

Calculation of Production-based Effluent Limits with Effluent Limitations Guidelines (ELGs)

Permittee Name: Exploratory Ventures, LLC
 Permit Number: AR0053384
 ELG Source: 40 CFR 420 - Iron and Steel Manufacturing

40 CFR 420 Subpart	CFR Citation *	Production Quantity ** (1,000 lb/day)
D - Steelmaking	40 CFR 420.44(a)	22,466
E - Vacuum Degassing	40 CFR 420.54	8,220
F - Continuous Casting	40 CFR 420.64	21,918
G - Hot Forming	40 CFR 420.74(c)(1)	21,918
I - Acid Pickling	40 CFR 420.94(b)(4)	Three (3) fume scrubbers
J - Cold Forming	40 CFR 420.104(a)(2)	23,726
K - Alkaline Cleaning	40 CFR 420.114(a)	7,068
L - Hot Coating	40 CFR 420.124(a)(1)	7,068
M - Direct Reduced Iron	40CFR 420.134(a)	16,439

* All of the above ELGs specify monthly average and daily maximum limits for pH within the range of 6.0 - 9.0 s.u.

** The production quantities for this facility are based on estimates of the operation, as provided by Exploratory Ventures, LLC.

The following equation will be used in the tables below to calculate monthly average and daily maximum limits for the pollutants listed in accordance with the specific subpart of 40 CFR 420.

$$\text{Limit (lb/day)} = \text{Production Quantity (1,000 lb/day)} \times \text{ELG Factor (lb/1,000 lb of product)}$$

Pollutant - Subpart D

It was noted in Air Permit No. 2445-AOP-R1 for Exploratory Ventures, LLC that baghouses are used as the primary emissions control devices for the electric arc furnaces. As with other steel mills, this type of control device is defined as *semi-wet*, in accordance with 40 CFR 420.41(e). Therefore, 40 CFR 420.44(a) applies in this situation and requires **no discharge of process wastewater pollutants** to navigable waters.

Pollutant - Subpart E	ELG Factor Monthly Avg (lb/1,000 lb)	ELG Factor Daily Max (lb/1,000 lb)	Production (1,000 lb/day)	Limit Monthly Avg (lb/day)	Limit Daily Max (lb/day)
TSS	0.00261	0.0073	8,220	21.4542	60.0060
Lead	0.0000313	0.0000939	8,220	0.2573	0.7719
Zinc	0.0000469	0.000141	8,220	0.3855	1.1590

Pollutant - Subpart F	ELG Factor Monthly Avg (lb/1,000 lb)	ELG Factor Daily Max (lb/1,000 lb)	Production (1,000 lb/day)	Limit Monthly Avg (lb/day)	Limit Daily Max (lb/day)
TSS	0.00261	0.0073	21,918	57.2060	160.0014
O&G	0.00104	0.00313	21,918	22.7947	68.6033

Lead	0.0000313	0.0000939	21,918	0.6860	2.0581
Zinc	0.0000469	0.000141	21,918	1.0280	3.0904

Pollutant - Subpart G	ELG Factor Monthly Avg (lb/1,000 lb)	ELG Factor Daily Max (lb/1,000 lb)	Production (1,000 lb/day)	Limit Monthly Avg (lb/day)	Limit Daily Max (lb/day)
TSS	0.0163	0.0435	21,918	357.2634	953.4330
O&G	None provided ***	0.0109	21,918	119.4531	238.9062

Pollutant - Subpart I	ELG Factor Monthly Avg (kg/day)	ELG Factor Daily Max (kg/day)	Production (fume scrubbers)	Limit Monthly Avg (lb/day)	Limit Daily Max (lb/day)
TSS	2.45	5.72	3	16.2040	37.8313
O&G	0.819	2.45	3	5.4168	16.2040
Lead	0.0123	0.0368	3	0.0814	0.2434
Zinc	0.0164	0.0491	3	0.1085	0.3247

Pollutant - Subpart J	ELG Factor Monthly Avg (lb/1,000 lb)	ELG Factor Daily Max (lb/1,000 lb)	Production (1,000 lb/day)	Limit Monthly Avg (lb/day)	Limit Daily Max (lb/day)
TSS	0.00125	0.0025	23,726	29.6575	59.3150
O&G	0.000417	0.00104	23,726	9.8937	24.6750
Chromium	0.0000167	0.0000418	23,726	0.3962	0.9917
Lead	0.0000063	0.0000188	23,726	0.1495	0.4460
Nickel	0.0000125	0.0000376	23,726	0.2966	0.8921
Zinc	0.0000042	0.0000125	23,726	0.0996	0.2966
Naphthalene	None provided ***	0.0000042	23,726	0.0498	0.0996
Tetrachloroethylene	None provided ***	0.0000063	23,726	0.0747	0.1495

Pollutant - Subpart K	ELG Factor Monthly Avg (lb/1,000 lb)	ELG Factor Daily Max (lb/1,000 lb)	Production (1,000 lb/day)	Limit Monthly Avg (lb/day)	Limit Daily Max (lb/day)
TSS	0.00626	0.0146	7,068	44.2457	103.1928
O&G	0.00209	0.00626	7,068	14.7721	44.2457

Pollutant - Subpart L	ELG Factor Monthly Avg (lb/1,000 lb)	ELG Factor Daily Max (lb/1,000 lb)	Production (1,000 lb/day)	Limit Monthly Avg (lb/day)	Limit Daily Max (lb/day)
TSS	0.0188	0.0438	7,068	132.8784	309.5784

O&G	0.00626	0.0188	7,068	44.2457	132.8784
Lead	0.0000939	0.000282	7,068	0.6637	1.9932
Zinc	0.000125	0.000376	7,068	0.8835	2.6576
Chromium (VI)	0.0000125	0.0000376	7,068	0.0884	0.2658

Pollutant - Subpart M	ELG Factor Monthly Avg (lb/1,000 lb)	ELG Factor Daily Max (lb/1,000 lb)	Production (1,000 lb/day)	Limit Monthly Avg (lb/day)	Limit Daily Max (lb/day)
TSS	0.00465	0.00998	16,439	76.4414	164.0612

*** Please note in the above tables for Subparts G and J that the federal regulations do not provide ELG factors for the monthly average values of O&G, Naphthalene, and Tetrachloroethylene. In order to incorporate monthly average values for the calculation of limits for these pollutants, a factor was calculated by dividing the daily maximum factor by two (2). This determination is based on Section 5.4.2 of the Technical Support Document for Water Quality-based Toxics Control (EPA, March 1991), which states that in the absence of other information, the daily maximum limit is divided by 2.0 in order to derive a monthly average limit. The subject factors can be seen in the table below:

Pollutant	Calculated Factor Monthly Avg (lb/1,000 lb)
O&G	0.00545
Naphthalene	0.0000021
Tetrachloroethylene	0.00000315

Building Block Approach

The final effluent limits are calculated using the *building block* approach according to Section 5.2.2.6 of the NPDES Permit Writer's Manual (EPA, 2010). This approach simply involves combining the allowable pollutant loadings (limits calculated in above tables) from each ELG Subpart to arrive at a single effluent limit for that specific pollutant.

Pollutant	Limit Monthly Avg (lb/day)	Limit Daily Max (lb/day)
TSS	735.4	1847.4
O&G	216.8	526.3
Chromium (VI)	0.09	0.27
Chromium	0.4	1.0
Lead	1.7	5.1
Nickel	0.30	0.89
Zinc	2.4	7.2
Naphthalene	0.05	0.10
Tetrachloroethylene	0.07	0.149
pH	6.0-9.0 s.u.	6.0-9.0 s.u.