agreed to submit corrective action plans to the auditors for review within 30 days of receipt of the audit report. The corrective action plans will then have an additional 90 days for implementation.



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2. Audit Details

2A. Agency Details

Agency Name: Louisville and Jefferson County MSD
Address: 4522 Algonquin Parkway, Louisville, KY
Volume of Wastewater Treated: 100 MGD Average, 330 MGD Peak
Biosolids Produced: 25,000 dry tons per year
Number of Employees: 92

Contractors Audited

B& H Hauling
Waste Management

Audit Team

The Internal Audit Team consisted of the following MSD personnel:

Robin Burch – Process Support Technician, Lead Auditor
Greg Brewton – Master Maintenance Electrician
Joe Falleri – Process Supervisor Operations
Troy Henderson – Process Technician II
Adraine Niehoff -- Emergency Response Pretreatment Inspector
Jenni Schelling -- Internal Auditor

2B. Definitions

Major Nonconformance – a serious omission from requirements and/or other departure that represents, or could cause, a systemic failure.

Minor Nonconformance – an isolated departure from requirements that does not represent a systemic failure.

Opportunity for Improvement – possible improvement in the EMS based on auditor observations.



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2C. Reference Materials

The following materials were used as a reference by the auditors during the internal audit:

Louisville and Jefferson County EMS Manual, June 2009
National Biosolids Partnership National Manual of Good Practice for Biosolids, January 2005
National Biosolids Partnership Management System Guidance Manual, June 2002

3. Detailed Audit Results

The auditors made the following observations with respect to each element during the audit process:

Element 1 – Documentation of EMS Manual for Biosolids

Process Description

The EMS manual is the foundation for the implementation of an effective biosolids program. The EMS manual details all the information needed to fulfill the requirements set forth by the NBP. Since the last internal audit, the EMS manual has undergone a general revision as well as a flow chart of the process has been developed to aid in the organization of the 17 EMS Elements.

Element Requirements (From the Guidance Manual)

The environmental management system for biosolids (including the other 16 EMS Elements) shall be documented in an EMS manual or equivalent set of program documents that describe, at least at a general level, the applicable policies, programs, plans, procedures and management practices in the EMS. The EMS manual shall:

1. Be approved by a level of the organization's management with the authority to commit people and resources to biosolids management activities.
2. Contain the organization's biosolids management policy and EMS procedures required by the EMS Elements.
3. Contain or cross-reference public participation in planning, communication, and emergency preparedness and response programs and plans required by the EMS Elements.
4. Cover all critical control points for its biosolids management activities throughout the biosolids value chain.



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5. Include or cross-reference all operational controls, procedures, processes, and other management methods used to achieve and maintain compliance with legal and other requirements.
6. Describe those biosolids management activities assigned to and performed by contractors.

Audit Results

1. Conforms.
2. Conforms.
3. Conforms.
4. Conforms.
5. Conforms.
6. Waste Management does not currently hold a contract for the Biosolids activities they are performing. Therefore, EMS activities have not been documented.

Element 1 – EMS Manual receives a Major Nonconformance (01) due to the items listed above.

Element 2 -- Biosolids Management Policy

Process Description

The EMS policy statement is the guiding principle to establish what an organization wants to get from the program. MSD continues to operate in adherence to the policy statement and the Code of Good Practice set forth in the EMS Manual and the NBP.

Element Requirements (From the Guidance Manual)

1. The organization shall establish a biosolids management policy (biosolids policy) that commits the organization to following the principles of conduct set forth in the National Biosolids Partnership's Code of Good Practice and may include other biosolids commitments the organization voluntarily chooses to adopt.



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2. The organization's biosolids management policy shall be communicated to employees, contractors, and all interested parties and be incorporated into the organization's biosolids programs, procedures, and practices.
3. Biosolids policy approved by Management.
4. Incorporate the Policy into MSD's Biosolids programs, procedures and practices.

Audit Results

1. Conforms.
2. The EMS policy has not been communicated to B&H contractors or employees with biosolid related activities. Auditors only looked at employees who had been employed for at least six months.
3. Conforms.
4. Conforms.

Element 2 – Biosolids Management Policy receives a Major Nonconformance (02) due to the items listed above.

Element 3 -- Critical Control Points

Process Description

Critical control points (Appendix 3A) should be identified in all area of the biosolids value chain. Each critical control point is fundamental to operating a successful EMS.

Element Requirements (From the Guidance Manual)

1. The organization shall identify and document the critical control points of its biosolids management activities throughout the biosolids value chain.
2. The organization shall also identify potential or actual environmental impacts at each critical control point.
3. The organization's critical control points shall be consistent with those identified in the NBP's National Manual of Good Practice and other authoritative sources on biosolids management.
4. The information on the organization's critical control points shall be kept up to date and the records shall link each critical control point and its potential environmental impacts with the corresponding operational control(s).



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- Organizations that have successfully completed a third-party verification audit shall provide notification to the NBP (and third-party verification auditor) after any operational change that requires a change to the identified critical control points or to environmental impacts associated with the critical control points.

Audit Results

- The following is a list of operational controls thought to be needed at the critical control points to effectively manage environmental impacts: (As referenced in the Manual of Good Practice.)

Critical Control Point	Operational Control
Digestion	Mixing
TSHT	Tank Level
Blend Well	Tank Level

Due to November 08's nonconformances, Sludge Hauling should be updated with random sampling as a monitoring and measurement activity.

- Environmental impacts identified at critical control points may not be relevant. Most environmental impacts listed in Appendix 3A, Critical Control Points, are the same. So it is questioned by the auditors if they are relevant for all operational controls at the critical control point.
- Conforms.
- The EMS manual states that critical control points will be reviewed and updated quarterly. Information cannot be found in meeting minutes that shows this has occurred.
- Conforms.

Opportunity for Improvement

The auditors believe by including process impacts in the environmental impact column the functionality of Appendix 3A would improve. In some instances, the process impact will be more significant than the environmental impact even though the environmental impact may be the end result.

During the audit, the auditors issued a major nonconformance because pretreatment was not listed as a value chain category in Appendix 3A. As it turns out, the pretreatment information was contained in a different format and separate page from the Appendix 3A that contains all the original value chain categories. Therefore, the auditors did not see it when reviewing the documentation. It is suggested the



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pretreatment information be added to the exiting Appendix 3A to prevent future confusion. The resulting nonconformance has been removed from this document.

Element 3 – Critical Control Points receives a Major Nonconformance (03) due to the items listed above.

Element 4 – Legal and Other Requirements

Process Description

The EMS manual Appendix 4A, List of Legal and Other Requirements, contains all the necessary information for the value chain. Each member of the EMS Core Team has a responsibility for keeping track of changing regulations and communicating these changes back to the team.

Element Requirements (From the Guidance Manual)

1. Establish a procedure for identifying and tracking legal and other requirements applicable to its biosolids management activities.
2. Establish and maintain records of applicable legal and other requirements.
3. Include a management process for incorporating changes and new requirements into the element of the EMS.

Audit Results

1. Conforms.
2. Conforms.
3. A procedure is in place, however, documentation could not be found that shows the process for incorporating changes has occurred. Below is the procedure listed in EMS manual: Document number 4001, Element 4 -- Legal and Other Requirements, states that “MSD will respond to changes in legal and other requirements in accordance with the procedure for management of change.” Document 2003, Management of Change, states “Changes in legal requirements, public perceptions, and other factors that may impact its biosolids program are monitored by MSD employees. If applicable, the EMS Coordinator reviews and updates the environmental management system to ensure the organization continues to meet its goals and objectives and ensure public acceptance. Any changes to the management system are approved by the Operations Manager at the Morris Forman Water Quality Treatment Center



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(MFWQTC). This includes the entire biosolids value chain. The Executive Director at MSD has delegated authority to the Operations Manager.”

Opportunity for Improvement

The auditors recommend a schedule be created then implemented that details specific personnel responsibilities and a time frame for completion. This schedule should be documented at the end of each timeframe as proof and a tracking mechanism for the element requirement.

Element 4 – Legal and other Requirements receives a Minor Nonconformance (01) due to the items listed above.

Element 5 – Goals and Objectives for Continual Improvement

Process Description

Goals and objectives are key to the continuous improvement process. Goals and objectives have been identified for value chain processes with sustainability also being a consideration when developing the goals.

Element Requirements (From the Guidance Manual)

1. The organization shall establish and periodically review measurable biosolids program goals and objectives for its biosolids management activities.
2. The organization’s goals and objectives shall reflect identified priorities for improving the environmental performance of its biosolids management activities based on its critical control points, identified or potential environmental impacts, legal and other requirements, and applicable best management practices as defined in the NBP’s National Manual of Good Practice and various authoritative information sources on biosolids management (e.g., Water Environment Federation manuals of practice).
3. The biosolids program goals and objectives also shall consider input from interested parties developed through proactive public participation.
4. The biosolids program goals and objectives shall be integrated with other Elements of its EMS.
5. The biosolids program goals and objectives shall be develop and documented using SMART criteria (i.e., be Specific, Measurable, Achievable, Relevant, and Time-bounded).



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6. The biosolids program goals and objectives shall be updated on a regular basis.
7. The organization shall establish an action plan that describes those improvement activities it is pursuing to achieve its biosolids program goals and objectives. The action plan shall designate schedules, milestones, resources, and responsibilities for achieving its biosolids program goals and objectives.

Audit Results

1. Conforms.
2. Conforms.
3. Conforms.
4. Conforms.
5. Pretreatment goals and objectives do not adhere to the SMART criteria. The digester gas goal is not specific and there is not an effective way of measuring gas utilization. Also, the target date for completion is past the due date.
6. Program goals and objectives for the pretreatment sections 5.1 and 5.2 do not have progress updates. The auditors are not sure if one year progress updates are considered to be a regular basis or adequate.
7. An action plan for most goals and objectives has been established. The target date is listed as on-going for some entries, this is understandable. However, milestones need to be placed in the action plan so tracking progress and effectiveness can be determined.

Element 5 – Goals and Objectives receives a Major Nonconformance (04) due to the items listed above.

Element 6 – Public Participation in Planning

Process Description

Public acceptance is a key element for the success of a biosolids program. Public participation is included in many aspects of the planning process as related to the 17 Elements. The Core Team does a good job in documenting information given at public forums and information received from other interested parties. Input received is discussed at regular intervals during management meetings. The EMS Coordinator maintains an interested party list and updates the public participation file as needed.



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Element Requirements (From the Guidance Manual)

1. The organization shall select and implement a proactive public participation approach to involve interested parties in its biosolids management program and EMS planning process.
2. The approach selected for public participation shall reflect the organization's commitments to ten (10) principles in the NBP's Code of Good Practice, including its plan for independent third-party verification of conformance with the EMS Elements.
3. The public participation approach shall be consistent with the degree of current public interest, the history of public involvement, the method of biosolids management, and related local circumstances.
4. The approach selected for public participation also shall provide interested parties with meaningful opportunities to express their views and perspectives relative to the organization's biosolids management activities, including concerns about environmental impacts, biosolids program performance, and potential areas for improvement.
5. The organization shall consider input from interested parties in initially developing its biosolids program goals and objectives during its EMS implementation and in updating them as part of its periodic review of biosolids management program performance.

Audit Results

1. Conforms.
2. Conforms.
3. Conforms.
4. Conforms.
5. Conforms.

Opportunity for Improvement

It has been over a year since public input has been logged in Appendix 9A, Record of Public Input and Inquiries. The auditors recommend avenues for meaningful opportunities be re-evaluated to make sure they are still a valid means of input.



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Element 7 – Roles and Responsibilities

Process Description

Roles and responsibilities are the first step in implementing the EMS. MSD has documented the roles and responsibilities of all employees. However, they are not broken down into specific operator responsibilities per process area.

Element Requirements (From the Guidance Manual)

1. The organization shall establish and maintain records of the assigned roles and responsibilities for its biosolids management program and activities. These records shall define and document roles and responsibilities of its employees for performing its biosolids management activities and EMS functions.
2. Appoint an individual with overall responsibility for ensuring that its biosolids management program and EMS are implemented and maintained.
3. Provide the human, technical, and financial resources necessary to execute these responsibilities effectively.
4. Define and document the roles and responsibilities of contractor(s) retained to perform various biosolids management activities and EMS functions through service agreements.

Audit Results

1. Document 12001, Document Control and Record Keeping, listed the SOP's as being controlled by the trainer and located with the trainer. However, Document 12001 also states "the SOP's are imbedded in the electronic EMS manual. Only members of the Core Team have full access to the EMS Manual." The responsibility is not clear as to who has control over the SOP's.

Job descriptions are available for each employee. However, the job descriptions do not detail roles and responsibilities of the operator for a specific area. To get this information, one would have to look at the area guidelines. The guidelines are the only documentation that shows what an employee would be responsible for as it relates to biosolids management and EMS functions. However, this documentation does not follow the creation protocol required in Element 12, Document Control and Recordkeeping, and it is unclear how up to date they are.



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Monitoring information for the Thickened Solids Holding Tanks were found on two different shift reports, i.e. digestion and dewatering. It is unclear which area has responsibility over the Thickened Solids Holding Tanks.

The roles and responsibilities are not clearly defined for the Blend Well.

2. Conforms.
3. Conforms.
4. Waste Management does not currently hold a contract for the biosolids activities they are performing. Therefore, EMS activities pertaining to roles and responsibilities have not been documented.

Element 7 – Roles and Responsibilities receives a Major Nonconformance (05) due to the items listed above.

Element 8 – Training

Process Description

Training is another critical point for having a successful EMS. In addition to training documentation, employees must have face to face training opportunities with qualified individuals.

Element Requirements (From the Guidance Manual)

1. The organization shall establish and maintain a training program to ensure that its employees responsible for specific biosolids management activities and for implementing various EMS functions are competent in performing their assigned tasks and duties. The training program shall provide general awareness of the EMS and how each employee's assigned roles and responsibilities relate to the entire biosolids value chain.
2. The training program shall address new or reassigned employees.
3. The organization shall maintain records of individual employee training delivered and completed.
4. The organization shall require that its contractors establish their own training programs consistent with their roles and responsibilities in biosolids management activities as defined through service agreements.



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Audit Results

1. Training documentation has not been established or maintained. Training documentation for Digestion, Secondary Solids Thickening, Thickened Solids Holding Tanks, and the Blend Well are outdated. No training material is available for all areas, or it is contained in an SOP that has not been approved or released. It is unclear how this lack of information could help any employee be competent in their assigned tasks and duties.
2. EMS Policy training is needed for new employees with biosolids responsibilities.
3. Conforms.
4. Waste Management does not currently hold a contract for the biosolids activities they are performing. Therefore, EMS activities related to training have not been documented.

Opportunity for Improvement

During personnel interviews, it was requested that additional training be conducted on the application of the laboratory results. Operators have shown interest to understand what exactly the laboratory result means to their particular area.

During personnel interviews, refresher EMS training was also requested. Operators have only had initial EMS training and would like to have the training again.

Element 8 – Training receives a Major Nonconformance (06) due to the items listed above.

Element 9 – Communication

Process Description

Communication about the EMS Program must exist internally and externally. Both have key components that must be presented to employees, stakeholders and the public to have an effective EMS. MSD maintains many avenues for communication both externally and internally. Creative ways of communication are always being investigated to make sure everyone stays engaged in the process.



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Element Requirements (From the Guidance Manual)

1. The organization shall establish and maintain a proactive communications program that provides on-going information about its biosolids management program and its EMS to interested parties and the public, consistent with local circumstances, the method of biosolids management, its public communications history, and degree of current interest in its biosolids management activities. The organization's communication program shall make available a summary of its independent, third-party EMS verification audit results to the public.
2. The communication program shall include a procedure for receiving inquiries and requests for information from interested parties about its biosolids management activities and EMS. The procedure shall define a process for ensuring a timely and complete response to inquiries by interested parties.
3. At a minimum, the organization's communications program shall make the following information about the organization's biosolids management program and activities available to interested parties:
 - a. Biosolids management policy
 - b. Applicable legal and other requirements
 - c. Biosolids program goals and objectives for continual improvement
 - d. Periodic biosolids management program performance report
 - e. Detailed report of its independent, third-party EMS verification audit results
4. Define roles and responsibilities of outside contractors in the communication plan.
5. The organization's communications program also shall communicate relevant information about its biosolids management activities and its biosolids management policy and all 17 Elements of its EMS to its employees and outside contractors, consistent with their assigned biosolids management roles and responsibilities.

Audit Results

1. Conforms.
2. Conforms.
3. Conforms.
4. Document 9001, Communication, does not define the roles and responsibilities of outside contractors.
5. Relevant information has not been communicated to outside contractors. B&H Hauling has not been trained on EMS Fundamentals.



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Strength

During the desk audit, an inquiry was made via the Louisville Green Website to test the timeliness of response. The EMS manual states a response should occur within 24 hours and it was.

Element 9 – Communication receives a Minor Nonconformance (02) due to the items listed above.

Element 10 – Operational Controls of Critical Control Points

Process Description

Operational Controls are essential in identifying if the day to day activities are meeting and maintaining the policy, legal and other requirements, as well as the environmental impacts.

Element Requirements (From the Guidance Manual)

1. The organization shall develop and implement standard operating procedures, work management practices, or other appropriate methods at all critical control points throughout the biosolids value chain to manage potential environmental impacts effectively.
2. Operational controls at critical control points shall incorporate all legal and other adopted requirements.
3. Operational controls shall consider applicable best-management practices as defined in various authoritative information sources on biosolids management (e.g. NBP National Manual of Good Practice, Water Environment Federation manuals of practice, etc.).
4. Operational controls shall include appropriate preventive maintenance procedures and work management systems for maintaining equipment, instrumentation, vehicles, and other treatment technology and process control systems associated with its biosolids management activities.
5. The organization shall require that its contractors establish their own operational controls consistent with their roles and responsibilities in biosolids management activities.



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Audit Results

1. Standard operating procedures have not been developed or implemented for Digestion, Secondary Solids Thickening or Dewatering (which includes Thickened Solids Holding Tanks and the Blend Well).
2. Conforms.
3. The following is a list of operational controls that should be included at the critical control point:

Critical Control Point	Operational Control
Digestion	Mixing
WAS	Tank Level
Blend Well	Tank Level

4. The monitoring parameters for preventative maintenance have been left blank. There is a monitoring and measurement practice in place and should be listed on Appendix 3A, Critical Control Points.
5. Waste Management does not currently hold a contract for the biosolids activities they are performing. Therefore, EMS activities related to operational controls have not been documented.

Opportunity for Improvement

There should be a written procedure when the venting occurs at the digester lids. Venting at this point in the process is considered a violation of an Air Pollution Control District Permit. A procedure needs to be in place so the venting episode can be kept at a minimum and to inform the appropriate personnel when venting does occur.

Strength

In March 2009, Louisville Green Biosolids exceeded the Federal Ceiling Limit for Nickel. Due to the operational controls in place, no final product was land applied. Since this incident, additional operational controls are being implemented to help with future identification of parties that may be responsible for any 503 violations.

Element 10 – Operational Control receives a Major Nonconformance (07) due to the items listed above.



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Element 11 -- Emergency Preparedness and Response

Process Description

MSD has prepared and implemented an emergency response program for the entire facility. Employees receive hazardous material, communication, fire extinguisher, CPR and respiratory training each year. Emergency response equipment is inspected on a monthly basis for readiness. Employees are trained as Emergency Response Technicians and have update yearly training. Plant wide emergency drills are conducted at least annually and in some instances more frequently.

Element Requirements (From the Guidance Manual)

1. The organization shall establish and maintain emergency preparedness and response plans and procedures to ensure effective response to accidents and emergency situations associated with its biosolids management activities.
2. The organization shall review and evaluate the effectiveness of its emergency preparedness and response procedures, including communications systems, and revise them as necessary.
3. All emergency response equipment shall be on site or readily available within a minimum response time.
4. The organization shall require its contractors to establish and maintain emergency preparedness and response plans and procedures to ensure effective response to accidents and emergency situations associated with its biosolids management activities.

Audit Results

1. A documented procedure does not exist in the event of a lower explosion limit (LEL) alarm in the Digester, Thickened Sludge Holding Tank, or the Blend Well. During personnel interviews, operators did not know how this alarm was handled or at what level the alarm is triggered.
2. The Blend Well LEL alarm does not communicate to the computer room and there is not an operator stationed in the area. Therefore, no one may be notified if a LEL alarm occurs.

No hydrogen sulfide preventative maintenance currently exists for the hydrogen sulfide stationary monitors located in the Main Equipment Building.

As part of the audit, the auditors asked if there were any safety concerns in the particular areas. Operators/supervisors said they were concerned about



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the atmosphere in Secondary Solids Thickening. Robin Burch and Joe Falleri went down to the area to investigate. They noticed hydrogen sulfide monitors on the east and west walls of the area, however, they were not functioning. After talking to the electricians, it was concluded those hydrogen sulfide monitors had never been completely installed and to their knowledge there were no hydrogen sulfide monitors in the area. Upon further investigation, there is a hydrogen sulfide monitor in the WAS ventilation system. However, it only alarms to a panel inside the WAS office and not to the computer room. In addition to this, Joe Falleri pointed out that the Dissolved Air Flotation Thickening (DAFT) tanks are not being properly maintained. Three of the eight DAFT tanks were in service, one was out of service for maintenance, and the remaining tanks had varying levels of water. It was noticed by the sludge on the surface of the water, none of them had been freshened up in the recent past. This is a source of hydrogen sulfide. If the hydrogen sulfide is a safety concern in the area, then management needs to do a better job to ensure proper operation of the DAFT tanks to reduce odors.

3. Conforms.
4. Waste Management does not currently hold a contract for the biosolids activities they are performing. Therefore, EMS activities related to emergency preparedness and response have not been documented.

Update

Safety issues related to the hydrogen sulfide monitors have been addressed prior to the audit report being finalized and released. The hydrogen sulfide monitor located in the WAS ventilation system is being connected to a PLC which will alarm to the computer room. Work has begun again on the project to install hydrogen sulfide monitors in the east and west areas of WAS. The hydrogen sulfide monitor and LEL alarm for the blend well have been linked to alarm in the computer room.

Element 11 – Emergency Preparedness and Response receives a Major Nonconformance (08) due to the items listed above.



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Element 12 – EMS Documentation, Document Control and Recordkeeping

Process Description

The EMS Coordinator has put together an extensive internal network drive to ensure employees with biosolids responsibilities have access to all EMS related documentation.

Element Requirements (From the Guidance Manual)

1. The organization shall establish and maintain document control procedures and practices to ensure that its biosolids management program documentation and documents are:
 - a. Available and can be located easily
 - b. Created following established document creation protocols
 - c. Kept up to date through periodic reviews and revisions (if applicable)
 - d. Properly marked with version number, effective date(s), and references to replaced or superseded versions
 - e. Approved by authorized personnel
2. The organization shall establish and maintain records of its biosolids management activities and ensure that they are:
 - a. Available and can be located easily
 - b. Retained for the specified period of time
3. The organization shall establish EMS documentation, document control, and records requirements for biosolids management activities conducted by its contractors in service agreements, and incorporate these requirements into its EMS for biosolids.
4. MSD's EMS Manual states documentation will be "maintained securely so that unintended changes do not occur." (12001 page 2 of 5).

Audit Results

1. a. SOP's for Digestion, Secondary Solids Thickening, and Dewatering (which includes the Blend Well and the Thickened Solids Holding Tanks) are not available.
 - b. Conforms.
 - c. The following documents have not been kept up to date:
Digestion Shift Report (Revision 1 Revision Date 7/16/08)



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The following information is not up to date:

The word “Thickened” needs to be placed in front of the “Solids Holding Tank Mixers.”

There are four hypochlorite tanks. The shift report only shows three tanks with only three locations for recording tank levels. Operators are currently drawing their own circle for tank number 4.

Pheonix is spelled incorrectly. It should be Phoenix.

PTO#2 should be removed. It is no longer in service.

Located on the EMS drive in the guidelines folder, there is a document titled Digestion guidelines. These guidelines are actually for the Dewatering area.

Document 12001, Document Control and Record Keeping: B&H Haulers is not listed as a contract that is maintained by the purchasing department. Metro Ag contract is listed as a controlled document, however, they are no longer a contractor for MSD, along with API.

Appendix 4A, Legal and Other Requirements: lists the Sales Agent agreement located in the Library with the CoreTeam/EMS Coordinator as the responsible person. However, Document 12001 Document Control and Record Keeping, lists the Main Office as the location with the Purchasing Manager as the responsible person.

Appendix 4A, Legal an Other Requirements: lists the Waste Disposal of Biosolids, Grit and Trash contract as located in the Library with the Core Team/EMS Coordinator as the responsible person. However, Document 12001, Document Control and Record Keeping, lists the Main Office as the location with the Purchasing Manager as the responsible person.

Appendix 4A, Legal and Other Requirements: lists the Process Vactoring/Cleaning of Biosolids with the Core Team/EMS Coordinator as the responsible person. However, Document 12001, Document Control and Record Keeping, lists the Purchasing Manager as the responsible person.

Document 7001, Roles and Responsibilities, needs to be updated with the current list of auditors.



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- d. The following shift reports have not been properly marked with version number, effective dates and reference to replaced or superseded versions: WAS Shift Report.
 - e. The following shift reports are not approved by authorized Personnel: Digestion and Dewatering.
2. Shift reports were not easily located.
Shift Reports from 9-2-04, 6-10-06 and 6-1-09 were reviewed. Document 12001, Document Control and Record Keeping, states these should be located in the Library or the supervisors office.
Shift Reports from 9-2-04 and 6-10-06 were found in the office located on the first floor of the administration building. The location is not listed on Document 12001, Document Control and Record Keeping, and not secure.
Shift report 6-4-09 was found in the supervisor's office; however, the file cabinets are not secure.
 3. Waste Management does not currently hold a contract for the biosolids activities they are performing. Therefore, EMS activities related to documentation and recordkeeping have not been documented.
 4. The following items are not securely maintained as stated in Element 12, Document Control and Record Keeping, of the EMS Manual:
 - Logbooks:** Currently logbooks are kept in the library, supervisors' office and in the specific work area, all of which are not secure. Therefore, the logbooks cannot be securely maintained.
 - Shift Reports:** Currently shift reports are kept in the library, supervisors' office and in the office located on the first floor of the administration building. All of which are not secure and the office on the first floor is not listed as a location for the shift reports in Element 12, Documentation and Record Keeping of the EMS Manual.

Opportunity for Improvement

The information contained on the EMS Drive is available to operator and supervisors. This information contains some older documents that are meant for training purposes. It is recommended these documents be updated to include the EMS requirements for document control since they are distributed as training material.

It is recommended the logbooks be standardized, for internal content and external labeling and stored in an organized fashion. The auditors believe standardization of information will make it more valuable to someone looking at the information in the future.



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Strength

On May 16, 2009 there was an unusual incident in Preliminary. The bottom plug of pista grit #2 came out and flooded the area. This caused the new headworks and the bar screens to go out of service. Old headworks was placed into service. The pista grits and bar screens are critical in preventing trash and grit from being pumped from the primary sludge to the digesters. Old headworks relies strictly on gravity setting of grit and trash.

On May 18, 2009 an unusual incident form was submitted that summarized the incident. Greg Brewton performed a spot check of the preliminary logbook that also contained this information. This documentation procedure was adequate from an audit standpoint.

Element 12 – Documentation and Recordkeeping receives a Minor Nonconformance (03) due to the items listed above.

Element 13 -- Monitoring and Measurement

Process Description

A systemic approach must be developed for monitoring and measurement to ensure the programs goals and objectives and operational controls are being met.

MFWQTC has an onsite laboratory responsible for all process, discharge monitoring required analyses, and pretreatment/ compliance industrial waste monitoring. The laboratory maintains a quality assurance program which includes SOPs and a Quality Assurance Manual.

A third party laboratory is responsible for the specific AOAC testing required by EPA 503. Recent results show available Nitrogen above the guaranteed value of 5%.

Progress continues in each process area as more information is beginning to be controlled in real time.

Element Requirements (From the Guidance Manual)

1. Establish and maintain regular monitoring and measurement procedures and practices for all biosolids management activities to accomplish the following:
 - a) Ensure compliance with applicable legal and other requirements



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- b) Measure biosolids program performance at critical control points
- c) Track progress toward achieving program goals and objectives
- 2. Record monitoring and measurement results and maintain records as established in the recordkeeping procedures under Element 12.
- 3. Require contractors to establish and maintain regular monitoring and measurement procedures and practices for all their assigned biosolids management activities, as defined in their service agreements.

Audit Results

- 1. The following should be removed from the monitoring and measurement column and operational control columns should be switched to better represent what is being monitored.

Critical Control Point	Operational Control	Monitoring Parameter
Secondary Solids Thickening	Total Solids	Laboratory Testing
	TS	Laboratory Testing
	Total Volatile Solids	Laboratory Testing
Anaerobic Digesters	TVS	Laboratory Testing
	Volatile Acids Alk Ratio	Laboratory Testing
	%DS	Laboratory Testing
	pH	Laboratory Testing
	%VM	Laboratory Testing

- 2. The following items are listed under monitoring and measurement, but it is unclear what is monitored or that no record of measurement is being made:

Secondary Solids Thickening

Capacities for Thickened Solids Holding Tanks, Dewatering and Dryers. Recommend to remove completely from list. There is not a good monitoring or measurement procedure for these.

Thickened Solids Holding Tanks

Preventative Maintenance: There is no monitoring parameter listed.

Anaerobic Digesters

VS Loading: There is no monitoring parameter listed.

Hydraulic Retention Time: Recommend to remove from the list.

Capacity in Dewatering and Dryers: No monitoring parameters listed.



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Gas Flow Totalizer: Recommend to remove from list.

Preventative Maintenance: No monitoring parameter listed.

Blend Well:

Preventative Maintenance: No monitoring parameter listed.

LEL Alarm: No documented procedure when an alarm occurs.

It was also discovered during the audit there are no scheduled preventative maintenance requests for any stationary hydrogen sulfide monitoring equipment located in the Main Equipment Building.

3. Waste Management does not currently hold a contract for the biosolids activities they are performing. Therefore, EMS activities related to monitoring and measurement have not been documented.

Opportunity for Improvement

The auditors recommend the moisture balances located in the Waste Activated Sludge (WAS) process area undergo the same quality check procedures as the moisture balances in the dryer process area.

On all shift reports, the auditors recommend having reference to the acceptable value/range when an operator is recording readings. If an acceptable value/range was listed next to the recorded value, then the operator would know immediately if the value was out of range.

Observation

During staff interviews, the rise rate was said to be performed two times per shift. Upon inspection of the shift reports and logbook entries, dates 5/14/09 and 6/1/09, the rise rate is only being recorded one time per shift for the entire area.

Strength

Two years worth of proficiency testing results were requested from the in house laboratory for the following test parameters for solid samples: Total Solids, Total Suspended Solids, Volatile Solids, pH and Alkalinity. The information obtained from the laboratory shows a proficiency of 94% of the results reviewed.

Element 13 – Monitoring and Measurement receives a Major Nonconformance (09) due to the items listed above.



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Element 14 – Nonconformances: Preventative and Corrective Actions

Process Description

The EMS Coordinator does a good job in documenting nonconformances as a result of internal and external audits.

Element Requirements (From the Guidance Manual)

1. Develop and implement a procedure to investigate any noncompliance with applicable regulatory requirements or nonconformance with internal EMS procedures identified during routine monitoring and measurement or periodic internal EMS audits.
2. Develop and implement a procedure to identify the cause and take actions to correct the nonconformance.
3. Develop and implement a procedure to document the necessary corrective action to prevent a recurrence.
4. Develop corrective action plans to address non conformances identified during routine monitoring and measurement and identify the nonconformance, the root cause(s), and the corrective action being taken. In the corrective action plans, identify changes to policies, programs, plans, operational controls, and monitoring and measurement procedures to prevent future nonconformances.
5. Establish formal corrective action plans to address findings of internal EMS audits and audits conducted by third parties. Document corrective action plans and describe what actions will be taken to address the audit findings, the individuals responsible, the estimated completion date, and required resources to develop and implement corrective and preventive action. Include recommended changes to policies, programs, plans, operational controls, and monitoring and measurement procedures to prevent future nonconformances. Document these changes in the corrective action plan and in the EMS manual and other relevant EMS documentation.
6. Track progress in completing the corrective actions and periodically update to reflect completion.

Audit Results

1. Conforms.
2. Conforms.



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3. Document 14003, Appendix 14B Corrective/Preventative Action Plan Spreadsheet, lists Internal Audit #1 Major Nonconformance 04 and states “Contracts for outside contractors do not adhere to the guidelines [...] set forth by the National Biosolids Partnership. The same document lists Internal Audit #2 Major Nonconformance 01B and states “The contract for Waste Management does not adhere to the EMS Standard [...]”. The same nonconformance will be cited during the current internal audit. Therefore, corrective actions have not been adequate in preventing a reoccurrence of nonconformances.
4. Conforms.
5. Conforms.
6. The following nonconformance has not been closed out even though it is complete per the EMS Coordinator: Internal Audit #2 Nonconformance 01A. Therefore, nonconformances have not adequately been tracked for completion.

Element 14 – Nonconformance and Corrective Action receives a Major Nonconformance (10) due to the items listed above.

Element 15 -- Biosolids Management Program Performance Report

Process Description

The performance report is a snapshot to date of the amount of biosolids produced, compliance performance, goals and objectives performance, summary of the corrective actions and any audit results. This report is used to inform the public and other interested parties of major accomplishments or happenings concerning the biosolids EMS.

Element Requirements (From the Guidance Manual)

1. Complete a periodic written biosolids management program performance report (at least annually), summarizing the performance of the biosolids management program. The report shall contain appropriate summaries of monitoring, measurements, and other results that demonstrate the performance of the biosolids program relative to the organization’s goals, objectives, and legal requirements, including those biosolids management activities conducted by contractors. The report also shall provide summaries of performance relative to other voluntary adopted requirements, the organization’s progress toward achieving its biosolids



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program goals and objectives, and a summary of its independent, third-party EMS verification audit results.

2. Make the periodic biosolids management program report available to the public. The organization shall have the flexibility of using other methods, including electronic methods such as a biosolids program webpage, in addition to or in lieu of a written periodic performance report.

Audit Results

1. Conforms.
2. The program performance report is made available to the public, however, the document contains multiple links to internal MSD drives which the public would not have access.

Opportunity for Improvement

The auditors believe the content of the Program Performance Report is not applicable to its intended audience. The auditors believe entirely too much information is contained in the summary.

Element 15 – Program Performance Report receives a Minor Nonconformance (04) due to the items listed above.

Element 16 -- Internal EMS Audit

Process Description

A procedure is in place for the Internal EMS Audit and is followed during the interim internal audit. The internal audit team develops a scope and plan for the audit and presents it to the EMS Coordinator. Further development of questions and checklists is also done during this audit period.

Element Requirements (From the Guidance Manual)

1. Establish and maintain an internal audit program to analyze the EMS for biosolids periodically and to determine whether it is effectively meeting its biosolids management policy, program requirements, and biosolids program goals and objectives. The internal EMS audit program shall



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define the scope, frequency, and methodology of the audits, assign responsibility for conducting the audits and communicating their findings, and designate individuals to whom these findings are to be conveyed. The internal audit also shall evaluate the organization's performance relative to established biosolids program goals, objectives and performance measures. The internal EMS audit program shall cover all the organization's biosolids management program activities, including those performed by contractors.

2. Report internal EMS audit results to the organization's management in a manner that allows them to take action to make necessary modifications to the EMS and biosolids management program. The person responsible for the biosolids management program shall develop, or delegate the development of, a comprehensive corrective action plan addressing each nonconformance identified by the internal audit.
3. Maintain, at a minimum, the following documents and records, as applicable, relating to the organization's audit program:
 - a) Description of audit methodology, protocol, scope, and schedule
 - b) Identification of lead auditor(s), qualifications, and description of roles and responsibilities of auditors, management representatives, and others that may participate in, review, or be expected to act upon the audit.
 - c) Corrective and/or preventive action plans prepared resulting from an audit, and any related changes made to policies, plans, procedures, and work practices that occur as a result of an audit's findings, evaluation, or follow-up actions.

Audit Results

The process was found to be in adherence with NBP expectations.

Element 17 -- Management Review

Process Description

A procedure is in place for the Management Review of entire EMS procedures. The review is to be a general overview of what has occurred during the past year but specifically to review adequacy, suitability, effective and overall performance.

Element Requirements (From the Guidance Manual)

1. At intervals the management determines appropriate, review the EMS and its performance relative to policy commitments, goals, objectives, and established performance measures to ensure its continuing stability,



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adequacy, and effectiveness. The management review shall address the possible need for changes to policy, the goals and objectives, the biosolids management program, and other EMS Elements based on internal EMS audit results, external verification EMS audits by third parties, changing circumstances, and the commitment to continual improvement. The management review shall be documented. Any changes to policies, plans, procedures, and work practices that are made as a result of the review also shall be documented.

2. Maintain, at a minimum, the following related to the organization's management reviews:
 - a) Schedule and scope for review
 - b) Documentation of findings, evaluation, and follow-up action
 - c) Documentation of changes to policies, plans, procedures, practices and other EMS Elements that occur as a result of the management review findings, evaluation, or follow-up actions
3. Assign a lead person or persons to be responsible for organizing and conducting the review.

Audit Results

1. Conforms.
2.
 - a. Conforms.
 - b. Actions were noted in the management review document, however, no person was assigned to follow-up. It seems no action plan has been initiated to address the action items in the document. No progress of follow-up actions have been made. Specifically: Work Group Meetings Action Item, "The reviewers would like to see more and more focus on the critical control area of the plant concerning standard operating procedure." And, Changing Circumstances and Continual Improvement Action Item, "In the future, the review team would like to see critical area improvements become a larger part of the goals and objectives." If no action plan is implemented, the auditors believe no progress will be made on these two items.
 - c. Conforms.
3. Conforms.

Opportunity for Improvement

The auditors recommend the Management Review Team be more specific in their recommendations. For example, the Team would like to see critical area improvements become part of the goal and objectives. The critical areas need to be defined.



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Element 17 –Management Review receives a Minor Nonconformance (05) due to the items listed above.



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4. Appendices

A. List of Interview Participants

Allen Adams	Fire and Safety Administrator
Robert Bates	Wastewater Process Supervisor
Sharon Worley	Senior Technical Services Engineer
David Coe	EMS Coordinator
Caryn Mulligan	Process Supervisor
David Roth	Trainer
Rob Roy	Maintenance Planner
Dan Sammons	Computer Room Operator
Mike Scott	Process Technician
Randy Sutton	Process Supervisor
Victor Dywer	Process Technician II
Richard Warman	Maintenance Supervisor
Pat Weathers	Operations Administration



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B. List of Requested Resources

EMS Manual
Appendix 3A, Critical Control Points
DAFT Unit Rotation Schedule
WAS Area Overview
WAS Senior Operator Report
MFWTP – WAS Operator Training Certification Form
Waste Activated Sludge Thickening Unit Process Control Procedure #6
Solids Dewatering Process Chapter 17
MFWTP – Dewatering Operator Training Certification Form
Dewatering Operator Report
Polymer Calculator
Anaerobic Digestion Process Chapter 16
MFWTP – Digestion Operator Training Certification Form
Digester and Peripheral Equipment Checklist
Digestion SOP (Not Approved)
Dewatering SOP (Not approved)
Unusual Incident Report Dated May 18, 2009
PM reports from SAP for Digestion, WAS
Master Training List
Air Pollution Permit 54-03-0 for the Flare
Appendix 4A, Legal and Other Requirements
Appendix 5A, Goals and Objectives
Appendix 14B, Corrective/Preventative Action Plan Spreadsheet
Emergency Response Manual
Contractor Requirements Sheet for contracts
Louisville Green Website
MSD Website, EMS Page
Meeting Minutes Core Team Year 2009
B&H Amended Contract
Dewatering, WAS, Digestion Shift Reports, 9-2-04, 6-10-06, 6-1-09
WAS Logbook, 3-14-07 to 8-27-07