



# Jordan Basin Water Reclamation Facility Industrial Pretreatment Local Limits Development Document

## INTRODUCTION

As part of the recently issued UPDES permit, Jordan Basin Water Reclamation Facility (JBWRF) is required to develop Local Limits. JBWRF is a new 15 MGD membrane bioreactor (MBR) treatment facility. Because the facility has not been operational for any significant amount of time, these Local Limits will be based on best professional judgment (BPJ), EPA's 2004 *Local Limits Development Guidance*, and the Utah State Local Limits Development Standard. This BPJ analysis will be replaced with site specific analysis and removal efficiencies after one year of stable operations. A schedule outlining this update process is presented at the end of this narrative. This manual contains support documents for this Local Limit development process.

## LEGAL AUTHORITY

JBWRF is wholly owned and operated by the South Valley Sewer District (SVSD), a political subdivision of the State. SVSD operates pursuant to authority granted in provisions of Title 17B and Title 19 of the Utah Code Annotated 1953, as amended, and as implemented by the SVSD Pretreatment Rules and Regulations adopted by Resolution dated \_\_\_\_\_. SVSD's legal authority includes the establishment and enforcement of these Local Limits.

## DEVELOPMENT BACKGROUND

The following items were used in completion of this document.

### Water Quality Standards:

Water Quality Standards for receiving waters (Jordan River) were taken



from Utah Administrative Code R317-2 with mass balances from the Permit Statement of Basis – Wasteload Analysis (attached). The wasteloads as expressed in ug/L were adjusted by the design flow so the value could be expressed in pounds per day.

Biosolids Disposal Criteria:

At the present time JBWRF has elected to landfill all biosolids. As such, biosolids disposal and 40 CFR Part 503 requirements were not considered as part of this initial analysis.

Nonetheless, future plans of JBWRF do include the beneficial use of biosolids. Upon becoming operational, site specific data regarding generated biosolids will be collected and factored according to 40 CFR 503 in future development of technically-based Local Limits for JBWRF.

Treatment Plant Removal Efficiencies:

As a new facility, actual removal efficiencies have not been calculated. BPJ has been used to estimate theoretical removal efficiencies. The basis for the judgment determination includes the use of the 2004 EPA Development Manual adjusted by average increased removal efficiency of a MBR treatment facility over that of a standard activated sludge plant. Using the article by Santos and Judd (attached) which evaluated increased metals removal by membranes, the average improvement in metals removal was 29%. As such, this average improvement was applied to all Development Manual mean removal efficiencies.

*PRIORITY POLLUTANT ANALYSIS*

Based on available information, the following Pollutants were evaluated:

1. Arsenic
2. Cadmium
3. Chromium – Total/VI
4. Copper
5. Lead
6. Mercury
7. Nickel
8. Selenium
9. Silver
10. Zinc
11. Aluminum
12. Cyanide

A Local Limit was not calculated for molybdenum since this Pollutant applies primarily to biosolids and was not included in the wasteload analysis.

#### *HEADWORKS LOAD DEVELOPMENT*

Headwork loads were developed for each Pollutant identified above. The design average flow for the POTW was used and is included. Commercial/residential background concentrations are based on historical sampling of the 9000 South Metering Station by South Valley Water Reclamation Facility (SVWRF). These same concentrations are used as theoretical headworks loading data since there is no known pollutant enrichment by industrial users (IU). Listed below are the Pollutants and their maximum allowable headworks load (MAHL). Detailed information on the development can be found in the supporting documents.

	ELEMENT	Max Allowable Load (Lbs/day)
1.	Aluminum	2,605.7

2.	Arsenic	4.6
3.	Cadmium	6.8
4.	Chromium T (based on Chromium VI toxicity data)	26.0
5.	Copper	101.3
6.	Lead	128.7
7.	Mercury	0.1787
8.	Nickel	526.0
9.	Selenium	12.9
10.	Silver	24.6
11.	Zinc	525.4
12.	Cyanide	24.4

The maximum headwork loads above appear, in general, to be protective without being overly conservative. The only value that appears to be suspect is the headwork load for mercury. Any difficulties with this metal will be rectified in the detailed analysis to be completed later since there is no enrichment of this metal by any Industrial User. All of the values for the MAHL are daily maximums based on Water Quality Standards.

*LOCAL LIMITS DETERMINATION*

JBWRF based its Local Limits analysis on an industrial flow of 250,000 gallons per day. The maximum allowable industrial load (MAIL) was distributed across the above gallons per day after being reduced by a 25% reduction to accommodate growth and safety. The following values are daily maximums.

	MAIL	Uniform Based Concentration Daily Maximum

CONSTITUENT	lbs/day	mg/L
CYANIDE	18.2	8.7
ALUMINUM	1805.4	865.9
ARSENIC	33.7	16.1
CADMIUM	5.1	2.4
CHROMIUM	19.4	9.3
COPPER	68.8	33.0
LEAD	96.3	46.2
MERCURY	0.05	0.0634
NICKEL	393.6	188.8
SELENIUM	9.3	4.4
SILVER	18.3	8.8
ZINC	378.6	181.6

#### Non-Petroleum Oil and Grease Limitation

This section evaluates a limit for non-petroleum oil and grease. Throughout the remainder of this section the term "oil and grease" refers to only non-petroleum based products. The typical wastewater treatment plant treating mostly domestic wastewater will reliably remove at least 90% of all oil and grease entering the system. For an MBR system, literature values show removal efficiencies from 95% to 99%. The UPDES permit for JBWRF allows maximum oil and grease discharge of 10 mg/L. Using the 95% removal criteria, the influent can then average 200 mg/L oil and grease and still meet permit. Typical domestic oil and grease influent concentrations rarely exceed 50 mg/L. The excess 150 mg/L could be applied to the industrial load and a corresponding concentration in excess of 1,000 mg/L could be applied. Therefore, JBWRF has chosen to use a local limit of 1,000 mg/L. This value allows for growth and a factor of safety should Industrial Users increase their concentration unexpectedly.

### Compatible Pollutants

JBWRF will continue to monitor and evaluate Compatible Pollutant discharges. The following allowable values are based on the current design basis that includes an influent BOD<sub>5</sub> of 226 mg/L, a TSS concentration of 250 mg/L and an ammonia concentration of 25 mg/L:

BOD <sub>5</sub>	55,459 pounds per day Max Daily Flow
TSS	52,341 pounds per day Max Daily Flow
Ammonia	4,609 pounds per day Max Daily Flow

Since the ability to treat both ammonia and BOD<sub>5</sub> are both limited by supply of oxygen and availability of the appropriate wastewater organisms, JBWRF may shift loads between the two Pollutants based on the net oxygen consumption of the activated sludge treatment process. Finally, based on this evaluation, JBWRF has determined that Local Limits are not necessary for these Compatible Pollutants. Should an Industrial User enter the system that exceeds 5% of the plant capacity, JBWRF will use mass based limits to control the discharger. JBWRF may bill high strength waste discharges as appropriate as a means of managing small Industrial Users.

### pH Limits

JBWRF proposes the following limits on discharge pH:

Minimum pH	5.0
Maximum pH	12.0

The lower limit is based on the prohibitive standard found in 40 CFR Part 403. The upper limit is based on the hazardous waste limit of 12.5 found in 40 CFR Part 261, reduced by 0.5 as a safety factor. These limits will be effective in controlling any corrosion.

*LOCAL LIMITS - EFFECT ON INDUSTRY*

JBWRF has evaluated the potential impact of these Local Limits on Industrial Users which are currently permitted in its service area. JBWRF has two industries that are regulated as Significant Industrial Users (SIU). These SIU's do not enrich for metals, and, as such, are not impacted by these Local Limits.

*SCHEDULE FOR REVISION & UPDATE OF JBWRF SITE-SPECIFIC LOCAL LIMITS*

<b>Task</b>	<b>Beginning Date</b>	<b>Completion Date</b>
Development of sampling plan for domestic Users, IUs and SIUs	June 1, 2012	September 1, 2012
Submit a determination of the need to revise Local Limits per US EPA Region VIII Strategy	September 1, 2013	December 1, 2013
If Local Limits are to be revised, a submittal is prepared and submitted	December 2, 2013	June 1, 2014
New Local Limits public noticed	Following State approval of new Local Limits	

## Jordan Basin Water Reclamation District MAHL, MAIL and Uniform Concentration Analysis

Design Flow	15 MGD							
	Statement of Basis - End of Pipe	Removal Efficiency	MAHL Water Quality	Commercial Residential	Growth Allowance	Factor of Safety	MAIL	Uniform Effluent Based
CONSTITUENT	lbs/day	%	lbs/day	lbs/day	10%	15%	lbs/day	mg/L
CYANIDE	5.367	78%	24.4	0.0626	2.43945	3.659	18.233325	8.7
ALUMINUM	182.396	93%	2605.7	148.8690	260.5654286	390.848	1805.371714	865.9
ARSENIC	17.889	61%	45.9	0.7506	4.587	6.881	33.651900	16.1
CADMIUM	1.626	76%	6.8	0.0025	0.677625	1.016	5.079686	2.4
CHROMIUM	3.378	87%	26.0	0.0751	2.598230769	3.897	19.411671	9.3
COPPER	10.133	90%	101.3	7.2433	10.1331	15.200	68.754960	33.0
LEAD	36.029	72%	128.7	0.2502	12.86742857	19.301	96.255514	46.2
MERCURY	0.005	72%	0.0179	0.0019	0.001787143	0.003	0.011527	0.0055
NICKEL	220.927	58%	526.0	0.9007	52.60157143	78.902	393.611066	188.8
SELENIUM	4.629	64%	12.9	0.3753	1.28575	1.929	9.267825	4.4
SILVER	6.881	72%	24.6	0.0876	2.457321429	3.686	18.342341	8.8
ZINC	78.813	85%	525.4	15.4874	52.542	78.813	378.577620	181.6

Note 1: The Design Flow has been used for determination of water quality MAHL based on State use of the value in the Statement of Basis.

Note 2: The end of pipe mass loading is based on the permit wasteload analysis table for end of pipe concentration covered using design flows.

Note 3: Removal efficiency is based on emperical values from the Local Limits Development Manual (2004) adjusted by an average improvement for membranes.

Note 4: Commercial/Residential current concentration based on 90th South Sampling, It is assumed that the IU's are not a significant enrichment over avarage.

Note 5: The uniformed based local limits are based on an enriched flow of 250,000 gallons per day.

Note 6: Since Biosolids are not going to be beneficially reused at this time, molbdenun has not been considered in the local limits review.