A reasonable potential analysis is completed using a single set of critical conditions for flow and pollutant concentration that will ensure the protection of water quality standards. To determine the critical condition of the effluent, EPA projects an upper bound of the effluent concentration based on the observed monitoring data and a selected probability basis. EPA generally applies the quantitative approach found in Appendix E of EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD)[1] to determine the upper bound of the effluent data. This methodology accounts for effluent variability based on the size of the dataset and the occurrence of non-detects (i.e., samples results in which a parameter is not detected above laboratory detection limits). For datasets of 10 or more samples, EPA uses the upper bound effluent concentration at the 95th percentile of the dataset. For datasets of less than 10 samples, EPA uses the maximum value of the dataset.

EPA uses the calculated upper bound of the effluent data, along with a concentration representative of the parameter in the receiving water, the critical effluent flow, and the critical upstream flow to project the downstream concentration after complete mixing using the following simple mass-balance equation:

$$C_s Q_s + C_e Q_e = C_d Q_d$$

Where:

C_s = upstream concentration (median value of available ambient data)
Q_s = upstream flow (dilution factor)
C_e = effluent concentration (95th percentile or maximum of effluent concentration)
Q_e = effluent flow of the facility (design flow)
C_d = downstream concentration
Q_d = downstream flow ($Q_s + Q_e$)

Solving for the downstream concentration results in:

$$C_d = \frac{C_s Q_s + C_e Q_e}{Q_d}$$

When both the downstream concentration (C_d) and the effluent concentration (C_e) exceed the applicable criterion, there is reasonable potential for the discharge to cause, or contribute to an excursion above the water quality standard. *See* 40 C.F.R. § 122.44(d). When

EPA determines that a discharge causes, has the reasonable potential to cause, or contribute to such an excursion, the permit must contain WQBELs for the parameter. *See* 40 C.F.R. § 122.44(d)(1)(iii). Limits are calculated by using the criterion as the downstream concentration (C_d) and rearranging the mass balance equation to solve for the effluent concentration (C_e).

For any pollutant(s) with an existing WQBEL, EPA notes that the analysis described in 40 CFR § 122.44(d)(1)(i) has already been conducted in a previous permitting action demonstrating that there is reasonable potential to cause or contribute to an excursion of WQS. Given that the permit already contains a WQBEL based on the prior analysis and the pollutant(s) continue to be discharged from the facility, EPA has determined that there is still reasonable potential for the discharge of this pollutant(s) to cause or contribute to an excursion of WQS. Therefore, the WQBEL will be carried forward unless it is determined that a more stringent WQBEL is necessary to continue to protect WQS or that a less stringent WQBEL is allowable based on anti-backsliding regulations at CWA §§ 402(o) and 303(d)(4) and 40 CFR § 122.44(l). For these pollutant(s), if any, the mass balance calculation is not used to determine whether there is reasonable potential to cause or contribute to an excursion of WQS, but rather is used to determine whether the existing limit needs to be more stringent in order to continue to protect WQS.

From a technical standpoint, when a pollutant is already being controlled as a result of a previously established WQBEL, EPA has determined that it is not appropriate to use new effluent data to reevaluate the need for the existing limit because the reasonable potential to cause or contribute to an excursion of WQS for the uncontrolled discharge was already established in a previous permit. If EPA were to conduct such an evaluation and find no reasonable potential for the controlled discharge to cause or contribute to an excursion of WQS, that finding could be interpreted to suggest that the effluent limit should be removed. However, the new permit without the effluent limit would imply that existing controls are unnecessary, that controls could be removed and then the pollutant concentration could rise to a level where there is, once again, reasonable potential for the discharge to cause or contribute to an excursion of WQS. This could result in an illogical cycle of applying and removing pollutant controls with each permit reissuance. EPA's technical approach on this issue is in keeping with the Act generally and the NPDES regulations specifically, which reflect a precautionary approach to controlling pollutant discharges.

The table below presents the reasonable potential calculations and, if applicable, the calculation of the limits required in the permit. Refer to the pollutant-specific section of the Fact Sheet for a discussion of these calculations, any assumptions that were made and the resulting permit requirements.

Pollutant	Conc. Units	DF	C_s[1]	C_e[2]		C_d[3]		Criteria		Reasonable Potential		Limits	
				Acute	Chronic	Acute	Chronic	Acute	Chronic	C_d & C_e > Acute	C_d & C_e> Chronic	Acute	Chronic
Arsenic	ug/L	71	0	0.6	0.6	0.008	0.008	69	36	N/A	N/A	No Limit	No Limit
Cadmium	ug/L	71	0.32	0	0	0.32	0.32	33.2	7.9	N/A	N/A	No Limit	No Limit
Copper	ug/L	71	1.6	8.4	8.4	1.7	1.7	5.8	3.7	N/A	N/A	No Limit	No Limit
Cyanide	ug/L	71	0	16.9	16.9	0.23	0.23	1.0	1.0	N/A	N/A	No Limit	No Limit
Lead	ug/L	71	0	0.6	0.6	0.008	0.008	220.8	8.5	N/A	N/A	No Limit	No Limit
Mercury	ug/L	71	0	0	0	0.00009	0.00009	2	11	N/A	N/A	No Limit	No Limit
Nickel	ug/L	71	2.9	2.0	2.0	2.9	2.9	74.7	8.3	N/A	N/A	No Limit	No Limit
Selenium	ug/L	71	0	0	0	0.004	0.004	291	71.1	N/A	N/A	No Limit	No Limit
Silver	ug/L	71	0	0	0	0.0001	0.0001	2.2		N/A	N/A	No Limit	No Limit
TRC	ug/L	71	0	0.5	0.5	0.007	0.007	13	7.5	N/A	N/A	No Limit	No Limit
Zinc	ug/L	71	38	20.4	20.4	38	38	95.1	85.6	N/A	N/A	No Limit	No Limit
Tetrachloroethylene	ug/L	71	0	0.6	0.6	0.008	0.008	29	29	N/A	N/A	No Limit	No Limit
Toluene	ug/L	71	0	0.4	0.4	0.006	0.006	290	290	N/A	N/A	No Limit	No Limit
1,2 Dichloroethane	ug/L	71	0	0.2	0.2	0.002	0.002	650	650	N/A	N/A	No Limit	No Limit
4,4 DDT	ug/L	71	0	0	0	0	0	0.07	0.001	N/A	N/A	No Limit	No Limit
PCB, Total	ug/L	71	0	0	0	0.0000009	0.0000009		0.0003	N/A	N/A	No Limit	No Limit
Ammonia (cold)	ug/L	71	0	32.1	32.1	0.5	0.5	8.1	1.2	N/A	N/A	No Limit	No Limit
Ammonia (warm)	ug/L	71	0	39.8	39.8	0.6	0.6	4.7	0.7	N/A	N/A	No Limit	No Limit

[1]Median concentration for the receiving water upstream of the zone of influence of the facility's discharge taken from the WET testing data during the review period (see Appendix A).

[2]Values represent the 95th percentile (for $n \geq 10$) or maximum (for $n < 10$) concentrations from the DMR data and/or WET testing data during the review period (see Appendix A). If the pollutant already has a limit (for either acute or chronic conditions), the value represents the existing limit.

Definitions:
DF = dilution factor
Cs = upstream ambient concentration

Ce = effluent concentration
Cd = downstream, mixed concentration: ((DF-1)*Cs+Ce)/DF