



City of Nevada, Iowa

Preliminary Scope of Services

Proposal

Askew Scientific Consulting

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Table of Contents

Introduction	3
Preliminary Review	3
Burke Current Treatment Agreement	3
POTW Industrial Surcharge Billing.....	5
City of Nevada Sewer Ordinances and Industrial Pretreatment Requirements	6
Proposed Statement of Work of Implementation of City Requirements	8
Standard Fee Structure for Askew Scientific.....	8
Table 1: City of Nevada Scope of Services	9
Summary	12
Conclusion	13
Appendix 1: Washington State BOD and CBOD Report	14

Table of Figures

Figure 1: Burke Treatment Agreement Limits in the Nevada NPDES permit	4
Figure 2: City of Nevada NPDES POTW Design Capacity	5
Figure 3: City of Nevada Ordinance of Oil and Grease.....	5
Figure 4: City of Nevada Industrial Surcharge Fees.....	6
Figure 5: City of Nevada Pretreatment Ordinance Section	7

Introduction

The following preliminary report will discuss the proposed services request from the City of Nevada staff. This report contains observations based on limited data and is not to be considered all-encompassing. A summary of consultant final costs will be provided in Table 1:

Preliminary Review

Burke Current Treatment Agreement

Figure 1 lists the Burke Treatment Agreement requirements in the City of Nevada's NPDES permit. Referring to the Design capacity, Design capacity exceedance warning (Figure 2) and the Oil and Grease Restricted Discharge (Figure 3). Review of this information indicates:

1. The Burke Treatment Agreement allows the industry to discharge a Daily maximum CBOD at 77% of the total BOD design load of the POTW.
2. As the NPDES Permit rationale erroneously equates CBOD to BOD (1 to 1), which is not supported in the Washinton State Reference, "**BOD and CBOD**" (*Appendix I*). The ratio for BOD to CBOD is (1.16 to 1). That means that when the Burke Treatment Agreement CBOD daily maximum value of 3,750 Pounds per Day is converted to BOD, the value becomes 4,350 pounds per day or 89% of the total BOD design load of the POTW.
3. The Nevada NPDES permit specifically states: "*Wastes in such volumes or quantities as to exceed the design capacity of the treatment works or reduce the effluent quality below that specified in the operation permit of the treatment works are considered to be a waste which interferes with the operation or performance of the treatment works and are prohibited by subrule IAC 567-62.1(7)*". The currently allowed Burke Treatment Agreement has been given BOD limits is excess of the capacity for the POTW to treat when the domestic and commercial wasteload is considered.
4. The Burke Treatment Agreement allows the industry to discharge a Daily maximum TKN at 75% of the total TKN design load of the POTW.
5. The Nevada NPDES permit specifically states: "*Wastes in such volumes or quantities as to exceed the design capacity of the treatment works or reduce the effluent quality below that specified in the operation permit of the treatment works are considered to be a waste which interferes with the operation or performance of the treatment works and are prohibited by subrule IAC 567-62.1(7)*". The currently allowed Burke Treatment Agreement has been given TKN limits is excess of the capacity for the POTW to treat when the domestic and commercial wasteload is considered.
6. The Burke Treatment Agreement allows the industry to discharge 300% over the City of Nevada's Oil and Grease limit of 100 milligrams per liter. There is no justification given to identify the Burke discharge containing dispersed or other soluble material which has a

600 milligram per liter limit. Fats, Oils and Greases from animal products are not this type of material.

Facility Name: NEVADA CITY OF STP			
Permit Number: 8562001			
Significant Industrial User Discharges:			
Significant Industrial User: BURKE CORPORATION			
Outfall #	Outfall Description		
001	EFFLUENT (WASTE) PRIOR TO DISCHARGE TO THE MUNICIPAL COLLECTION SYSTEM.		
Significant Industrial User Effluent Limitations			
You are prohibited from discharging pollutants except in compliance with the following effluent limitations:			
BURKE CORPORATION			
Outfall: 001 Effective Dates: 02/01/2022 to 01/31/2027			
Parameter	Season	Limit Type	Limit Values
FLOW			
	Yearly	30 Day Average	0.35 MGD
	Yearly	DAILY MAXIMUM	0.50 MGD
CBOD5			
	Yearly	30 Day Average	3,073 LBS/DAY
	Yearly	DAILY MAXIMUM	3,750 LBS/DAY
TOTAL SUSPENDED SOLIDS			
	Yearly	30 Day Average	646 LBS/DAY
	Yearly	DAILY MAXIMUM	750 LBS/DAY
NITROGEN, TOTAL KJELDAHL (AS N)			
	Yearly	30 Day Average	570 LBS/DAY
	Yearly	DAILY MAXIMUM	750 LBS/DAY
OIL AND GREASE			
	Yearly	30 Day Average	300 MG/L
	Yearly	DAILY MAXIMUM	300 MG/L
PH			
	Yearly	DAILY MAXIMUM	9.5 STD UNITS
	Yearly	DAILY MINIMUM	5.5 STD UNITS

Figure 1: Burke Treatment Agreement Limits in the Nevada NPDES permit

<p>Facility Name: NEVADA CITY OF STP</p> <p>Permit Number: 8562001</p> <p style="text-align: center;">Design Capacity</p> <p>Design: 1</p> <p>The design capacity for the treatment works is specified in Construction Permit Number 2004-0257-S, issued January 26, 2004. The treatment plant is designed to treat:</p> <ul style="list-style-type: none"> * An average dry weather (ADW) flow of 1.6580 Million Gallons Per Day (MGD). * An average wet weather (AWW) flow of 3.7100 Million Gallons Per Day (MGD). * A maximum wet weather (MWW) flow of 6.2180 Million Gallons Per Day (MGD). * A design 5-day biochemical oxygen demand (BOD5) load of 4871 lbs/day. * A design Total Kjeldahl Nitrogen (TKN) load of 1004.00 lbs/day. * A design Total Suspended Solids (TSS) load of 4558 lbs/day. <p>Operator Certification Type/Grade: WW/III</p> <p>Wastes in such volumes or quantities as to exceed the design capacity of the treatment works or reduce the effluent quality below that specified in the operation permit of the treatment works are considered to be a waste which interferes with the operation or performance of the treatment works and are prohibited by subrule IAC 567-62.1(7).</p>

Figure 2: City of Nevada NPDES POTW Design Capacity

<p>97.04 RESTRICTED DISCHARGES.</p> <p>No person shall discharge or cause to be discharged the following described substances, materials, waters, or wastes if it appears likely in the opinion of the Superintendent that such wastes can harm either the sewers, sewage treatment process, or equipment, have an adverse effect on the receiving stream or can otherwise endanger life, limb, public property, or constitute a nuisance. In forming an opinion as to the acceptability of these wastes, the Superintendent will give consideration to such factors as the quantities of subject wastes in relation to flows and velocities in the sewers, materials of construction of the sewers, nature of the sewage treatment process, capacity of the sewage treatment plant, degree of treatability of wastes in the sewage treatment plant, and other pertinent factors. The substances restricted are:</p> <ol style="list-style-type: none"> 1. High Temperature. Any liquid or vapor having a temperature higher than one hundred fifty degrees (150°) F (65° C). 2. Fat, Oil, Grease. Any water or waste containing fats, wax, grease, or oils, whether emulsified or not, in excess of 100 milligrams per liter or 600 milligrams per liter of dispersed or other soluble matter.
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Figure 3: City of Nevada Ordinance of Oil and Grease

POTW Industrial Surcharge Billing

Figure 4 lists the sewer surcharge rates for wastewater dischargers that exceed the following levels:

1. CBOD 300 mg/L
2. TSS 300 mg/L
3. TKN 35 mg/L

The surcharge percent increase in sewer rate charges was only 2.2%-2.5% per year for the 5-year time frame in Figure 4. This Cost-of-Living philosophy does not take into account a realistic O&M required for the entire collection system, the current and future POTW and the extra strain place on the current and future POTW treatment infrastructure.

99.07 SURCHARGE.

For those contributors who contribute wastewater the strength of which is greater than the limits set out below, a surcharge in addition to the normal user charge will be collected. The surcharge for operation and maintenance including replacement is:

1. Carbonaceous Biological Oxygen Demand (CDOB) per pound over 300 mg/l

July 2012	July 2013	July 2014	July 2015	July 2016	July 2017
\$0.180	\$0.185	\$0.189	\$0.194	\$0.199	\$0.204
(per pound)					

2. Total Suspended Solids (TSS) in excess of 300 mg/l

July 2012	July 2013	July 2014	July 2015	July 2016	July 2017
\$0.450	\$0.450	\$0.461	\$0.473	\$0.485	\$0.497
(per pound)					

3. Total Kjeldahl Nitrogen (TKN) in excess of 35 mg/l

July 2012	July 2013	July 2014	July 2015	July 2016	July 2017
\$0.700	\$0.718	\$0.735	\$0.754	\$0.773	\$0.792
(per pound)					

4. Oil and Grease:

- A. \$0.10 per pound in excess of 300 mg/l and an additional
- B. \$0.20 per pound in excess of 600 mg/l

Figure 4: City of Nevada Industrial Surcharge Fees

City of Nevada Sewer Ordinances and Industrial Pretreatment Requirements

The entirety of the City of Nevada pretreatment ordinance is illustrated in Figure 5. The minimum requirement listed in the federal regulation 40 CFR § 403 have not been met.

97.05 RESTRICTED DISCHARGES – POWERS.

If any waters or wastes are discharged, or are proposed to be discharged to the public sewers, which waters contain the substances or possess the characteristics enumerated in Section 97.04 and which in the judgment of the Superintendent may have a deleterious effect upon the sewage works, processes, equipment, or receiving waters, or which otherwise create a hazard to life or constitute a public nuisance, the Superintendent may:

1. Rejection. Reject the wastes by requiring disconnection from the public sewage system;
2. Pretreatment. Require pretreatment to an acceptable condition for discharge to the public sewers;
3. Controls Imposed. Require control over the quantities and rates of discharge; and/or
4. Special Charges. Require payment to cover the added cost of handling and treating the wastes not covered by existing taxes or sewer charges under the provisions of Chapter 99.

97.06 SPECIAL FACILITIES.

If the Superintendent permits the pretreatment or equalization of waste flows, the design and installation of the plants and equipment shall be subject to the review and approval of the Superintendent and subject to the requirements of all applicable codes, ordinances, and laws. Where preliminary treatment or flow-equalizing facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the owner at the owner's expense.

97.07 CONTROL MANHOLES.

When required by the Superintendent, the owner of any property serviced by a building sewer carrying industrial wastes shall install a suitable control manhole together with such necessary meters and other appurtenances in the building sewer to facilitate observation, sampling, and measurement of the wastes. Such manhole, when required, shall be accessibly and safely located, and shall be constructed in accordance with plans approved by the Superintendent. The manhole shall be installed by the owner at the owner's expense, and shall be maintained by the owner so as to be safe and accessible at all times.

97.08 TESTING OF WASTES.

All measurements, tests, and analyses of the characteristics of waters and wastes to which reference is made in this chapter shall be determined in accordance with the latest edition of *Standard Methods for the Examination of Water and Wastewater*, published by the American Public Health Association, and shall be determined at the control manhole provided, or upon suitable samples taken at said control manhole. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest downstream manhole in the public sewer to the point at which the building sewer is connected. Sampling shall be carried out by customarily accepted methods to reflect the effect of constituents upon the sewage works and to determine the existence of hazards to life, limb, and property. (The particular analyses involved will determine whether a 24-hour composite of all outfalls of a premises is appropriate or whether a grab sample or samples should be taken. Normally, but not always, CBOD and suspended solids analyses are obtained from 24-hour composites of all outfalls whereas pH's are determined from periodic grab samples).

Figure 5: City of Nevada Pretreatment Ordinance Section

Proposed Statement of Work of Implementation of City Requirements

Standard Fee Structure for Askew Scientific

The City of Nevada shall provide all equipment, expendable supplies and technical support necessary to complete the project. Such equipment, expendable suppliers and technical support shall be provided at no charge.

Primary consultant shall be Dr. Edward Askew. Dr. Edward Askew shall report directly to the designated City of Nevada representative and to any other party designated by the City of Nevada in connection with the performance of the duties under this Agreement and shall fulfill any other duties reasonably requested by the City of Nevada and agreed to by the Consultant.

COMPENSATION: The Consultant shall provide consulting services to the City of Nevada according to the above estimate and on an "as needed" basis. Consulting Hours shall be defined as follows:

"Regular" consulting hours shall consist of any time Consultant works for City of Nevada on-site or off-site during regular business hours. Regular business hours are defined as 8:00 AM to 5:00 PM Monday through Friday excluding national holidays. All Regular consulting hours will be provided at a rate of one hundred dollars (\$100.00) per hour rounded to the nearest hour.

The City of Nevada shall pay Consultant the Consultant's actual costs of travel and lodging. Time spent traveling to shall be billed as regular consulting hours.

The exact amount of time needed to complete the project is unknown. This agreement shall not exceed the costs listed without express written approval from the City of Nevada.

The Consultant will issue an itemized invoice for time and expenses on a monthly basis. Payment is due within 30 days of billing. A finance charge of 3% per month will be added after 30 days. Costs of collection including reasonable attorney's fees shall be borne by the City of Nevada. Consultant reserves the right to suspend service to the City of Nevada if unpaid invoices exceed the net 30-day terms. Consultant also reserves the right to withhold any work product including reports, raw data, certificates and letters or reliance until invoices are paid in full.

Table 1 (below) outlines Askew Scientific Services and associated costs for the City of Nevada project.

Table 1: City of Nevada Scope of Services

Askew Scientific Services:	Askew Scientific Hours	Cost (\$100 per Hour)
<ul style="list-style-type: none"> • Preliminary review of: <ul style="list-style-type: none"> ○ Last five years of NPDES Monthly operational reports for industrial and POTW compliance. ○ Review of city ordinances. ○ Review of engineering reports for proposed rate charges 	40	\$4,000
<ul style="list-style-type: none"> • Updated Rate Structure <ul style="list-style-type: none"> ○ BOD and COD ○ TSS ○ Oil and Grease ○ Total Nitrogen ○ Total Phosphorous ○ Total Copper 	40	\$4,000
<ul style="list-style-type: none"> • Raising Capital to Meet Requirements <ul style="list-style-type: none"> ○ Work with City Engineering Firm and City Legal Staff 	20	\$2,000
<ul style="list-style-type: none"> • Independent Rate Structure with O & M <ul style="list-style-type: none"> ○ Current rate structure improvements to divide Residential Charges from Industrial/Commercial Charges. ○ Engineering study review or development to address: <ul style="list-style-type: none"> ▪ Current POTW needs. ▪ Collection system needs ▪ New POTW needs 	60	\$6,000

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Askew Scientific Services:	Askew Scientific Hours	Cost (\$100 per Hour)
<ul style="list-style-type: none"> • Justification of Fees and Enforcement for; <ul style="list-style-type: none"> ○ City Ordinances ○ Regulatory Fines ○ NPDES Compliance for treatment Agreement ○ Compliance with the Pretreatment requirements in 40 CFP § 403 	60	\$6,000
<ul style="list-style-type: none"> • Collection Process for Money for Building of the Plant. <ul style="list-style-type: none"> ○ Work with City Engineering firm and City Legal Staff to: <ul style="list-style-type: none"> ▪ Develop and collect payment from industrial dischargers for new lift station to new POTW ▪ Develop and collect payment from industrial dischargers for new POTW ▪ Develop and collect payment from industrial dischargers for current collection system. ▪ Update city ordinances to provide for collection of sewer use fees for: <ul style="list-style-type: none"> • Residential dischargers • Commercial/Industrial discharges without sampling manholes • Commercial/Industrial discharges without sampling manholes 	50	\$5,000

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Askew Scientific Services:	Askew Scientific Hours	Cost (\$100 per Hour)
<ul style="list-style-type: none"> • Pretreatment Agreement- Review and provide template for future as well as enforcement fees/penalties to include <ul style="list-style-type: none"> ○ City Ordinance requirements ○ NPDES Treatment Agreement requirements ○ State of Iowa Code requirements ○ 40 CFR § 403 requirements • Enforcement Response Plan requirements 	60	\$6,000
<ul style="list-style-type: none"> • Reporting requirements for user to include: <ul style="list-style-type: none"> ○ Permitted Treatment Agreement concentrations and poundage ○ Treatment Agreement violations ○ Technical Review Criteria discharge violations ○ State of Iowa Code requirements ○ 40 CFR § 403 requirements ○ Enforcement Response Plan requirements 	60	\$6,000
<ul style="list-style-type: none"> • Industrial and Personnel Manual to Follow (which runs parallel with our city code). This manual and training will cover the requirements of: <ul style="list-style-type: none"> ○ Updated City ordinance ○ State of Iowa Codes ○ 40 CFR § 403 ○ 40 CFR § 136 ○ Applicable EPA Guidance Manuals 	60	\$6,000
TOTAL	450	\$45,000

Summary

Preliminary review of the City of Nevada city ordinances and NPDES permit with the Burke Treatment Agreement has identified the following problems:

1. The Burke Treatment Agreement allows the industry to discharge a Daily maximum CBOD at 77% of the total BOD design load of the POTW.
2. As the NPDES Permit rationale erroneously equates CBOD to BOD (1 to 1), which is not supported in the Washinton State Reference, “**BOD and CBOD**” (*Appendix I*) . The ratio for BOD to CBOD is (1.16 to 1). That means that when the Burke Treatment Agreement CBOD daily maximum value of 3,750 Pounds per Day is converted to BOD, the value becomes 4,350 pounds per day or 89% of the total BOD design load of the POTW.
3. The Nevada NPDES permit specifically states: “*Wastes in such volumes or quantities as to exceed the design capacity of the treatment works or reduce the effluent quality below that specified in the operation permit of the treatment works are considered to be a waste which interferes with the operation or performance of the treatment works and are prohibited by subrule IAC 567-62.1(7)*”. The currently allowed Burke Treatment Agreement has been given BOD limits is excess of the capacity for the POTW to treat when the domestic and commercial wasteload is considered.
4. The Burke Treatment Agreement allows the industry to discharge a Daily maximum TKN at 75% of the total TKN design load of the POTW.
5. The Nevada NPDES permit specifically states: “*Wastes in such volumes or quantities as to exceed the design capacity of the treatment works or reduce the effluent quality below that specified in the operation permit of the treatment works are considered to be a waste which interferes with the operation or performance of the treatment works and are prohibited by subrule IAC 567-62.1(7)*”. The currently allowed Burke Treatment Agreement has been given TKN limits is excess of the capacity for the POTW to treat when the domestic and commercial wasteload is considered.
6. The Burke Treatment Agreement allows the industry to discharge 300% over the City of Nevada’s Oil and Grease limit of 100 milligrams per liter. There is no justification given to identify the Burke discharge containing dispersed or other soluble material. Fats, Oils and Greases from animal products are not this type of material.
7. The surcharge percent increase in sewer rate charges was only 2.2%-2.5% per year for the 5-year time frame in Figure 4. This Cost-of-Living philosophy does not take into account a realistic O&M required for the entire collection system, the current and future POTW and the extra strain place on the current and future POTW treatment infrastructure.

8. The entirety of the City of Nevada pretreatment ordinance is illustrated in Figure 5. The minimum requirement listed in the federal regulation 40 CFR § 403 have not been met.
9. The current City of Nevada Code of Ordinance that is available at https://codelibrary.amlegal.com/codes/nevada/latest/nevada_ia/0-0-0-2882 has the following deficiencies:
 - a. No specific section for pretreatment requirements listed in the federal regulation 40 CFR § 403.
 - b. No enforcement action for dischargers failing to comply with the NPDES or pretreatment limits.
 - c. No fine structure for dischargers failing to comply with the NPDES or pretreatment limits.
 - d. Listing CBOD instead of BOD for sewer use fees.
 - e. Allowing Burke to exceed the city ordinance Oil and Grease limit in the Treatment Agreement.
 - f. Failure to separate residential sewer user rates from commercial/industrial rates.

Conclusion

Until the Preliminary Review of the City of Nevada's Ordinance and a site visit to the city and all industrial wastewater discharge sites is completed no detailed conclusion can be reached. But, in the interim the following observations can be made:

1. The City of Nevada ordinances are sorely inadequate for anything dealing with industrial wastewater.
2. The current sewer rates are not adequate for the needs of the city for their current treatment works and collection system
3. The Burke Treatment Agreement must be adjusted to the current and future NPDES permits limits for the city.

Appendix 1: Washington State BOD and CBOD Report

Washington State Department of Ecology
Environmental Assessments Program
Lab Accreditation Section

Supplemental Guidance for the Determination of

BIOCHEMICAL OXYGEN DEMAND (BOD₅)

and

CARBONACEOUS BOD (CBOD₅)

in

Water and Wastewater

Prepared by

Perry F. Brake, Chemist
Lab Accreditation Section

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d. It would take the bacteria in a wastewater sample 20-plus days to assimilate all the consumable material in a water sample. Because it is impractical to spend 20 days analyzing a BOD sample, a 5-day test has been established as the standard (hence, BOD₅). Depending on the specific waste stream, 60-70% of the available material is consumed in a 5-day period. Another test that measures the oxygen requirements of water is chemical oxygen demand (COD) which, in a relatively short time, measures essentially 100% of the chemically oxidizable material. One can expect BOD₅ and COD results for the same sample to be related, the BOD₅ value being perhaps 60-70% of the COD value depending on the nature of the sample. Also, because BOD₅ is a measure of nitrogenous and carbonaceous material, and CBOD₅ is a measure of only the carbonaceous material, one would also expect a correlation for BOD₅ and CBOD₅ for a given sampling site. Indeed, Table 1 shows there is a very consistent ratio of BOD₅ to COD, and BOD₅ to CBOD₅ for a given type of sample (in this case, performance evaluation, or PE samples from EPA's Water Pollution, or WP Studies). One should be able to determine BOD₅/COD₅ and BOD₅/CBOD₅ ratios for a given waste stream, although the ratios may not be as constant, or of the same magnitude as those shown in Table 1. Table 1 also shows a consistent ratio between BOD₅ and total organic carbon (TOC) for a given sampling site. If a relatively consistent BOD₅/COD ratio can be established for a given sampling point, the COD test can be used as a screening process for estimating the BOD₅ of the same sample. When used for this purpose, the Hach Company's recently developed (but not yet EPA-approved) manganese-III COD method can be used rather than an approved method, all of which generate considerable contaminated waste.

Table 1 - Comparison of BOD₅, CBOD₅, COD, and TOC Values for WP Studies*

Study	BOD ₅ mg/L	CBOD ₅ mg/L	BOD ₅ /CBOD ₅ Ratio	COD mg/L	BOD ₅ /COD Ratio	TOC mg/L	BOD ₅ /TOC Ratio
WP040	119	100	1.19	19.2	0.62	76	1.57
WP039	37.6	31.9	1.18	60.7	0.62	24	1.57
WP038	50.3	43	1.17	81	0.62	32	1.57
WP037	93.1	80	1.16	152	0.61	60	1.55
WP036	13	11.3	1.15	20.8	0.63	8.2	1.59
WP035-1	141	117	1.21	235	0.60	93.1	1.51
WP035-2	62.5	51.6	1.21	101	0.62	40	1.56
WP034-1	30.2	26.2	1.15	48.1	0.63	19	1.59
WP034-2	9.99	8.7	1.15	15.9	0.63	6.3	1.59
WP033-1	12.1	10.7	1.13	19.5	0.62	7.7	1.57
WP033-2	54.7	46.7	1.17	88.6	0.62	35	1.56
WP032-1	70.9	64.7	1.10	111	0.64	44	1.61
WP032-2	15.2	13.7	1.11	24.3	0.63	9.6	1.58
WP031-1	44.9	38.5	1.17	70.8	0.63	28.1	1.60
WP031-2	131	112	1.17	207	0.63	82	1.60
WP030-1	14	12	1.17	21.8	0.64	8.61	1.63
WP030-2	21.8	19.5	1.12	35.4	0.62	14	1.56
Average			1.16		0.62		1.58

* Demands samples in EPA's discontinued Water Pollution Studies were a 50:50 mixture of glucose/glutamic acid.