**Discharge Limits and MAHL Allocation Procedures of Muskegon County**

I. Introduction

This document is referred to by name in the Muskegon County Sewer Use Ordinance, Revision IV, Section 2.4, B. Every wastewater treatment plant has its own unique capacity to treat various pollutants. This document relates particularly to the unique capacity of the Muskegon County Wastewater Management System (MCWMS) to treat various pollutants. The purpose of this document is fourfold:

1) To discuss briefly how the capacity to treat each pollutant was determined.

2) To discuss how this treatment capacity was allocated to domestic users, industrial users, and hauled waste users.

3) To publish the limits placed on industrial users and hauled waste users for various pollutants in or characteristics of their wastewaters.

4) To describe the efforts of MCWMS to monitor the loadings of pollutants entering the sewage collection system and wastewater treatment plant to help ensure that the plant is not receiving more of a pollutant than can be treated.

II. How the capacity to treat each pollutant was determined

“MAHL” is an abbreviation of Maximum Allowable Headworks Loading. “Headworks” means the point at which the raw wastewater enters the wastewater treatment plant. (Another word for headworks is influent.) “Loading” is the amount of a pollutant entering into the treatment plant through the incoming wastewater. A pollutant loading is usually given in pounds per day. Therefore, the Maximum Allowable Headworks Loading for a pollutant is the maximum pounds of the pollutant that a wastewater treatment plant can receive and treat. MAHL is therefore synonymous with “treatment capacity”. If a treatment plant receives more pounds of a pollutant than it can treat, it could endanger the lives or health of the workers who maintain the sewage collection system, result in the discharge of pollutants that would be damaging to the environment, or temporarily inhibit the plant’s ability to treat wastewater.

In 2009, MCWMS performed a six-month study to determine the MAHLs for a number of pollutants. In the study, MCWMS staff looked at the levels of pollutants coming into the plant compared to levels going out of the plant in order to determine the percentage removed for each pollutant. It also determined the concentration levels at which a pollutant could impact the safety of collection system workers and the concentration levels that could disrupt treatment at the plant. All this information went into establishing MAHLs.

III. MAHL Allocation

The MAHL (or plant treatment capacity) for each pollutant, after a 10% safety factor has been deducted from it, is allocated to domestic sanitary waste, hauled waste, and industrial waste.

The domestic sanitary allocation was determined from data acquired during the MAHL study of 2009. Average pollutant concentrations were measured in samples of sanitary sewage collected from various locations in the county. From the average pollutant concentrations and the average domestic sewage flow rate, the average pollutant loadings received from sanitary waste were calculated.

Similarly, average pollutant concentrations were determined for the hauled waste flow entering the wastewater treatment plant. Using the average pollutant concentrations and a hauled waste flow of 0.150 million gallons per day (or 4.5 million gallons per month), loadings were calculated, and a portion of the MAHL equal to these calculated loadings became the treatment capacity allocated to hauled waste. In its daily operation, the WWTP can monitor how close it is to exceeding the treatment capacity reserved for hauled waste by simply comparing the actual hauled waste flow to 4.5 million gallons per month. This large flow was chosen to provide a safety factor in treating hauled waste.)

After deducting the domestic sanitary and hauled waste allocations from the MAHL, the remaining treatment capacity is allotted to the industries that discharge to MCWMS. This allocation for industrial waste is sometimes referred to as the MAIL, which stands for Maximum Allowable Industrial Loading. A portion of the MAIL is allotted to each industry, and the size of each industry’s allotment is proportional to the volume of flow that the industry discharges. The allotment for each pollutant is calculated from the industry’s average flow rate (to which 20% is added as a safety factor) and the concentration limit placed on that pollutant in the industry’s wastewater discharge permit, which is issued to the industry by MCWMS. If an industry’s flow is a limited parameter in its wastewater discharge permit (as in the case of industries whose discharge is associated with groundwater remediation), then that flow limit, without the addition of 20%, is used in the calculation of the wastestream allocation.

MCWMS employs a spreadsheet for a strict accounting of the allocation of the MAIL. The spreadsheet calculates the allocation of each pollutant for each industrial discharge. The allocations for all the industrial wastestreams for a given pollutant are summed up, and the sum is compared to the total MAIL. Any portion of the MAIL not allocated is reserved for industrial growth and for the granting of Specific Alternative Limits if necessary. The following table is an excerpt from the industrial allocation spreadsheet. The “Industrial Allocation Spreadsheet” is available for review on the MCWMS network located at the Administration Building.

**TABLE 1: Industrial Allocation Spreadsheet Excerpt**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Client ID | Monitor Site ID | Flow + 20% (MGD) | Phosphorus Monthly Average Limit (mg/L) | Phosphorus Monthly Average Allocation (lb/day) |
| ADAC | ADAC101 | 0.0036204 | 125 | 25.0975875 |
| BDKJ | BDKJ005 | 0.0662208 | 18.0 | 8.202187008 |
| BRCS | BRCS001 | 0.3221316 | 18.0 | 34.68517135 |
| CAMU | CAMU001 | 0.8770032 | 18.0 | 143.4869008 |
| CNNM | CNNM001 | 0.0068244 | 18.0 | 6.009241176 |
| DMMI | DMMI001 | 0.0026688 | 50.0 | 1.6918653 |
| DMMI | DMMI002 | 0.0150276 | 18.0 | 6.514127028 |
| DSCD | DSCD212 | 0.000102 | 3055 | 3.64053963 |
| DSCP | DSCP101 | 0.0008256 | 50.0 | 0.670938 |
| DYNF | DYNF101 | 0.0015552 | 18.0 | 0.251091036 |
| ESCO | ESCO101 | 0.0716124 | 18.0 | 5.930831556 |
| GLFI | GLFI101 | 0.0218124 | 18.0 | 0.941636448 |
| HACK | HACK001 | 0.024156 | 18.0 | 3.62847276 |
| HACK | HACK002 | 0.024156 | 18.0 | 3.62847276 |
| HACK | HACK003 | 0.024156 | 18.0 | 3.62847276 |
| HACK | HACK004 | 0.024156 | 18.0 | 3.62847276 |
| HLNW | HLNW101 | 0.0124464 | 104 | 23.35777517 |
| HLTE | HLTE001 | 0.0041064 | 40.0 | 0.09773664 |
| HOW1 | HOW1001 | 0.0184992 | 18.0 | 1.35459378 |
| HOW3 | HOW3001 | 0.0329556 | 40.0 | 8.23391136 |
| HOW3 | HOW3003 | 0.0047016 | 40.0 | 8.982558 |
| HOW3 | HOW3102 | 0.0333324 | 18.0 | 10.96851445 |
| HOW4 | HOW4002 | 0.0423432 | 18.0 | 4.000332636 |
| HOW4 | HOW4003 | 0.030132 | 18.0 | 4.262779548 |
| HOW4 | HOW4101 | 0.0425844 | 18.0 | 1.360722348 |
| HOW5 | HOW5002 | 0.0041976 | 18.0 | 8.279695368 |
| HOW5 | HOW5101 | 0.0458616 | 18.0 | 1.9467216 |
| HOWO | HOWO001 | 0.0135144 | 40.0 | 23.53129776 |
| HOWT | HOWT001 | 0.0754152 | 1750 | 60.880113 |
| IMCC | IMCC001 | 0.0031524 | 40.0 | 0.09773664 |
| KAYD | KAYD001 | 0.0334164 | 60.0 | 10.034028 |
| KNL2 | KNL2101 | 0.0230916 | 500 | 223.277151 |
| L3CO | L3CO001 | 0.0262284 | 18.0 | 1.723930128 |
| LRNI | LRNI101 | 0.2927112 | 300 | 704.4638706 |
| MACI | MACI101 | 0.0011868 | 18.0 | 0.676666008 |
| MCSW | MCSW001 | 0.0152604 | 18.0 | 0.835648272 |
| MCSW | MCSW002 | 0.0092316 | 18.0 | 0.90126 |
| MCSW | MCSW003 | 0.0523332 | 18.0 | 1.261764 |
| MCTC | MCTC201 | 0.004152 | 18.0 | 0.716141196 |
| MFTH | MFTH101 | 0.0120024 | 18.0 | 0.972820044 |
| PCDP | PCDP001 | 0.005118 | 50.0 | 1.5651882 |
| PCDC | PCDC001 | 0.0074 | 50.0 | 3.08765 |
| PHLO | PHLO001 | 0.0047292 | 200 | 7.8930348 |
| PRPR | PRPR101 | 0.0030432 | 18.0 | 0.701000028 |
| QPLT | QPLT101 | 0.0301272 | 18.0 | 3.455791344 |
| SCST | SCST111 | 0.000006 | 500 | 0 |
| TCWC | TCWC001 | 0.0465708 | 18.0 | 2.486936844 |
| THOD | THOD101 | 0.0000096 | 0.100 | 8.0112E-06 |
| TOWR | TOWR101 | 0.0012696 | 18.0 | 0.030102084 |
| WEBB | WEBB001 | 0.0057408 | 100 | 3.274578 |
| WHLL | WHLL101 | 0.006474 | 18.0 | 0.87332094 |
| Groundwater Discharges | | Limited Flow (MGD) |  |  |
| BOFO | BOFO101 | 0.432 | 5.00 | 18.0252 |
| MAHL | MAHL301 | 0.3 | 5.00 | 12.5175 |
| MICH | MICH101 | 0.216 | 5.00 | 9.0126 |
| PPSS | PPSS001 | 0.266881 | 5.00 | 11.13560973 |
| TLVS | TLVS201 | 0.18 | 5.00 | 7.5105 |
|  |  |  | Total Allocation (lb/day): | 1435.325051 |
|  |  |  | MAIL (lb/day): | 2990.91 |
|  |  |  | % of MAIL Allocated: | 47.99% |
|  |  |  | % of MAIL Reserved: | 52.01% |
|  |  |  |  |  |

An industry’s flow is updated annually in the spreadsheet. The flows are taken from a user’s Continued Compliance Report or Semi-Annual Evaluation Report.

IV. Limits for Industrial Dischargers

MCWMS establishes the following local limits for industries.

**TABLE 2: Local Limits for Industries Discharging to the Collection System**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pollutant | Monthly Avg. Limit (mg/l) | Daily Max Limit (mg/l) | Monthly Avg. Limit (mg/l) Applicable to Groundwater Remediation Sites | Daily Max Limit (mg/l) Applicable to Groundwater Remediation Sites |
| BOD | 300 | NA | 50.0 | NA |
| TSS | 500 | NA | 100 | NA |
| Phosphorus | 18.0 | NA | 5.00 | NA |
| Cadmium | 0.250 | 0.500 | 0.0500 | 0.100 |
| Chromium | 8.00 | 30.0 | 0.100 | 0.300 |
| Copper | NA | 1.50 | NA | 0.0500 |
| Lead | 0.475 | 0.750 | 0.0500 | 0.100 |
| Nickel | 3.50 | 8.00 | 0.0500 | 0.100 |
| Silver | 0.0500 | 0.100 | 0.0200 | 0.0500 |
| Zinc | NA | 18.0 | NA | 0.500 |
| Mercury | NA | <0.0002 | NA | <0.0002 |
| Cyanide | 0.100 | 0.200 | 0.0500 | 0.100 |
| Acetone | NA | 25.0 | NA | 25.0 |
| Aniline | 0.0100 | NA | 0.0100 | NA |
| Benzene | 0.0100 | NA | 0.0100 | NA |
| Bis(2-ethylhexyl)phthalate | 0.400 | NA | 0.400 | NA |
| 2-Butanone (MEK) | 2.50 | NA | 2.50 | NA |
| Carbon tetrachloride | 0.0100 | NA | 0.0100 | NA |
| Chlorobenzene | 0.0500 | NA | 0.0500 | NA |
| Chloroethane | NA | 0.0500 | NA | 0.0500 |
| Chloroform | NA | 0.0500 | NA | 0.0500 |
| 1,2-Dichlorobenzene | 0.0100 | NA | 0.0100 | NA |
| 1,3-Dichlorobenzene | 0.0100 | NA | 0.0100 | NA |
| 1,4-Dichlorobenzene | 0.100 | NA | 0.100 | NA |
| 1,1-Dichloroethane | NA | 0.150 | NA | 0.150 |
| 1,2-Dichloroethane | NA | 0.100 | NA | 0.100 |
| 1,1-Dichloroethylene | 0.0150 | NA | 0.0150 | NA |
| cis-1,2-Dichloroethylene | NA | 0.100 | NA | 0.100 |
| trans-1,2-Dichloroethylene | NA | 0.100 | NA | 0.100 |
| Ethylbenzene | 0.200 | NA | 0.200 | NA |
| N-Ethylaniline | 0.010 | NA | 0.010 | NA |
| Methylene chloride | NA | 0.200 | NA | 0.200 |
| Naphthalene | 0.0500 | NA | 0.0500 | NA |
| Tetrachloroethylene | 0.100 | NA | 0.100 | NA |
| Tetrahydrofuran | NA | 0.150 | NA | 0.150 |
| Toluene | 0.300 | NA | 0.300 | NA |
| 1,1,1-Trichloroethane | 0.0750 | NA | 0.0750 | NA |
| 1,1,2-Trichloroethane | NA | 0.100 | NA | 0.100 |
| Trichloroethylene | NA | 0.0250 | NA | 0.0250 |
| Vinyl chloride | 0.0100 | NA | 0.0100 | NA |
| Total Xylenes | 0.300 | NA | 0.300 | NA |

Some of limits for volatile organic compounds were put in place to protect those who work on the collection system from exposure to hazardous levels of volatile organic vapors. MCWMS may grant an industry a Specific Alternative Limit (SAL) higher than those published above. In cases where the Federal Government imposes a categorical limit that is stricter than the local limit, the stricter limit will be imposed. Likewise, if a local limit is stricter than a Federal categorical limit, the local limit will be imposed. The MCWMS Director reserves the right to establish local initiatives. A local initiative is the imposition of a limit in a user permit or order upon a pollutant or flow, which, if not limited, may result in harm to the wastewater treatment plant, its workers or the environment, or which may interfere with the analysis of other limited parameters. The parameter limited in a local initiative may be a pollutant listed in Table 2 or 3 but with a stricter limit than is given for that parameter in Table 2 or 3, or it may be a parameter different than those listed in these tables.

In some cases a SAL for a volatile organic compound may be granted to a user in excess of the concentration that could contribute to vapor levels potentially exceeding the exposure limit for collection system workers. In such cases, the municipalities that would be affected will be informed annually which users are permitted to discharge above worker health levels so that workers can take appropriate protective measures when working on the collection system downstream of those users. Notification will be sent to the affected municipalities’ public works departments by certified mail or other verifiable means. It will be sent yearly. It will contain the names and addresses of those industries that are permitted to discharge over the worker health limit, the names of the compounds, the permitted discharge concentrations, and, for comparison, the concentration limit that would be considered safe for collection system workers. These conditions were approved by the Municipal Wastewater Users Committee.

The limits for mercury, unlike those for other pollutants in Table 2, are not derived from a technically determined MAHL. Instead they are driven by the fact that MCWMS is not currently meeting the water quality based effluent limit for mercury of 1.3 nanograms per liter. Therefore, MCWMS is under a State-imposed mercury reduction program. Consequently, no discharge of mercury is permitted at or above 0.0002 mg/L, which is the commonly achieved quantification limit for mercury when analyzed by atomic absorption methods.

**TABLE 3: Instantaneous Limits for Industries Discharging to the Collection System**

|  |  |  |
| --- | --- | --- |
| Pollutant Property | Instantaneous Limit | Instantaneous Limit Applicable to Groundwater Remediation Sites |
| Flashpoint, Lower Limit | 140°F | 140°F |
| pH, Lower Limit | 5.0 s.u. | 5.0 s.u. |

**TABLE 4: Instantaneous Limits for Hauled Waste**

|  |  |
| --- | --- |
| Pollutant Property | Instantaneous Limit |
| Flashpoint, Lower Limit | 140°F |
| pH, Lower Limit | 3.0 s.u. |
| pH, Upper Limit | 12.5 s.u. |

It should be noted that, although Table 4 lists only three limits applying to hauled waste, if any hauled waste should be generated by an industry falling within a Federal category as defined in 40CFR Parts 401-471, all the limits that are assigned to that industry in the Federal regulations will be applied to the hauled waste as well.

IV. MCWMS Headworks Loading Tracking

Tracking the pollutant loading that enters the wastewater treatment plant requires sampling, testing, and evaluation at the headworks. This is to ensure that the plant does not receive a greater loading than it can treat. To monitor the pollutant loadings received by the wastewater treatment plant, MCWMS generates a monthly report showing the headworks loading for each pollutant. This headworks loading is the combined loading of not only the main sewered influent, but also hauled waste and the three outfalls from Muskegon County Solid Waste, which discharges directly into the MCWMS east storage lagoon. The report shows both the daily loadings and the monthly average loadings for each pollutant so that they can be compared to the respective daily maximum and monthly average MAHLs. The report includes many more pollutants than just those that occur in the table of local limits. MCWMS has developed MAHLs for most of the pollutants for which it routinely tests. Limits were published for only a handful of them.

This report is part of the MCWMS Monthly Operating Report. If the report indicates that a pollutant’s loading exceeds its MAHL (or merely comes close to exceeding it), it can be noticed quickly and action can be taken to address the issue. If a daily or monthly average loading exceeds a MAHL, it appears highlighted in the report. A sample portion of this monthly report is shown here.

**TABLE 5: Excerpt from the Total Pollutant Loading from the MCWMS Monthly Operating Report**



The allocation of treatment capacity given to hauled waste, as already explained, is based upon a flow of 4.5 million gallons per month and average pollutant concentrations that were determined in 2009. Assuming that the average pollutant concentrations remain fairly constant, the pollutant loadings received from hauled waste are easily monitored by tracking the hauled waste flow for each month. If the hauled waste flow should ever approach four and a half million gallons per month, then steps will be taken to regulate the hauled waste flow. These steps may include postponing some discharges when possible or turning some discharges away if necessary. A hauled waste flow is reported weekly so that its loading contribution may be monitored.

In addition to tracking the volume of hauled waste flow, MCWMS also monitors hauled waste through sampling and analysis. Septage and grease loads are randomly sampled approximately weekly. Wastestreams that are not septage or grease are sampled according to the schedules published in the permits of those hauled waste users. The sampling frequency in the permits of hauled waste users is determined according to the following factors. Users with a potential to exceed the surcharge threshold of BOD and TSS for hauled waste are sampled monthly at a minimum in order to accurately determine the surcharges for the user. The sampling frequency for all other parameters is based on the impact that certain expected pollutants would have on the system and the allocated amount of those pollutants.

Permits for hauled waste users do not include limits other than for pH and flashpoint. Therefore, if an excessive pollutant concentration is discovered in a hauled waste sample, enforcement response will be based upon the user’s discharging a waste other than what was specified in the waste characterization provided in its permit application. Penalties may include letters of noncompliance, notices of violation, fines, or revocation of the permit to discharge.

The average hauled waste pollutant concentrations upon which the hauled waste allocation was based were determined in 2009. These concentrations will be re-evaluated yearly for all inorganic pollutants except cyanide (unless a hauled waste wastestream is known to be a source of cyanide). If an average pollutant concentration from the yearly evaluation is found to change by 20% or more from the average concentration currently being used in calculations, then the new average will be used thereafter to determine the hauled waste pollutant loadings.

To ensure that treatment is occurring as expected, sampling is conducted throughout the treatment plant at various stages. A copy of the current “Metro Sampling Schedule” which contains the sampling schedule and parameters collected is available for review at the administration building.