CITY OF ALBANY
BIOSOLIDS MANAGEMENT PROGRAM
DEQ/EPA ANNUAL REPORT — 2009

I. Background/General

A. Facility: Albany-Millersburg Water Reclamation Facility
405 Davidson Street, NE
Albany, OR 97321

NPDES Permit #: 102024, EPA #OR-002880-1, DEQ File 1098

Facility Contact: Herb Hoffer, Environmental Services Manager

B. Reporting Period: Calendar Year 2009

C. Narrative Descriptions

The City of Albany's Wastewater Treatment Plant has been in the process of a major upgrade and reconfiguration over the past several years, and 2009 saw completion of the facility structures. During 2009 the entire treatment process was in transition including essential steps in the biosolids generation process. The 2009 Biosolids Annual Report describes steps both in the previous existing wastewater process as well as the process for the new facility, now termed the Albany-Millersburg Water Reclamation Facility (WRF).

1. **WWTP Biosolids generation process:** The City of Albany operated a Wastewater Treatment Plant (WWTP) providing secondary treatment using the activated sludge process until February 10, 2009 when it was replaced by a temporary process and then by the Albany-Millersburg Water Reclamation Facility (A-M WRF). Overall in 2009, the City treated 2,692 million gallons of wastewater of which approximately 103 million gallons was permitted industrial wastewater. The City of Albany does not accept septage or hauled waste.

   Prior to February 10, 2009**,** the City of Albany WWTP biosolids generation process consisted of primary and secondary clarification, dissolved-air flotation thickening of waste-activated sludge, and anaerobic digestion. Biosolids were then thickened using Andritz belt-filter presses (2), and stored in covered bins. All land applied biosolids in 2009 were produced by this system. Major features of this facility are summarized as follows:

   - Headworks structure with a mechanically-raked bar screen and gravity grit removal.
   - Two circular, primary clarifiers.
   - Two complete-mix aeration basins with variable-output aeration blowers.
   - Two circular, secondary clarifiers.
   - Primary (Raw) sludge pump station and sludge recirculation (RAS) pump station.

- Two rectangular, dissolved-air, flotation thickeners with appurtenant pumping and dry-polymer facilities.

- Two circular, fixed-cover, primary anaerobic digesters with gas mixing and pumped recirculation/water heating system with a primary and stand-by boiler. The primary digesters operate in the mesophilic range 95 to 131 degrees F.

- One floating-cover, secondary, anaerobic digester without mixing or heating, used for sludge storage and gas holding, and two secondary digesters functioning primarily as holding tanks for the biosolids thickening process.

- Solid-bowl, decanter centrifuge for post digestion biosolids thickening, available if needed.

- Pumping and stand pipe facilities for loading of digested liquid biosolids, available if needed.

- Two (cake) Andritz belt-filter presses with liquid or dry polymer capabilities.

- Two 1,750 cubic yard capacity covered bins for cake storage with inclined-screw augers for loading.

2. WWTP Biosolids preparation process:
Waste activated sludge was thickened by dissolved-air flotation prior to pumping to digestion. The City had the option of using a solid-bowl decanter centrifuge (Sharples PM-38000) for thickening of digested biosolids prior to land application, or using the Andritz belt filter presses to produce cake. Another option was to pre-thicken the digested sludge with the centrifuge prior to the belt presses to increase efficiency of the belt presses.

3. WWTP Biosolids storage and application processes:
Belt filter press thickening of biosolids was used for all finished biosolids thickening in 2008 and 2009. The biosolids cake was stored in the biosolids storage facility at the Wastewater Treatment Plant until weather conditions were suitable for application. The cake was loaded directly into the truck-mounted Knight spreader via screw conveyors, and hauled capacity is twelve cubic yards of material. The cake was then applied to application sites permitted through DEQ.

All of the biosolids land applied in 2009 were produced in this system between end of land application in 2008 (October 31) and changeover to the new plant on February 10, 2009. The Class B biosolids was physically separated from any of the solids produced by the new plant.

Additionally, the old primary digesters were cleaned by contractors and the solids were hauled to Coffin Butte Landfill. The total amount of solids taken to Coffin Butte from the digester cleaning operation was just over 1,053 tons of thickened cake.

4. New Water Reclamation Facility (WRF) treatment and biosolids generation process:
On February 10, 2009 new wastewater treatment processes began: influent wastewater flowed through a new headworks facility using fine screening, with screened wastewater moving into vertical loop reactors (VLRs) for aerobic digestion. New large volume secondary

clarifiers were used followed by new chlorine contact basins. While the liquid phase was basically complete in February 2009, an interim system was used to treat the solids waste portion. During the interim solids system, VLRs were used as aerobic digesters. Once the digestion process was completed a temporary pipe from the VLRs took treated batches to the existing Andritz belt filter presses and the solids were stored in the existing East biosolids bin. The previously pressed anaerobically digested biosolids were kept physically separated in the West biosolids storage bin.

The interim process, using VLR basins, did not produce solids of acceptable quality for land application in accordance with EPA, DEQ, and requirements under our Environmental Management System (EMS). Previous permits had been obtained for that possibility and the solids were taken to Coffin Butte Landfill in Corvallis, Oregon, operated by Allied Waste.

On September 21, 2009 the A-M WRF construction was completed, with the addition of two new aerobic digesters and a Siemens Cannibal Interchange Reactor solids reduction system. Solids produced in the new process were monitored for EPA, DEQ and EMS biosolids parameters; however the sludge produced was not of acceptable quality for land application. Therefore, our contingency plan was put into place and solids were disposed of at Coffin Butte Landfill. In 2009 we hauled 4,700 wet tons of thickened cake to the Coffin Butte landfill, including the 1,053 wet tons from the old primary digester cleaning.

Major features of the WRF facility include:

- Headworks structure with mechanically-cleaned perforated plate screens with vortex grit removal.
- Two chains of three Vertical Loop Reactors (VLRs) with variable disc aerators and centrifugal blowers to supply air.
- Three large capacity circular secondary clarifiers
- Primary (Raw) sludge pump station and sludge recirculation (RAS) pump station.
- Two rectangular, open-air aerobic digesters with forced air blowers.
- Two rectangular, open-air interchange reactors with rotating drum screens and Hydro-Cyclone grit removal.
- Two (cake) Andritz belt-filter presses with liquid or dry polymer capabilities.
- Two 1,750 cubic yard capacity covered bins for cake storage with inclined-screw augers for loading.

5. Annual goals, accomplishments, problems, changes:

Albany is a charter member in the National Biosolids Partnership (NBP) and formally committed to the NBP's Code of Good Practice in 2000. In 2006 Albany's Environmental Management System (EMS) was certified by NBP following a third party audit, and in May 2007 the City completed its first annual interim EMS audit and in so doing became the 11th

agency nationwide to reach platinum status with the NBP**.**

- In May 2009, Albany staff performed an internal EMS audit with the assistance of a representative from Clackamas County's Water Environment Services biosolids EMS team. The results of this audit were no nonconformances related to the required annual review of internal management documents.
- The City's biosolids EMS continues to work as a framework of beliefs and methods that ensure the City produces a high quality product that is managed with implications to product quality, environmental impact, and economic sustainability in mind. The absence of any major or minor nonconformances demonstrate the City's commitment to continual improvement – the founding principle of the biosolids EMS program. Recognized strengths of Albany's biosolids program include public outreach and our commitment to a goal setting process and continual improvement through the City's Environmental Management System. Biosolids program outreach was highlighted in 2009 by publication of Albany's Biosolids newsletter.

The third quarterly biosolids sample (7/14/09) showed an increase in the level of Ni, Zn and Mo. Even though the results were less than 65% of the EPA clean Biosolids level (40 CFR 503.13 Table 3), staff collected additional samples in September (9/1/09) and once in November (11/02/09) and in December (12/16/09). These tests show the metals returning approximately to historic levels. A similar increase in these metals was documented in 2008. The City is formalizing a plan to investigate potential sources of the metals collectively or individually. No definitive cause has been identified but we are continuing to monitor the metals data and implement preventative and corrective actions in accordance with our Biosolids EMS.

Also, in 2009 the City began revisions to Albany's Biosolids Management Plan (BMP) to reflect the changes in structures and processes at the new WRF. The revised BMP has been submitted to DEQ for their review and public comment.

D. Total Annual Production

1. Amount generated/prepared:	82.1 dry tons Class B Biosolids (Jan.1 - Feb.10, 2009)
2. Amount land applied:	164 dry tons or 1,392 cubic yards of cake (Includes Class B generated after end of hauling 2008)
3. Amount taken to landfill:	4,700 wet tons of thickened cake

E. Total Application Acres Utilized: 102

II. Pollutant Monitoring

A. Required frequency: Four times per year, minimum.

B. Analytical Results: See Table 1 & 2.

III. Pathogen Reduction

A. WWTP Operations Prior to February 10, 2009

Sampling and analysis for specific pathogens was not required and was not performed. Pathogen reduction is accomplished through the anaerobic digestion process. Sludge was retained in the primary digesters for an average of 36 days at an average temperature range of 95.9 to 96.2 degrees Fahrenheit and consistently met the PSRP requirements for Class B biosolids as defined in 40 CFR Part 503.32. Digester temperature monitoring data and detention time data are shown in Attachment A.

B. Interim Process and A-M WRF

Following February 10, 2009 sampling and analysis for pathogen reduction was conducted in accordance with 40 CFR Part 503.32. The City of Albany intends to verify Class B pathogen reduction as described in the revised Biosolids Management Plan (BMP) and excerpted below.

> Alternative 1: 40 CFR Part 503.32(b)(3) considers sludge treated in one of the PSRPs listed in Appendix B of 40 CFR Part 503 to meet Class B biosolids criteria for pathogen reduction. The following PSRP is primarily used at the A-M WRF:
>
> Aerobic Digestion – A process where sludge is agitated with air or oxygen to maintain aerobic conditions for a specific mean cell residence time at a specific temperature. Values for the mean cell residence time and temperature shall be at least 40 days at 20^{o}C or 60 days at 15^{o}C. During the winter months, temperatures may be below 15^{o}C. Using process design information, it is anticipated that infrequent wasting will be required using the Cannibal® system. Therefore, it is projected that under favorable conditions, wasting will occur only after the temperatures are above 15^{o}C for 60 days or more.
>
> Alternative 2: If the parameters from Alternative 1 are not attainable, testing will be performed for fecal coliform density as an indicator for pathogens per 40CFR Part 503.32(b)(2) which states: the geometric mean of seven samples shall be less than 2 million colony forming units (CFUs) per gram of total solids. The seven samples shall be taken near the time of disposal or application of the biosolids.

Representative sampling was conducted for solids produced during the interim VLR process and, when completed, for solids produced by the aerobic digester process. Pathogen testing was within limits, however Vector Attraction Reduction (VAR) criteria and regulatory criteria did not meet Class B standards (see Table 3).

IV. Vector Attraction Reduction

A. WWTP

Prior to February 10, 2009 the City consistently met volatile solids reduction of 38% through the primary digesters, required in 40 CFR Part 503.33. This is demonstrated through methods and data shown in Attachment B.

B. Interim Process and A-M WRF

To meet the biosolids vector attraction reduction requirements, the City of Albany must demonstrate compliance with one of EPA's Part 503 vector attraction reduction rule options. EPA lists 12 compliance options; several of the options are not attainable or not practical for Albany's biosolids program as specified in Albany's revised BMP. Albany used the specific oxygen uptake rate (SOUR) for aerobically digested biosolids as stated below.

> The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20°C. (40 CFR 503.33 Alternative #4)

Sampling and analysis for Vector Attraction Reduction (VAR) was conducted in accordance with 40 CFR Part 503.33. The samples were analyzed and evaluated for EPA, DEQ and EMS standards. The samples did not meet all standards during the interim process and were disposed of at the Coffin Butte landfill.

V. Biosolids Quality

Statement of Biosolids Quality: The City of Albany continues to strive to produce 100% Class B Biosolids. The sample data listed in Table 1 shows that the measured concentrations for all metals were below the 40 CFR Part 503, Table 3 levels. All of the metals tested were also below the Part 503, Table 1 levels.

As noted in this report solids produced during the interim process have not met regulatory standards using EPA, DEQ and Environmental Management System parameters and have not been land applied. The new WRF is in a start up and transition phase and Albany staff continues to analyze operation and design data. We are consistently producing excellent effluent and working to improve the quality of the biosolids product.

VI. Application, Management, and Reporting Requirements

A. Biosolids Test Data: See Tables 1 and 2.

B. A-M WRF Compliance Test Data: See Table 3.

C. Site-specific Application Information: See Table 4.

D. Soil Sample Data for third consecutive year of application sites: See Attachment C.

Table 1— Pollutant Monitoring
Test data is expressed in mg/kg dry weight.

Date	Cd	Cu	Pb	Ni	Zn	Cr	Ag	As	Se	Mo	Hg
01/08/2009	2.3	289	41.5	35.5	1100	40.2	10.9	ND @ 5.0	ND @ 5.0	15.9	1.6
01/16/2009 ALC	2.2	283	36.6	33.6	1020	40.7	10.5	ND @ 5.0	ND @ 5.0	18.7	1.1
01/16/2009 Delta	ND@2.75	245	33.4	31.4	898	33.9	11.2	3.6	5.77	18.0	1.3
04/02/2009	1.7	227	30.6	26.1	1110	31.2	8.4	ND @ 5.0	ND @ 5.0	15.8	1.6
07/14/2009	ND@1.0	240	33.9	35.1	1790	28.0	8.9	ND @ 5.0	ND @ 5.0	23.1	1.1
09/01/2009	2.0	248	37.9	40.3	1310	31.2	8.7	ND @ 5.0	ND @ 5.0	20.5	1.7
11/02/2009	2.0	291	33.8	36.3	1260	37.0	8.8	6.32	ND @ 5.0	20.8	2.9
12/16/2009	1.4	195	22.9	30.2	769	24.9	5.4	ND @ 5.0	ND @ 5.0	15.1	0.5
Average	1.7[1]	252	33.8	33.6	1157	33.4	9.1	3.1[2]	2.91[3]	18.5	1.5

1/16 was a split between ALC and Delta labs
9/1 was a follow up sample taken in 3rd quarter because of rise in Zn level
12/16 was a follow up sample to check on metals.
[1] Cd 1/16 averaged with ND@ 2.75 as 1.38; Cd 7/14 averaged with ND@ 1.0 as 0.5
[2]As averaged with ND@ 5.0 as 2.5
[3]Se averaged with ND@ 5.0 as 2.5

Table 2—Nutrient Monitoring

Test data is expressed in % dry weight, except pH which is standard units

Date	K	PO4	NH3	NO3	TKN	Tsol	% Vol	pH
01/08/2009	0.14	1.22	0.71	ND @ 0.01	5.33	18.2	65.0	7.6
01/16/2009 ALC	0.17	1.21	0.69	ND @ 0.01	4.93	18.1	63.6	8.0
01/16/2009 Delta	0.13	1.00	0.80	ND@ 0.04	5.40	17.5	55.2	7.6
04/02/2009	0.15	1.19	0.40	ND @ 0.01	6.68	13.9	75.4	7.4
07/14/2009	0.41	1.89	0.36	ND @ 0.01	6.50	13.2	76.7	6.7
09/01/2009								
11/02/2009	0.28	1.30	0.19	ND @ 0.01	5.52	13.8	70.4	6.4
12/16/2009	0.52	1.72	0.22	ND @ 0.01	6.86	13.9	74.4	
Average	0.26	1.36	0.48		5.89	15.5	68.7	7.3

1/16 samples were split between ALC and Delta labs

9/1 was a follow up sample taken in 3rd quarter because of rise in Zn level and tested just for metals.

12/16 was a follow up sample to check on metals.

Table 3 AM-WRF Compliance Test Data 2009			
Date	**Fecal Coliform Density[1]**	**SOUR[2]**	**Comments**
3/20/09		7.7	
3/30/09		0.5	
3/31/09	147,000		
4/7/09		17.20	
4/17/09		5.22	
4/24/09		5.26	
5/26/09		1.3/1.6	2 different VLR trains
6/9/09		.4/.8	2 different VLR trains
6/16/09	ND@49		
6/22/09		0.30	
6/23/09	360,000		
7/14/09	1,150,000		
7/17/09	119,000		
7/20/09		2.20	
8/21/09		7.00	
8/24/09		7.00	
9/1/09	98,000	2.90	
9/22/09	119,000		
10/15/09		0.86	
10/21/09		6.70	
11/16/09		1.80	
11/17/09	16,300		
11/18/09		4.40	
11/24/09		1.20	
12/23/09		10.0/13.0	2 different aerobic digesters
12/31/09		3.4/11.0	2 different aerobic digesters

1. Fecal coliform density units – CFUs/gm TS
2. Specific Oxygen Uptake Rate (SOUR) units – mg O_2/hr/gm TS

Table 4 – Land Application Site Information								
	Site ID #	**Location (twn, rge, sec)**	**Crop(s)**	**Acres applied**	**N lb/acre applied**	**Application Rate DT/acre**	**Total D/T Site**	**Seasonal Restrictions**
Marble	1	14S, 1W, 2	Pasture/ Hay	11.08	70.57	1.91	21.11	0.25 inches of rainfall/24 hours
	2	14S, 1W, 2	Pasture/ Hay	10.89	71.47	1.95	21.28	0.25 inches of rainfall/24 hours
Miller	2	11S, 4W, 22	Pasture	18.93	50.01	1.51	28.56	0.25 inches of rainfall/24 hours: Apr. – Oct.
Wirth	51	13S, 3W,15	Fescue	61.03	50.67	1.52	92.86	0.25 inches of rainfall/24 hours: June 1 – Oct 31

"I certify, under penalty of law, that the information that will be used to determine compliance with the Class B pathogen requirements in Sec. 503.32(b), the vector attraction reduction requirement in Sec. 503.33(b) (1), and the site restrictions in Sec. 503.32(b) (5) for each site on which Class B sewage sludge was applied, was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

_____ Date: _____

Herb Hoffer, Environmental Services Manager