Westernik,Anna

From: Evelyn Mahieu [Evelyn.Mahieu@uosa.org]
Sent: Tuesday, October 07, 2008 3:50 PM
To: Westernik,Anna
Subject: 2008 Local Limits Re-evaluation
Attachments: 2008 UOSA Local Limits.pdf

Anna:

Thank you for the Pretreatment Audit Report.

Recommendations one (1) and two (2) listed on Page 21 of the report will be implemented. On recommendation three (3) I am providing the following information:

a) SIU Survey - UOSA submitted the 2008 SIU survey with a cover letter dated March 24, 2008.
b) Attached is an electronic copy of the 2008 Local Limits re-evaluation. The hard copy was mailed to your attention today.
c) Streamlining - I will continue to work on the three jurisdictions Sewer Ordinances language. As you know Fairfax County administers Pretreatment requirements in the UOSA portion of their service area and they will modify the County's Ordinance.

By the way, I did not bind the Local Limits document. If you have a preference for bound or unbound documents, let me know.

Thanks, E

Evelyn Mahieu, Ph.D.
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upper occoquan sewage authority

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Charles P. Boepple
Executive Director

Michael D. Reach
Deputy Executive Director

October 6, 2008

Ms. Anna T. Westernik
Environmental Specialist II
Department of Environmental Quality
Northern Virginia Regional Office
13901 Crown Court
Woodbridge, Virginia 22193

RECEIVED
OCT 8 2008
DEPT. OF ENVIRONMENTAL QUALITY-NRO

RE: Pretreatment Program – Local Limits Re-evaluation

Dear Ms. Westernik

Enclosed is the Upper Occoquan Service Authority's (UOSA's) Local Limits Re-evaluation required in the VPDES Permit No. VA0024988, Part I.D.1.b.

If you have any questions concerning the enclosed local limits document, do not hesitate to contact Evelyn Mahieu, UOSA's Regulatory Affairs Coordinator at (703) 227-0202 or me at (703) 830-2200.

Sincerely,

Charles P Boepple

Charles P. Boepple
Executive Director

CPB/ET
Enclosure

UPPER OCCOQUAN SERVICE AUTHORITY
LOCAL LIMITS

October 2008

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EXECUTIVE SUMMARY

The Upper Occoquan Service Authority (UOSA), in compliance with Part I.D.1.b of its Virginia Pollutant Discharge Elimination System permit (VPDES No. VA0024988) re-evaluated its local limits to meet the following objectives:

- Prevent the introduction of pollutants into the UOSA sewerage system that may interfere with its operation;
- Prevent the passthrough of untreated pollutants that may violate UOSA's VPDES permit; and,
- Prevent the introduction of pollutants that may cause the UOSA final effluent, sludge, or other UOSA product to be unsuitable for reclamation and reuse.

This document describes the methodology used by UOSA to develop technically based local limits.

The potential impact from the studied pollutants on UOSA was evaluated with respect to the three objectives outlined above. The Maximum Allowable Headwork's Load (MAHL) for the UOSA plant for each pollutant was determined by applying the most restrictive calculated value. Once the MAHL was determined for each pollutant, the maximum allowable industrial load (MAIL) was calculated by subtracting background pollutant (commercial/domestic) load from the MAHL. The MAHL and MAIL were calculated using the methodology outlined in EPA guidance documentation[1]. Site specific data were used when available.

UOSA has four member jurisdictions; Fairfax County, Prince William County, the City of Manassas, and the City of Manassas Park. According to the UOSA Service Agreement, each jurisdiction owns a percentage of UOSA's treatment and hydraulic capacity. The UOSA plant total MAHL and MAIL were first calculated and the total MAIL

[1] USEPA, Office of Wastewater Management 4203, Local Limits Development Guidance, EPA 833-R-04-002A, July 2004.

was then distributed to the four UOSA member jurisdictions based on their owned percentage of the UOSA plant capacity.

Both maximum plant capacity (54 mgd) and 2007 average daily flow (ADF) scenarios are used to calculate MAHL and MAIL. It is important to realize the basis for local limits are dynamic. Because local limits are affected by industrial and domestic flow ratios, UOSA believes it is necessary to evaluate local limits whenever additional Significant Industrial Users (SIUs) enter the service area. Accordingly, the MAHL and MAIL calculated herein may change based on additional SIUs entering the UOSA Service Area.

1.0 INTRODUCTION

UOSA is required to develop, issue and enforce control mechanisms (permits) for SIUs. Permits issued to SIUs contain numerical discharge limits for certain toxic pollutants as applicable. Numerical limits are based on the technical analysis herein.

This document describes the methods and data used to calculate the MAHL and subsequent MAIL for each pollutant studied.

2.0 GENERAL METHODOLOGY

Each evaluated pollutant was studied with respect to the three fundamental objectives: interference, passthrough, and residuals reuse. The MAHL for each pollutant is equal to the most restrictive value. The following toxic pollutants were evaluated: arsenic, cadmium, copper, chromium, cyanide, lead, mercury, nickel, silver, and zinc.

Section 3.0 describes the specific calculations used for determining MAHL for the studied toxic pollutants. Section 4.0 describes the methods used to determine MAIL and the methods used for allocation to SIUs in each jurisdiction. The specific data used are included in Section 5.0 and the Appendices. Section 6.0 contains data summaries showing available pollutant load based on the methodology described herein.

3.0 MAXIMUM ALLOWABLE HEADWORK'S LOADING CALCULATIONS

This section describes the applicable standards, criteria and equations necessary to calculate the MAHL for each studied pollutant.

3.1 Plant Process Inhibition

Three treatment processes were evaluated to assess the impact of pollutants to prevent process inhibition. Threshold inhibitory levels for activated sludge, nitrification,

and anaerobic digestion were used to calculate MAHL designed to protect plant treatment processes.

UOSA used process inhibition values provided by EPA[1].

3.1.1 Secondary Biological Processes (Activated Sludge/Nitrification)

$$L_{INHIB2} = \frac{(8.34)(C_{CRIT})(Q_{POTW})}{1-R_{PRIM}}$$

Where,

L_{INHIB2} = Maximum allowable headwork's load (lbs./day) based on inhibition of the activated sludge/nitrification process.
C_{CRIT} = Inhibition level for activated sludge/nitrification (mg/L).
Q_{POTW} = POTW average flow (MGD).
R_{PRIM} = Primary removal efficiency (as a decimal).

3.1.2 Anaerobic Sludge Digestion (Metals)

$$L_{INHIB/SLUDGE} = \frac{(8.34)(C_{CRIT})(Q_{DIG})}{R_{SEC}}$$

Where,

$L_{INHIB/SLUDGE}$ = Maximum allowable headwork's load (lbs./day) based on anaerobic digestion inhibition.
C_{CRIT} = Anaerobic Sludge Digestion inhibition level (mg/L).
Q_{DIG} = Sludge flow to digester (MGD).
R_{SEC} = Secondary removal efficiency (as a decimal).

3.1.3 Anaerobic Sludge Digestion (Cyanide)

$$L_{INHIB/SLUDGE} = \frac{(L_{INF})(C_{CRIT})}{C_{DIG}}$$

Where,

$L_{INHIB/SLUDGE}$ = Maximum allowable headwork's load (lbs./day) based on anaerobic digestion inhibition.
L_{INF} = Existing headwork's load (lbs./day) based on existing influent concentrations.
C_{CRIT} = Anaerobic Sludge Digestion inhibition level (mg/L).
C_{DIG} = Pollutant level in sludge to digester (mg/L).

3.1.4 Final Inhibition Limitation

L_{INHIB} = Minimum of L_{INHIB2} and $L_{INHIB/SLUDGE}$. This value is equal to the maximum allowable headwork's load based on process inhibition.

3.2 Pass-Through (Effluent Quality)

Two factors were considered to assess the impact of pollutants on UOSA effluent quality. Virginia Water Quality Standards (WQS) and VPDES permit limits. UOSA's VPDES permit does not contain limits for the studied pollutants; therefore, Virginia WQS were used to calculate MAHL to prevent passthrough. The more stringent of the "chronic" or "acute" WQS were used to determine the MAHL. No dilution factor attributable to UOSA's receiving stream was assumed when developing the MAHL to protect aquatic life because UOSA is greater than 99% of the in-stream concentration.

The MAHL to prevent passthrough were calculated using the following equations.

3.2.1 Water Quality Criteria - Chronic/Acute

$$L_{CHRONIC/ACUTE} = \frac{(8.34)[C_{WQ}(Q_{STR}+Q_{POTW})-(C_{STR}Q_{STR})]}{(1-R_{POTW})}$$

Where,

$L_{CHRONIC/ACUTE}$ = Maximum allowable headwork's load (lbs./day) based on chronic/acute water quality criteria.

C_{WQ} = Chronic/acute water quality criteria or standard (mg/L).

Q_{STR} = 7Q10/1Q10 receiving stream flow (assumed 0.0 MGD).

Q_{POTW} = POTW average flow (MGD).

C_{STR} = Background concentration in receiving stream (mg/L).

R_{POTW} = POTW removal efficiency (as a decimal).

3.2.2 Final Pass-Through Limitation

L_{PASS} = Minimum of $L_{CHRONIC/ACUTE}$. This value is equal to the maximum allowable headwork's load based on pass-through criteria.

3.3 Biosolids Reuse

Biosolids land application criteria are used in assessing the impact of pollutants on residuals reuse. UOSA's treatment processes result in two types of residuals; lime solids and biosolids. Lime solids are a result of the high lime process that follows secondary treatment and those solids are landfilled in a UOSA-owned industrial landfill and are not land applied. Biosolids are land applied and the analysis shown herein apply only to Biosolids. The majority of pollutants are removed by primary and secondary treatment; therefore, pollutant concentrations are greater in biosolids. UOSA used biosolids land application criteria to determine the MAHL to protect residuals reuse. The National Sludge Regulations (40 CFR, Part 503) were used as the standard for biosolids reuse.

The following equations are used to determine the MAHL based on residuals land application.

3.3.1 Biosolids Disposal Criteria – Land Application

$$L_{RESID\text{-}DISP} = \frac{(0.0022)(C_{CRIT})(Q_{DISP})}{R_{SEC}} \quad \text{(Metals)}$$

$$L_{RESID\text{-}DISP} = \frac{L_{INF} \times C_{CRIT}}{C_{DISP}} \quad \text{(Cyanide)}$$

Where,

$L_{RESID\text{-}DISP}$	=	Maximum allowable headwork's load (lbs./day) based on biosolids disposal options. (Land Application)
Q_{DISP}	=	Sludge to disposal (dry tons/day).
R_{SEC}	=	POTW removal efficiency through secondary treatment (as a decimal).
C_{CRIT}	=	Maximum pollutant concentration for sludge to disposal (mg/kg). (Land Application)
L_{INF}	=	Influent cyanide loading (lbs./day).
C_{DISP}	=	Pollutant level in sludge to disposal (mg/kg).

3.4 Final Maximum Allowable Headwork's Load (MAHL)

Once the MAHL values based on pass-through, inhibition, and reuse were determined, the minimum value for each pollutant became the limiting MAHL.

MAHL = Minimum of L_{PASS}, L_{INHIB}, and $L_{RESID\text{-}DISP}$. This value represents the maximum allowable headwork's load (lbs./day).

4.0 MAXIMUM ALLOWABLE INDUSTRIAL LOAD (MAIL)

This section describes the methodology UOSA used to determine the individual MAIL for each jurisdiction.

4.1 Allocation of Pollutant Load to Industry

EPA identifies four possible alternatives for allocating MAIL. These alternatives are:

1) Uniform maximum allowable concentrations based on the total flow from all industrial users;

2) Uniform maximum allowable concentration limits based on allocation of pollutant loading to only those industries contributing the pollutant of concern;

3) Proportionate reduction of the pollutant by each industrial user that discharges the pollutant, based on the industrial user's mass loading; and,

4) Technology-based limitation applied selectively to SIUs for a particular pollutant.

UOSA elected to use allocation method number 4 above. To determine the total pounds of pollutant industry may discharge, the uncontrollable (domestic/commercial)

load to the plant from all the jurisdictions were subtracted from the total plant MAHLs and a 10 percent safety factor applied. The following calculations were used to determine each MAIL.

4.1.1 Expansion and Safety Factor

L_{SF} = (MAHL)(SF)

Where,

L_{SF} = Load allocated as a safety factor (lbs./day)
SF = Safety Factor (10 percent)
MAHL = Minimum of L_{PASS}, L_{INHIB}, and $L_{RESID\text{-}DISP}$.

4.1.2 Background Pollutant Load

L_{DOM} = $(8.34)(C_{DOM})(Q_{DOM})$

Where,

L_{DOM} = Domestic/Commercial pollutant load (lbs./day)
Q_{DOM} = Domestic/Commercial flow (MGD)
C_{DOM} = Domestic/Commercial pollutant concentration (mg/L)

4.1.3 Maximum Allowable Industrial Load

MAIL = MAHL - L_{SF} - L_{DOM}

Where,

MAIL = Maximum allowable industrial load (lbs./day)
MAHL = Maximum allowable headwork's load (lbs./day)
L_{SF} = Safety Factor load (lbs./day)

4.2 Mass Based Industrial Effluent Limits

UOSA has elected to allocate MAIL to each jurisdiction based on its owned plant capacity. The calculated MAILs represent current and maximum flow scenarios. The industrial/domestic flow ratios change when new SIUs enter the UOSA Service Area. Accordingly, UOSA re-evaluates MAILs as conditions warrant. In no case MAILs are

greater than applicable categorical concentration limits or production based effluent limits allocated to SIUs.

5.0 DATA ACQUISITION

The following sections contain a brief explanation of how data were obtained and which values were chosen to perform the calculations. Existing site specific data were used whenever available and, when unavailable, new data were obtained. Where site specific data were unobtainable, UOSA used data provided by EPA.

The following data are required to derive local limits:

1) UOSA total plant and member jurisdiction flow;
2) Actual UOSA pollutant influent, process effluent, and final effluent concentration data, and pollutant removal efficiencies;
3) DEQ water quality standards;
4) UOSA biosolids application criteria;
5) Treatment process inhibition data; and,
6) Current metals load allocated to SIUs.

When all the samples for an analyte registered non-detectable or non-quantifiable, UOSA used one-half the detection or reporting limits for calculation purposes. All wastewater samples taken to generate data for this report were collected, preserved and analyzed in accordance with 40 CFR Part 136.

5.1 Flow Data

Various types of flow data are required to develop MAHL/MAIL. Domestic flow, industrial flow, sludge flow to disposal, and sludge flow to digesters are required. As stated in the Executive Summary, UOSA developed two MAHLs, one based on jurisdictional ADF, and one based on each jurisdiction's maximum capacity in the 54-mgd

plant. Flow data are included in Table 5.1 and Appendix C.

In the 2007 ADF scenario, the industrial flow component per jurisdiction was based on actual 2007 industrial flow. In the maximum capacity ownership scenario, industrial flow was based on UOSA estimates.

Table 5.1 and Appendix C also contain sludge flow data in million gallons/day and dry tons/day. Year 2007 data show 0.55 dry tons/day of biosolids are produced per million gallons/day raw influent and that 0.0051 million gallons per day flows to the anaerobic digesters per million gallons of raw influent. These factors were used to determine sludge flow and sludge production for the UOSA plant full capacity. The jurisdictions sludge flow and production were calculated based on their percentage allocation at UOSA.

Table 5.1 –Flow Information

Flow Component	UOSA Plant	
	2007 ADF	Plant Capacity[2]
Total Flow (mgd)	28.5	54
Industrial Flow (mgd)	2.02	5.00
Domestic Flow (mgd)	26.5	49.0
Flow to Digesters (mgd)	0.15	0.28
Sludge Production (dry tons/day)	15.7	29.8

5.2 Domestic Sewage Pollutant Concentration Data

Table 5.2 shows 2001 pollutant concentrations for the UOSA influent and domestic/commercial parameter concentrations (background). The background concentrations were calculated by subtraction of the 2007 industrial load from the influent load and then arithmetically converted into concentrations (Appendix B). The

[2] The industrial flow, flow to digester and sludge production for the Plant Capacity are estimates based on 2007 data.

background data was utilized in the calculations of the plant MAIL.

Table 5.2 – Domestic/Commercial Concentration Data per Jurisdiction (µg/L)[3] [4]

Parameter	*UOSA RAW INFLUENT*	*UOSA BACKGROUND*
Arsenic	0.58	0.50
Cadmium	0.15	0.04
Chromium, Total	1.25	0.94
Copper	37.7	26.4
Cyanide[5]	5.00[6]	5.19
Lead	1.40	1.30
Mercury	0.15	0.14
Nickel	2.00	0.06
Silver	1.80	1.70
Zinc	153[6]	163

5.3 UOSA Pollutant Removal Rates

Table 5.3 contains UOSA's pollutant removal rates. The treatment removal percentages are the average of data collected prior to 2008 and including removals obtained in a plant profile conducted in 2008.

Table 5.3 - UOSA Pollutant Removal Rates

Parameter	Primary Removal Rate (%)	Secondary Removal Rate (%)	2001 Plant Removal Rate (%)	Parameter	Primary Removal Rate (%)	Secondary Removal Rate (%)	2001 Plant Removal Rate (%)
Arsenic	71	73	66	Lead	31	85	95
Cadmium	54	67	93	Mercury	55	94	87
Chromium, Total	29	74	84	Nickel	36	67	85
Copper	28	82	96	Silver	20	82	97
Cyanide	27	69	66[7]	Zinc	32	60	96

5.4 Water Quality Standards (WQS)

Table 5.4 contains the Virginia WQS UOSA used to calculate MAHL/MAIL.

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[3] The influent metals concentration is the average of 2007 concentrations.
[4] Any values below reporting limits were averaged as ½ the reporting limit.
[5] Because cyanide is non-detectable at UOSA influent, the cyanide concentration is reported as half the reporting limit.
[6] The industrial flow appears to have a diluting effect on concentrations.

Table 5.4 – Virginia Water Quality Standards [8]

Parameter	Acute (µg/L)	Chronic (µg/L)	Parameter	Acute (µg/L)	Chronic (µg/L)
Arsenic	340	**150**	Lead	164	**19.0**
Cadmium	5.23	**1.39**	Mercury	1.4	**0.77**
Chromium (III)	702	**91**	Nickel	226	**25.0**
Chromium (VI)	16.0	**11.0**	Silver	**5.35**	N/A
Copper	17.0	**11.0**	Zinc	**145**	147
Cyanide	22.0	**5.2**			

5.5 Process Inhibition Data

UOSA used the data contained in Table 5.5 to calculate MAHL/MAIL to prevent plant process inhibition/upset. UOSA does not have specific process inhibition data. Therefore, data provided by EPA were used to calculate MAHL to protect unit process inhibition.

Table 5.5 – Unit Process Inhibition Data[1]

Parameter	Activated Sludge (mg/L)	Nitrification (mg/L)	Anaerobic Digestion (mg/L)
Arsenic	0.10	1.5	1.6
Cadmium	1.0	5.2	20
Chromium (III)	10	None	130
Chromium (VI)	1.0	1.0	110
Chromium, Total [12]	50.5	0.25	None
Copper[9]	1.0	0.27	40
Cyanide	0.10	0.34	4.0
Lead	1.0	0.50	340
Mercury	0.10	---	---
Nickel	1.0	0.25	10.0
Silver	0.25	---	13[10]
Zinc[12]	0.30	0.29	400

[7] The % removal shown is from 1997 data because all 2007 data was not quantifiable.
[8] The cadmium, copper, lead, nickel, and zinc water quality standards are hardness dependent. The receiving stream hardness is 129 mg/L as reported by DEQ in the UOSA 2007 Permit Fact Sheet.
[9] The median value for the EPA provided range was utilized for nitrification inhibition.
[10] The inhibitory concentration is for dissolved silver.

5.6 *Biosolids Application Criteria*

The biosolids application criteria presented in Table 5.6 were used to determine MAHL/MAIL to protect UOSA's biosolids reuse. Table 5.6 also contains 2007 biosolids sampling data.

Table 5.6 – UOSA Biosolids Land Application Criteria[11]

Parameter	Land Application Criteria (mg/kg)	2007 Average UOSA Biosolids Concentration (mg/kg)	2007 Maximum UOSA Biosolids Concentration (mg/kg)
Arsenic	41	2.67	4.90
Cadmium	39	1.16	2.00
Chromium	No Criteria	24.4	30.3
Copper	1500	283	480
Lead	300	16.8	28.0
Mercury	17	0.87	1.30
Nickel	420	19.9	30.0
Silver[12]	No Criteria	42.9	43.4
Zinc	2800	514	690

The data show pollutants in UOSA's biosolids are well below applicable biosolids land application criteria.

6.0 MAXIMUM ALLOWABLE INDUSTRIAL LOAD PER JURISDICTION

Section 6.1 presents the results of the calculations described in Section 4.0. The necessary data is entered into spreadsheets, one for the UOSA plant at 2001 ADF and another for the UOSA plant at full capacity (54 mgd), and the total plant MAHL and MAIL calculated for each studied pollutant. Each jurisdiction was assigned pollutant loads for both flow scenarios based on the percentage of the UOSA plant capacity they own.

Mercury is not included in the pollutant load allocation because the MAIL for each jurisdiction is 0.0 lbs./day. The uniform mercury concentration limit determined in UOSA's

[11] The solids criteria are from the 503 regulations, Table 503.13.
[12] The data shown for silver and chromium are historical.

1992 local limits evaluation will remain in effect (see Section 6.2).

6.1 Summary Tables

Tables 6.1 through 6.4 contain the MAIL per jurisdiction for each studied pollutant. Tables 6.1 through 6.4 also contain current allocated industrial pollutant load per jurisdiction. Details on load calculations are shown in Attachment A.

Table 6.1 – MAIL and Current Pollutant Loading Allocation – Fairfax County

Parameter	Maximum Allowable Industrial Load (lb./day)		Current Load Allocated to Industry (lb./day)	Load Remaining (lb./day)
	At Owned Capacity	At 2007 ADF		At 2007 ADF
Arsenic	1.43	0.75	0.0	0.75
Cadmium	1.56	0.82	0.0	0.82
Chromium[13]	12.4	6.53	0.0	6.53
Copper	35.0	18.4	0.0	18.4
Cyanide	1.89	0.99	0.0	0.99
Lead	9.21	4.86	0.0	4.86
Nickel	11.3	5.96	0.0	5.96
Silver	12.4	6.56	0.0	6.56
Zinc	48.6	25.3	0.0	25.3

No SIUs are located in the UOSA service area of Fairfax County. In the event a SIU locates to Fairfax County, UOSA will evaluate the industry's need for pollutant loading and allocate MAIL as appropriate.

[13] The form of chromium shown is hexavalent. A total chromium limit was calculated, but the most stringent of both is reported in this document.

Table 6.2 – MAIL and Current Pollutant Loading Allocation – Prince William County

Parameter	Maximum Allowable Industrial Load (lbs./day)		Current Load Allocated to Industry (lbs./day)	Load Remaining (lbs./day)
	At Owned Capacity	At 2007 ADF		At 2007 ADF
Arsenic	1.03	0.54	0.0	0.54
Cadmium	1.13	0.60	0.0	0.60
Chromium [13]	8.95	4.73	0.0	4.73
Copper	25.3	13.3	0.0	13.3
Cyanide	1.37	0.72	0.0	0.72
Lead	6.66	3.52	0.0	3.52
Nickel	8.16	4.31	0.0	4.31
Silver	8.99	4.75	0.0	4.75
Zinc	35.1	18.3	0.0	18.3

There are currently no SIUs in Prince William County. In the event a SIU locates to Prince William County, available MAIL will be allocated as appropriate.

Table 6.3 – MAIL and Current Pollutant Load Allocation – Manassas

Parameter	Maximum Allowable Industrial Load (lbs./day)		Current Load Allocated/Discharged by Industry (lbs./day)	Load Remaining (lbs./day)
	At Owned Capacity	At 2007 ADF		At 2007 ADF
Arsenic	0.50	0.27	0.03	0.24
Cadmium	0.55	0.29	0.03	0.26
Chromium [15]	4.37	2.31	0.09	2.22
Copper	12.4	6.51	3.12	3.39
Cyanide	0.67	0.35	0.04	0.31
Lead	3.25	1.72	0.04	1.68
Nickel	3.98	2.11	0.46	1.65
Silver	4.39	2.32	0.06	2.26
Zinc	17.2	8.93	0.25	8.68

There are currently two SIUs located in Manassas. There is sufficient load allocation at average daily flow and at full plant capacity to service the two industries located in this jurisdiction. In the event additional SIUs located in Manassas, UOSA will evaluate the industry need for metals and cyanide allocation and will re-evaluate the MAIL as appropriate.

Table 6.4 – MAIL and Current Pollutant Load Allocation – Manassas Park

Parameter	Maximum Allowable Industrial Load (lbs./day)		Current Load Allocated to Industry (lbs./day)	Load Remaining (lbs./day)
	At Owned Capacity	At 2007 ADF		At 2007 ADF
Arsenic	0.17	0.09	0.0	0.09
Cadmium	0.18	0.10	0.0	0.10
Chromium [13]	1.46	0.77	0.0	0.77
Copper	4.14	2.18	0.0	2.18
Cyanide	0.22	0.12	0.0	0.12
Lead	1.09	0.58	0.0	0.58
Nickel	1.34	0.71	0.0	0.71
Silver	1.47	0.78	0.0	0.78
Zinc	5.75	3.00	0.0	3.00

There are currently no SIUs in Manassas Park. In the event a SIU locates to Manassas Park, available MAIL will be allocated as appropriate.

Table 6.5 shows total plant MAIL and total allocated industrial load. The data show ample available pollutant load based on 2007 ADF and total plant capacity.

Table 6.5 – Cumulative Loading – UOSA Plant

Parameter	Total Plant MAIL (lbs./d)		Total Allocated Industrial Load (lbs./d)	Total MAIL Remaining (lbs./d)	
	At Plant Capacity	At 2007 ADF	Allocation and/or Actual Load	At Plant Capacity	At 2007 ADF
Arsenic	3.13	1.65	0.03	3.10	1.62
Cadmium	3.42	1.81	0.03	3.39	1.78
Chromium [13]	27.1	14.3	3.69	23.4	10.6
Copper	76.8	40.4	3.12	73.7	37.3
Cyanide	4.16	2.17	0.04	4.12	2.13
Lead	20.2	10.7	2.44	17.8	8.26
Nickel	24.8	13.1	0.46	24.3	12.6
Silver	27.3	14.4	0.06	27.2	14.3
Zinc	107	55.5	2.37	104.6	53.1

6.2 Mercury

UOSA has established a mercury local limit of 0.00055 mg/L. The 0.00055 mg/L limit is based on UOSA's ability to accept historical mercury load without plant upset passthrough or reuse problems. Because a zero industrial discharge load may not be feasible, a logical goal is to maintain industrial discharge mercury load at levels UOSA has historically received without consequence. Therefore, UOSA is electing to continue enforcing the 0.00055 mg/L mercury limit.

APPENDIX A - DATA SPREADSHEETS

UPPER OCCOQUAN SEWAGE AUTHORITY
UOSA LOCAL LIMITS DEVELOPMENT- Total Plant - AT 2007 AVERAGE DAILY FLOW (ADF) AND AT 2005 WQS

PARAMETER	Ref Table 5.4 WQS STANDARDS (ug/l)	Ref Table 5.5 ACTIVATED SLUDGE INHIBITION (ug/l)	Ref Table 5.5 ANAEROBIC DIGESTION INHIBITION (ug/l)	Ref Table 5.5 NITRIFICATION INHIBITION (ug/l)	Ref Table 5.6 SLUDGE STANDARD (mg/kg)	Ref Table 5.2 UOSA INFLUENT OBSERVED CONC. (ug/l)	Ref Table 5.3 PRIMARY TREAT. REMOVAL %	Ref Table 5.3 SECONDARY TREAT. REMOVAL %	Ref Table 5.3 PLANT TREAT. REMOVAL %	MAXIMUM ALLOWABLE LOAD BASED ON WATER QUALITY STANDARDS (lbs/d)	MAXIMUM ALLOWABLE LOAD BASED ON ACTIVATED SLUDGE INHIBITION (lbs/d)	MAXIMUM ALLOWABLE LOAD BASED ON ANAEROBIC DIGESTION INHIBITION (lbs/d)	MAXIMUM ALLOWABLE LOAD BASED ON NITRIFICATION INHIBITION (lbs/d)	MAXIMUM ALLOWABLE LOAD BASED ON SLUDGE QUALITY (lbs/d)	GOVERNING STANDARD	MAXIMUM ALLOWABLE INDUSTRIAL LOAD (MAIL) (lbs/d)	BACKGRD CONC. (ug/l)	BACKGRD LOAD (lbs/d)	CURRENT HEADWORKS LOAD (lbs/d)
ARSENIC	150.00	100	1600	1500	41	0.50	71%	73%	66%	105.09	82.85	2.98	1242.82	1.96	SLUDGE	**1.65**	0.50	0.11	0.12
CADMIUM	1.39	1000	20000	5200	39	0.04	54%	67%	93%	4.73	516.59	26.46	2686.29	2.02	SLUDGE	**1.81**	0.04	0.01	0.01
CHROMIUM (VI) (1)	11.00	1000	110000	1000	3000	0.94	29%	74%	84%	16.17	333.62	161.48	333.62	140.82	WQS	**14.34**	0.94	0.21	0.22
CHROMIUM (III) (1)	91.00	10000	130000	250	1200	0.94	29%	74%	84%	133.77	3336.24	190.85	83.41	56.33	SLUDGE	**50.49**	0.94	0.21	0.22
CHROMIUM, TOTAL (2), (3)	91.00	50500	130000	250	1200	0.94	29%	74%	84%	133.77	16847.99	190.85	83.41	56.33	SLUDGE	**50.49**	0.94	0.21	0.22
COPPER (4)	11.00	1000	40000	270	1500	26.44	28%	82%	96%	60.36	332.45	51.44	89.76	63.60	DIG	**40.45**	26.44	5.85	6.29
CYANIDE (5)	5.20	100	4000	340	1000000	5.19	27%	69%	66%	3.64	32.63	98.94	110.95	3943.11	WQS	**2.17**	5.00	1.11	1.24
LEAD	19.00	1000	340000	500	300	1.30	31%	85%	95%	95.74	343.24	439.01	171.62	12.18	SLUDGE	**10.68**	1.30	0.29	0.31
MERCURY (6)	0.000	100	1000000	1000000	17	0.14	55%	94%	87%	0.00	53.33	1408.58	533299.68	0.63	WQS	**-0.03**	0.14	0.03	0.03
NICKEL	25.00	1000	10000	250	420	0.06	36%	67%	85%	38.46	369.61	14.56	92.40	21.63	DIG	**13.09**	0.06	0.01	0.01
SILVER (6)	5.35	1000000	13000	1000000	1000000	1.67	20%	82%	97%	49.02	296561.34	16.42	296561.34	42118.20	DIG	**14.41**	1.67	0.37	0.40
ZINC (4)	145.00	300	400000	290	2800	163.01	32%	60%	96%	927.91	105.25	511.09	101.74	160.32	NIT	**55.51**	163.01	36.05	38.81

FLOW	28.54	MGD	2007 Average Daily Flow (ADF)
INDUSTRIAL FLOW	2.02	MGD	Actual 2007 industrial flow
DOM/COMM FLOW	26.52	MGD	
ADF	28.54	MGD	2007 ADF
DIGESTER FLOW	0.15	MGD	Actual average daily flow to digester in 2007
PERCENT SOLIDS TO DISPOSAL	31%		% from "2007 Sludge Data" worksheet
SLUDGE FLOW TO DISPOSAL	15.74	DRY METRIC TONS/DAY	Actual daily tons produced in 2007

1 METRIC TON = 1000 Kg

(1) The Primary Treatment % removal for Total Cr was used for Cr(III) and Cr(VI). The influent concentrations for the state (III) and (VI) were reported equal to the Total Cr concentration.
The nitrification inhibition value for Total Cr was used for Cr(III) since there was none published.
(2) The median value of the published concentration range for activated sludge inhibition was used as the inhibition value. The median was approximated as the average of the high and low concentrations in the range.
(3) No inhibition value for anaerobic digestion was found for Total Chromium. The value shown is for Cr(III).
(4) The nitrification inhibition values for copper and zinc are the median value of the published concentration ranges.
(5) The UOSA raw influent cyanide concentration is non-quantifiable. The % shown is from the 1998 Local Limits calculations.
(6) For silver as for other metals, there were no published values for inhibition, 1000 mg/L was used as inhibitory values.
(7) Silver as dissolved metal for digestion inhibition.

Prepared by Upper Occoquan Sewage Authority 2008

Maximum Allowable Industrial Load Allocation to Jurisdictions Based on Flow Allocation At ADF and 2005 WQS--All Allocations in lb./day

	Total Plant Maximum Allowable Industrial Load (MAIL)	Fairfax County	PWC	City of Manassas	Manassas Park	Check Totals
Parameter	100.0000%	45.5553%	32.95760%	16.09135%	5.39574%	100.0000%
ARSENIC	1.65240804	0.752760176	0.544594095	0.265894793	0.08915898	1.65240804
CADMIUM	1.80773457	0.823519712	0.595785997	0.290888931	0.09753993	1.80773457
CHROMIUM (VI)	14.34453039	6.53470023	4.72761348	2.308228857	0.77398783	14.34453039
CHROMIUM (III)	50.48586983	22.9990119	16.63893291	8.12385895	2.72406608	50.48586983
CHROMIUM, TOTAL	50.48586983	22.9990119	16.63893291	8.12385895	2.72406608	50.48586983
COPPER	40.44719514	18.42585907	13.33042628	6.508500485	2.18240931	40.44719514
CYANIDE	2.17293423	0.989887672	0.716147052	0.349654492	0.11724501	2.17293423
LEAD	10.67779350	4.864305606	3.519144865	1.718201322	0.57614170	10.67779350
MERCURY	-0.03165207	NA	NA	NA	NA	NA
NICKEL	13.08714374	5.961893409	4.313208971	2.105898347	0.70614301	13.08714374
SILVER	14.40808335	6.563651998	4.748559012	2.318455387	0.77741695	14.40808335
ZINC	55.51176985	25.28857796	18.29534912	8.932594206	2.99524857	55.51176985

Sludge Flow to Digeters and Biosolids Allocation to Jurisdictions Based on Flow Allocation At ADF Utilizing 2005 WQS--All flow allocations in mgd and biosolids in dry metric tons per day

	Total Plant Maximum Allowable Industrial Load (MAIL)	Fairfax County	PWC	City of Manassas	Manassas Park	Check Totals
Parameter	100.0000%	45.5553%	32.9576%	16.0914%	5.3957%	100.0000%
Flow to digester	0.14741	0.0671545	0.048583792	0.023720745	0.007954023	0.14741306
Biosolids for Disposal	15.74	7.171678	5.188443294	2.533226243	0.849439635	15.74

UPPER OCCOQUAN SEWAGE AUTHORITY
UOSA LOCAL LIMITS DEVELOPMENT- Total Plant - AT 54 mgd AT 2005 WQS

PARAMETER	Ref Table 5.4 WQS STANDARDS	Ref Table 5.5 ACTIVATED SLUDGE INHIBITION	Ref Table 5.5 ANAEROBIC DIGESTION INHIBITION	Ref Table 5.5 NITRIFICATION INHIBITION	Ref Table 5.6 SLUDGE STANDARD	Ref Table 5.2 UOSA INFLUENT OBSERVED CONC.	Ref Table 5.3 PRIMARY TREAT. REMOVAL	Ref Table 5.3 SECONDARY TREAT. REMOVAL	Ref Table 5.3 PLANT TREAT. REMOVAL	MAXIMUM ALLOWABLE LOAD BASED ON WATER QUALITY STANDARDS	MAXIMUM ALLOWABLE LOAD BASED ON ACTIVATED SLUDGE INHIBITION	MAXIMUM ALLOWABLE LOAD BASED ON ANAEROBIC DIGESTION INHIBITION	MAXIMUM ALLOWABLE LOAD BASED ON NITRIFICATION INHIBITION	MAXIMUM ALLOWABLE LOAD BASED ON SLUDGE QUALITY	GOVERNING STANDARD	MAXIMUM ALLOWABLE INDUSTRIAL LOAD (MAIL)	BACKGRD CONC.	BACKGRD LOAD	CURRENT HEADWORKS LOAD
	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(mg/kg)	(ug/l)	%	%	%	(lbs/d)	(lbs/d)	(lbs/d)	(lbs/d)	(lbs/d)		(lbs/d)	(ug/l)	(lbs/d)	(lbs/d)
ARSENIC	150.00	100	1600	1500	41	0.50	71%	73%	66%	198.81	156.74	5.64	2351.11	3.71	SLUDGE	**3.13**	0.50	0.20	0.22
CADMIUM	1.39	1000	20000	5200	39	0.04	54%	67%	93%	8.95	977.27	50.05	5081.80	3.82	SLUDGE	**3.42**	0.04	0.02	0.02
CHROMIUM (VI) (1)	11.00	1000	110000	1000	3000	0.94	29%	74%	84%	30.59	631.13	305.49	631.13	266.40	WQS	**27.15**	0.94	0.39	0.43
CHROMIUM (III) (1)	91.00	10000	130000	250	1200	0.94	29%	74%	84%	253.07	6311.34	361.03	157.78	106.56	SLUDGE	**95.52**	0.94	0.39	0.43
CHROMIUM, TOTAL (2), (3)	91.00	50500	130000	250	1200	0.94	29%	74%	84%	253.07	31872.29	361.03	157.78	106.56	SLUDGE	**95.52**	0.94	0.39	0.43
COPPER (4)	11.00	1000	40000	270	1500	26.44	28%	82%	96%	114.19	628.91	97.31	169.80	120.32	DIG	**76.77**	26.44	10.81	11.91
CYANIDE (5)	5.20	100	4000	340	1000000	5.19	27%	69%	66%	6.89	61.73	187.16	209.88	7459.41	WQS	**4.16**	5.00	2.04	2.34
LEAD	19.00	1000	340000	500	300	1.30	31%	85%	95%	181.12	649.32	830.50	324.66	23.05	SLUDGE	**20.21**	1.30	0.53	0.59
MERCURY (6)	0.000	100	1000000	1000000	17	0.14	55%	94%	87%	0.00	100.89	2664.69	1008873.13	1.18	WQS	**-0.06**	0.14	0.06	0.06
NICKEL	25.00	1000	10000	250	420	0.06	36%	67%	85%	72.75	699.21	27.54	174.80	40.93	DIG	**24.76**	0.06	0.02	0.03
SILVER (6)	5.35	1000000	13000	1000000	1000000	1.67	20%	82%	97%	92.73	561021.83	31.06	561021.83	79677.37	DIG	**27.27**	1.67	0.68	0.75
ZINC (4)	145.00	300	400000	290	2800	163.01	32%	60%	96%	1755.39	199.11	966.86	192.47	303.29	NIT	**106.61**	163.01	66.62	73.41

FLOW	54.00	MGD	Plant capacity
INDUSTRIAL FLOW	5.00	MGD	Assumed total industrial flow at mgd
DOM/COMM FLOW	49.00	MGD	
ADF	54.00	MGD	Plant capacity
DIGESTER FLOW	0.28	MGD	Plant capacity (mgd) x 0.005164 mg DIGESTER/mg INFLUENT
PERCENT SOLIDS TO DISPOSAL	31%		% from "2007 Sludge Data" worksheet
SLUDGE FLOW TO DISPOSAL	29.78	DRY METRIC TONS/DAY	Based on (ratio of 2007 Tons per day at 28.5449 mgd) *54

1 METRIC TON = 1000 Kg

(1) The Primary Treatment % removal for Total Cr was used for Cr(III) and Cr(VI). The influent concentrations for the state (III) and (VI) were reported equal to the Total Cr concentration.
The nitrification inhibition value for Total Cr was used for Cr(III) since there was none published.
(2) The median value of the published concentration range for activated sludge inhibition was used as the inhibition value. The median was approximated as the average of the high and low concentrations in the range.
(3) No inhibition value for anaerobic digestion was found for Total Chromium. The value shown is for Cr(III).
(4) The nitrification inhibition values for copper and zinc are the median value of the published concentration ranges.
(5) The UOSA raw influent cyanide concentration is non-quantifiable. The % shown is from the 1998 Local Limits calculations.
(6) For silver as for other metals, there were no published values for inhibition, 1000 mg/L was used as inhibitory values.
(7) Silver as dissolved metal for digestion inhibition.

Maximum Allowable Industrial Load Allocation to Jurisdictions Based on Flow Allocation
At 54 mgd and 2005 WQS--All Allocations in lb./day

	Total Plant Maximum Allowable Industrial Load (MAIL)	Fairfax County	PWC	City of Manassas	Manassas Park	Check Totals
Parameter	100.0000%	45.5553%	32.95760%	16.09135%	5.39574%	100.0000%
ARSENIC	3.13082564	1.426258403	1.031845106	0.503792169	0.16892996	3.13082564
CADMIUM	3.42022160	1.558093733	1.127223082	0.550359892	0.18454490	3.42022160
CHROMIUM (VI)	27.14558516	12.36626482	8.946534379	4.36809162	1.46469434	27.14558516
CHROMIUM (III)	95.51619881	43.51273337	31.47985028	15.36984763	5.15376754	95.51619881
CHROMIUM, TOTAL	95.51619881	43.51273337	31.47985028	15.36984763	5.15376754	95.51619881
COPPER	76.77444998	34.97486513	25.30301897	12.35404688	4.14251900	76.77444998
CYANIDE	4.15948941	1.894869729	1.370868036	0.669318076	0.22443357	4.15948941
LEAD	20.21252030	9.207883242	6.661562338	3.252467759	1.09060696	20.21252030
MERCURY	-0.05848055	NA	NA	NA	NA	NA
NICKEL	24.75826108	11.27871111	8.15972957	3.983938903	1.33588149	24.75826108
SILVER	27.27287732	12.4242532	8.988486825	4.388574649	1.47156264	27.27287732
ZINC	106.60659506	48.56500158	35.13497912	17.15444231	5.75217205	106.60659506

Sludge Flow to Digeters and Biosolids Allocation to Jurisdictions Based on Flow Allocation At 54 mgd Utilizing 2005 WQS--All flow allocations in mgd and biosolids in dry metric tons per day

	Total Plant Maximum Allowable Industrial Load (MAIL)	Fairfax County	PWC	City of Manassas	Manassas Park	Check Totals
Parameter	100.0000%	45.5553%	32.9576%	16.0914%	5.3957%	100.0000%
Flow Allocation	54.0000	24.5999	17.7971	8.6893	2.9137	54.0000
Flow to digester	0.27887	0.127039961	0.091908705	0.044873873	0.015047075	0.278869614
Biosolids for Disposal	29.78	13.56706844	9.815271305	4.792247201	1.606932948	29.78

APPENDIX B – INDUSTRIAL USERS AND UOSA BACKGROUND INFORMATION

LOCAL LIMITS CALCULATIONS MICRON TECHNOLOGY METALS LOADINGS

2007 Micron Technology Metals Summary

Metal	Average Concentration, mg/L	Average Load, lb/day
Arsenic	0.002	0.0266
Cadmium	0.0016	0.0260
Chromium	0.0056	0.0880
Copper	0.1974	3.1167
Lead	0.0026	0.0428
Mercury	0.00025	0.0040
Nickel	0.0305	0.4635
Silver	0.0037	0.0595
Zinc	0.0106	0.1714

<RL = 1/2 RL

RL = reporting limit

LOCAL LIMITS CALCULATIONS MICRON TECHNOLOGY CYANIDE LOADINGS

MTV 2007 Cyanide Concentration and Loading

Parameter	Detection Limits (mg/L)	Date	Conc. (mg/l)	Flow (mgd)	Limit (mg/L)	Loading (lb/d)
Cyanide	0.005	1/15/07	0.0025	1.94	Monitor	0.0404
Cyanide	0.005	2/12/07	0.0025	2.09	Monitor	0.0436
Cyanide	0.005	3/12/07	0.0025	1.85	Monitor	0.0386
Cyanide	0.005	4/9/07	0.0025	1.84	Monitor	0.0384
Cyanide	0.005	5/7/07	0.0060	1.66	Monitor	0.0830
Cyanide	0.005	6/4/07	0.0025	2.17	Monitor	0.0454
Cyanide	0.005	7/2/07	0.0025	1.80	Monitor	0.0376
Cyanide	0.005	8/13/07	0.0025	1.72	Monitor	0.0359
Cyanide	0.005	9/10/07	0.0025	1.34	Monitor	0.0279
Cyanide	0.005	10/9/07	0.0025	1.84	Monitor	0.0384
Cyanide	0.005	11/5/07	0.0025	1.65	Monitor	0.0345
Cyanide	0.005	12/3/07	0.0025	1.55	Monitor	0.0323
		Average	0.0028			0.0413

<RL = 1/2 <RL

LOCAL LIMITS CALCULATIONS BAE SYSTEMS METALS LOADINGS

2007 BAE Metals

Sample Date	Q Average, gallons	Average flow, mgd	CHROMIUM, mg/L	Cr Load, lb/day	LEAD, mg/L	Lead Load, lb/day	MERCURY, mg/L	Mercury Load, lb/day	ZINC, mg/L	Zinc Load, lb/day
08-Jan-07	95,486.00	0.0955	0.002	0.0016	0.0025	0.0020	0.0001	0.0001	0.04	0.0319
06-Feb-07	98,544.00	0.0985	0.0005	0.0004	0.0025	0.0021	0.0001	0.0001	0.028	0.0230
05-Mar-07	97,634.00	0.0976	0.0005	0.0004	0.0025	0.0020	0.0001	0.0001	0.05	0.0407
02-Apr-07	99,537.00	0.0995	0.0005	0.0004	0.0025	0.0021	0.0002	0.0002	0.09	0.0748
08-May-07	99,324.00	0.0993	0.0005	0.0004	0.0025	0.0021	0.0001	0.0001	0.108	0.0895
05-Jun-07	101,473.00	0.1015	0.002	0.0017	0.0025	0.0021	0.0001	0.0001	0.12	0.1016
09-Jul-07	103,017.00	0.1030	0.0005	0.0004	0.0025	0.0021	0.0001	0.0001	0.12	0.1032
07-Aug-07	101,163.00	0.1012	0.0005	0.0004	0.0025	0.0021	0.0001	0.0001	0.175	0.1477
04-Sep-07	99,846.00	0.0998	0.0005	0.0004	0.0025	0.0021	0.0001	0.0001	0.11	0.0917
02-Oct-07	94,490.00	0.0945	0.0005	0.0004	0.0025	0.0020	0.0001	0.0001	0.13	0.1025
05-Nov-07	97,371.00	0.0974	0.0005	0.0004	0.0025	0.0020	0.0001	0.0001	0.104	0.0845
04-Dec-07	92,246.00	0.0922	0.0005	0.0004	0.0025	0.0019	0.0001	0.0001	0.07	0.0539
	Average	**0.0983**	**0.0008**	**0.0006**	**0.0025**	**0.0021**	**0.0001**	**0.0001**	**0.0954**	**0.0787**

<RL = 1/2 RL

LOCAL LIMITS CALCULATIONS UOSA INFLUENT BACKGROUND CONCENTRATION FOR METALS

Calculation of UOSA Metals Background Concentration

Metal	2007 UOSA Influent Concentration Event 1, ug/L	2007 UOSA Influent Concentration Event 2, ug/L	2007 UOSA Influent Average, ug/L	Annual average Load (lb/day at Annual Average Influent flow (28.5449 mgd)	2007 MTV Load, lb/day	2007 BAE Load, lb/day	2007 Background Influent Average Annual Load, lb/day	2007 Bacground Conc, mg/L at flow 28.5449 - 2.0241 = 26.5208, mgd -- 2.0240 mgd is IU flow	2007 Background in ug/L
ARSENIC	0.7	0.45	0.575	0.1370	0.026554	0	0.1104	0.0005	0.4989
CADMIUM	0.2	0.1	0.15	0.0357	0.026032	0	0.0097	0.0000	0.0438
CHROMIUM (VI)									
CHROMIUM (III)									
CHROMIUM, TOTAL	1.3	1.2	1.25	0.2978	0.088038	0.000615794	0.2091	0.0009	0.9448
COPPER	46.8	28.5	37.65	8.9685	3.116704	0	5.8518	0.0264	26.4409
LEAD	1.1	1.7	1.4	0.3335	0.042819	0.002051707	0.2886	0.0013	1.3041
MERCURY	0.15	0.15	0.15	0.0357	0.003971	8.89902E-05	0.0317	0.0001	0.1431
NICKEL	1.8	2.2	2	0.4764	0.463453	0	0.0130	0.0001	0.0586
SILVER	3	0.6	1.8	0.4288	0.059541	0	0.3692	0.0017	1.6683
ZINC	121	184	152.5	36.3266	0.171411	0.078747998	36.0764	0.1630	163.0087

< RL = 1/2 RL

LOCAL LIMITS CALCUATIONS OF CYANIDE BACKGROUND CONCENTRATION

CN Background Calculation

UOSA Influent 2007 CN conc, ug/L	UOSA Flow, mgd	UOSA loading, lb/day	MTV loading, lb/day	BAE Loading, lb/day	Background loading lb/day	IU Average 2007 flow	Background Concentraiton in ug/L
5	28.5449	1.191036	0.041337	0	1.149698473	2.024092	5.19

<RL = 1/2 RL

Calc Inf CN Bkg Conc
Local 2008 (2005 WQS) at 2007 ADF.xls
10/2/2008
1:33 PM

APPENDIX C – UOSA FLOW INFORMATION

UOSA MONTHLY FLOW REPORT

AVERAGE DAILY FLOW
SUMMARY
for
December 2007

	UOSA Influent mgd	Fairfax County mgd	Prince William County mgd	City of Manassas mgd	City of Manassas Park mgd
LIMIT: (Highest 30 consecutive days average daily flow during the past 48 months)	**54.000**	**27.600**	**15.797**	**7.689**	**2.914**
ACTUAL: (Highest 30 consecutive days average daily flow during the past 48 months)	**37.605 Jul-06**	**15.348 Jul-06**	**13.445 Jul-06**	**7.745 Mar-07**	**1.749 Nov-06**
Highest 30 consecutive days average daily flow this month	29.356	12.317	10.277	5.635	1.128
Average daily flow this month					
Collection System	29.2515	12.2877	10.2282	5.6166	1.1190
Septage Receiving Facility	0.0176	0.0051	0.0124	0.0001	0.0000
Total average daily flow (mgd)	29.2691	12.2928	10.2406	5.6167	1.1190
Average daily flow past 3 months					
Collection System	27.8016	11.8827	9.7477	5.1783	0.9929
Septage Receiving Facility	0.0130	0.0038	0.0092	0.0000	0.0000
Total average daily flow (mgd)	27.8146	11.8865	9.7569	5.1783	0.9929
Average daily flow past 12 months					
Collection System	28.5206	12.2187	9.6625	5.5801	1.0593
Septage Receiving Facility	0.0143	0.0040	0.0100	0.0000	0.0003
Total average daily flow (mgd)	28.5449	12.2227	9.6725	5.5801	1.0596

Rain data in total inches:	**Month** December-07	**Quarter** October-07 through December-07	**Year** January-07 through December-07
UOSA Plant Site Gage	2.82	9.38	32.48
Dulles Weather Station Gage	2.97	8.96	28.05

REFERENCE TABLE 5.1 AT 2007 ADF

2007 Calculation of Digester Flow per Million Gallon of Influent and Sludge Production per Million gallon of Influent flow

mg = million gallons

Digester Flow

2007 Average Digester Flow, gal/day	147,413
2007 Average Plant Influent Flow, mgd	28.5449
Ratio, vol disgester/vol influent flow, mg/mg	0.005164250

Sludge Production

2007 Production, dry metric tons per year	5,746
Daily production, dry metric tons per day	16
2007 Average Plant Influent Flow, mgd	28.5449
Ratio, ton sludge/mg influent flow	0.5515
At 54 mgd	29.78