



MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

PFAS GENERIC CRITERIA DEVELOPMENT

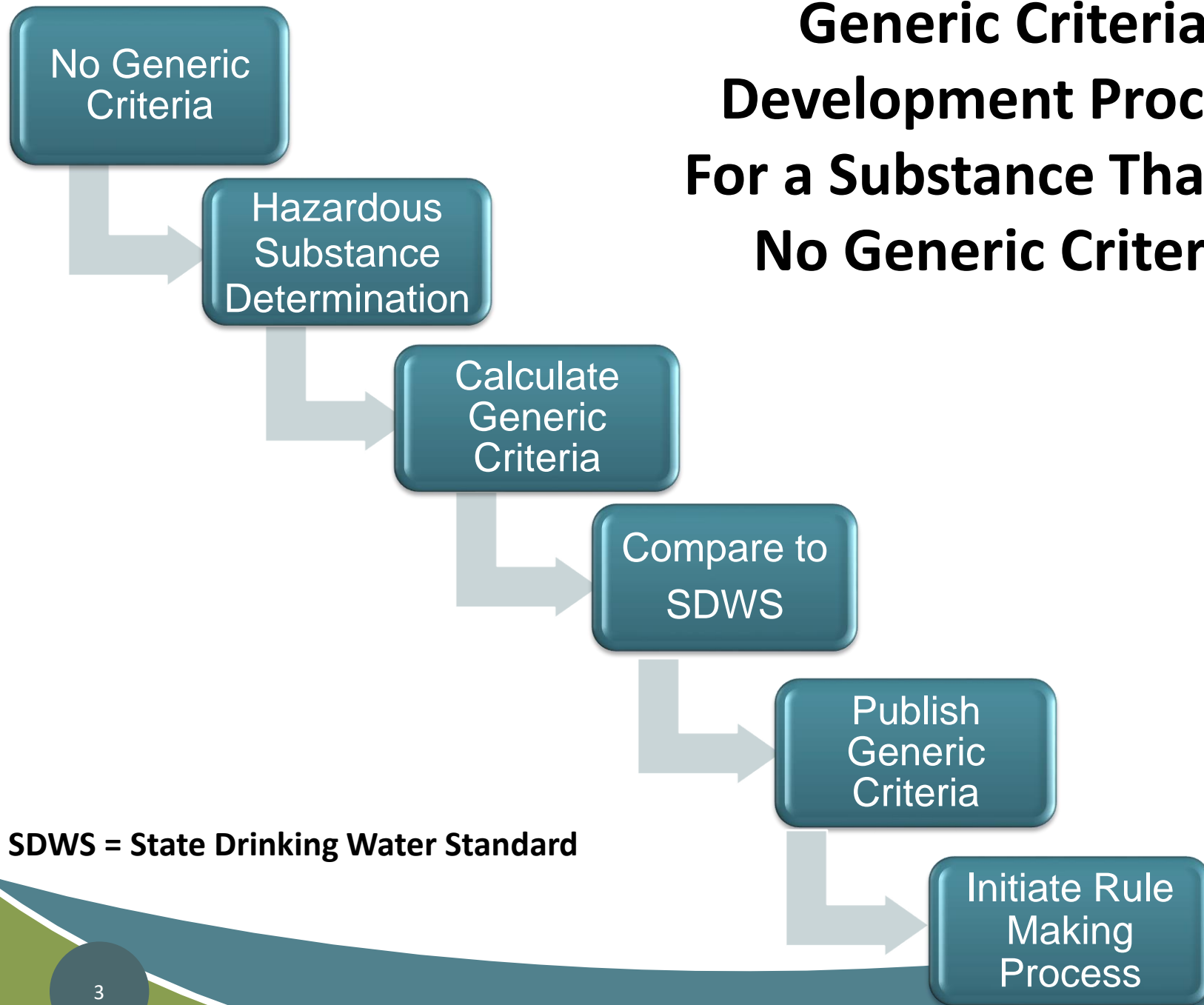
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State Drinking Water Standards

- Safe Drinking Water Act, 1976 PA 399
- State drinking water standards were promulgated for 7 per- and polyfluoroalkyl substances (PFAS)
- PFOA and PFOS had established cleanup criteria of 70 ppt (singularly and combined)

Specific PFAS	Drinking Water Standard Parts per Trillion (ppt)
PFNA	6
PFOA	8
PFHxA	400,000
PFOS	16
PFHxS	51
PFBS	420
HFPO-DA	370

Generic Criteria Development Process For a Substance That Has No Generic Criteria



SDWS = State Drinking Water Standard

PFAS Generic Criteria Development

Sec. 20120a(23)

No
Generic
Criteria

- Calculate generic criteria [Sec. 20120a(3)(a)& (b); and all other requirements of Part 201]

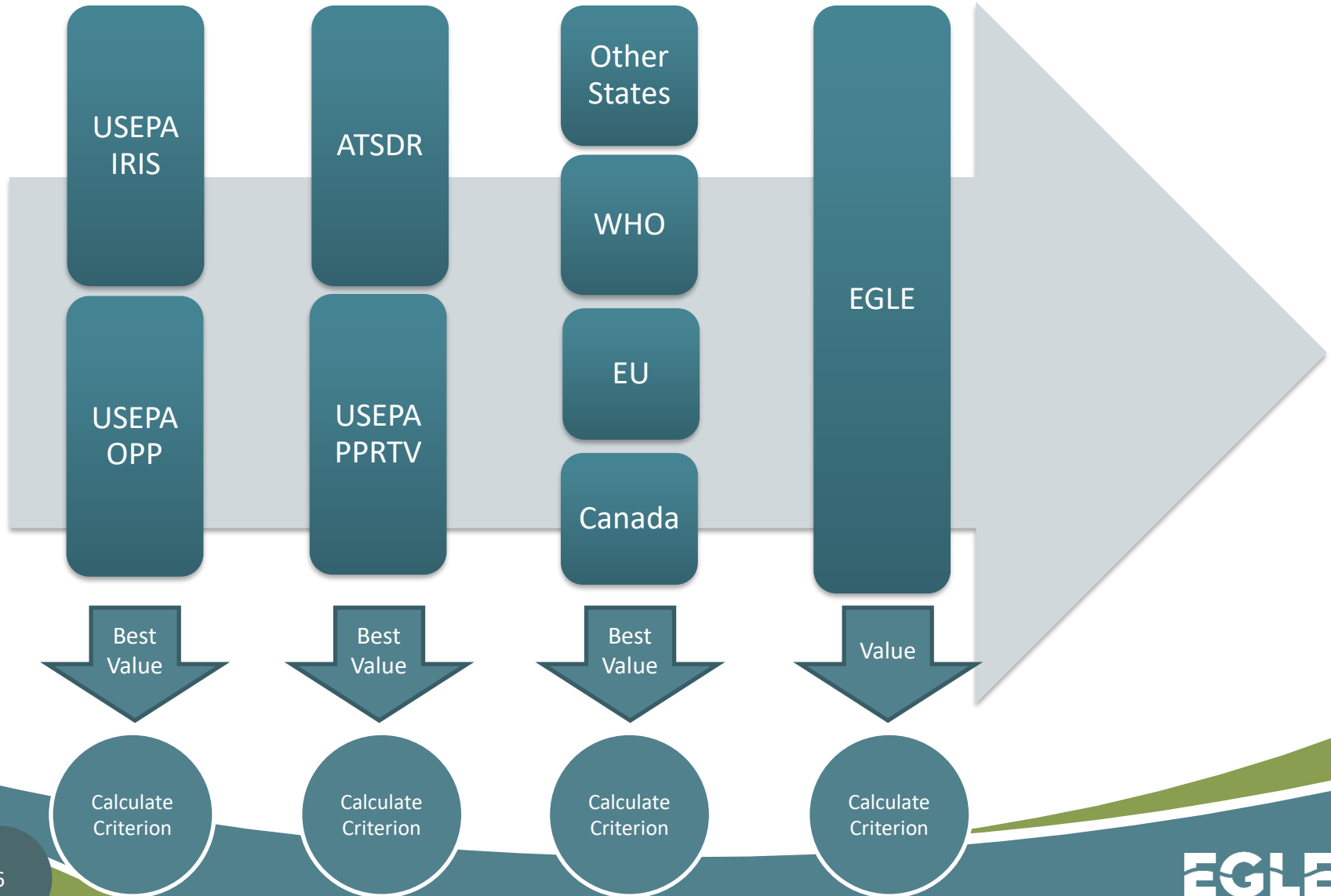
PFAS Generic Criteria Development

Sec. 20120a(3)

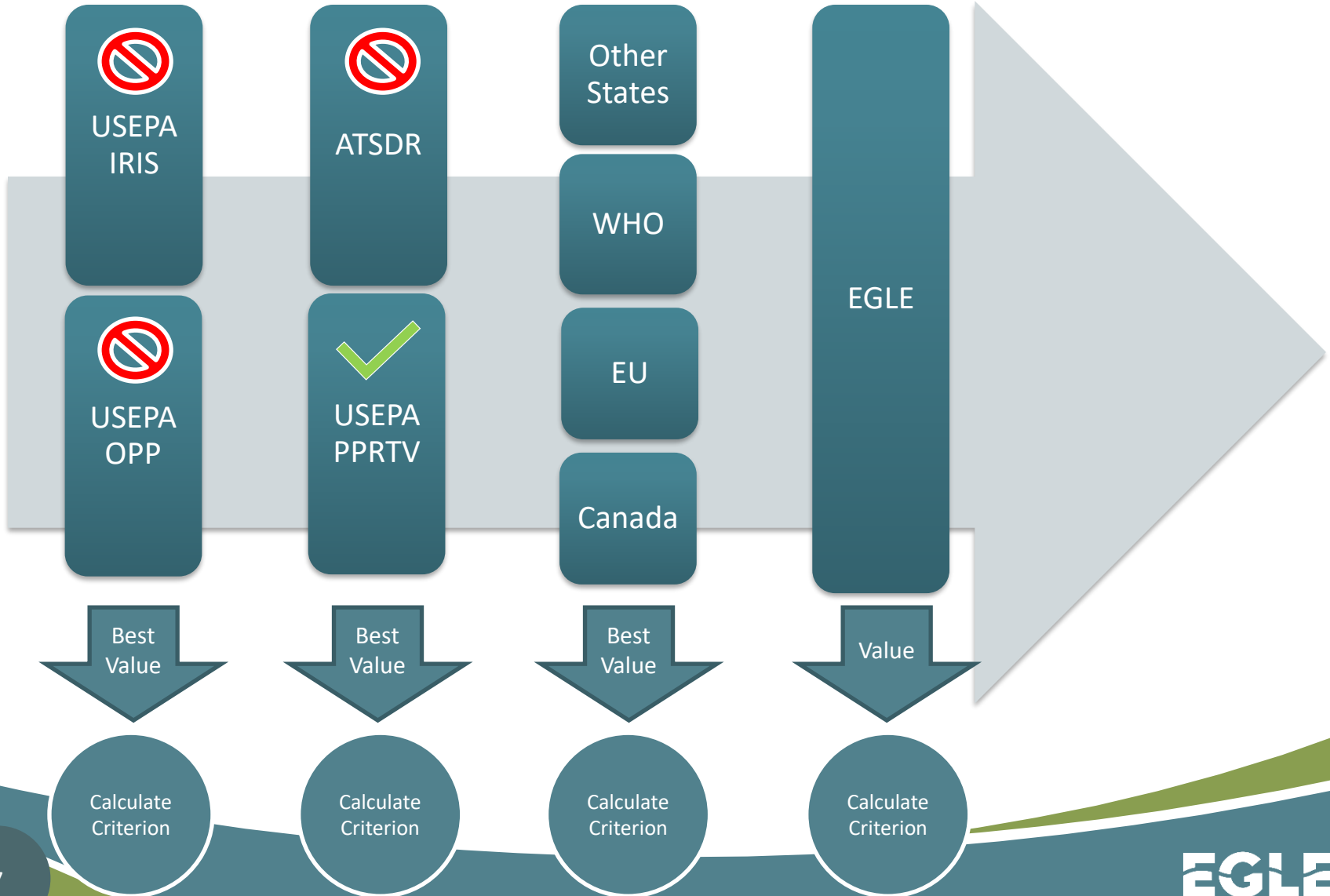
Calculate
Generic
Criteria

- Determine toxicity value
[Sec. 20120a(3)(a)]
- Determine chemical physical data
[Sec. 20120a(3)(b)]
- Calculate generic criteria
[Sec. 20120a(3)(a)& (b); and
all other requirements of Part 201]

Part 201 Toxicity Value Selection Process



PFBS Toxicity Value Selection



PFAS Toxicity Value Selection Outcomes

PFAS	Toxicity Value (mg/kg/day)	Toxicity Value Basis
PFNA	0.0000025	New Hampshire Dept. of Environmental Services
PFHxS	0.0000093	New Hampshire Dept. of Environmental Services
PFHxA	0.0000038	Texas Commission on Environmental Quality
PFBS	0.02	USEPA Provisional Peer Reviewed Toxicity Value
HFPO-DA (GenX)	0.001	North Carolina Department of Health and Human Services

PFAS Generic Criteria Development

Rule 10(3) Cleanup criteria for groundwater based on ingestion of groundwater for drinking water shall be calculated according to the following algorithms. Criteria calculated under this subrule shall be the generic cleanup criterion, unless a state drinking water standard is available or, if a criterion protective of adverse aesthetic characteristics is more restrictive, as provided for in section 20120a(5) of the act.

EQUATION FOR CARCINOGENIC EFFECTS:

$$DWC = \frac{TR \times BW \times AT \times CF}{SF \times EF \times ED \times IR_{dw}}$$

where,

DWC	(Drinking water criterion)	=	chemical-specific (ug/L or ppb)
TR	(Target risk level)	=	10^{-5}
BW	(Body weight)	=	70 kg
AT	(Averaging time in days)	=	25,550 days (70 years x 365 days/year)
CF	(Conversion factor)	=	1000 ug/mg
SF	(Oral cancer slope factor)	=	chemical-specific (mg/kg-day) ⁻¹
EF	(Exposure frequency)	=	350 days/year (residential) 245 days/year (nonresidential)
ED	(Exposure duration)	=	30 years (residential) 21 years (nonresidential)
IR _{dw}	(Drinking water ingestion rate)	=	2 liters/day (residential) 1 liter/day (nonresidential)

Rule 10 Algorithms

Rule 10 Algorithms

$$DWC = \frac{THQ \times RfD \times BW \times AT \times RSC \times CF}{EF \times ED \times IR_{dw}}$$

where,

DWC	(Drinking water criterion)	= chemical-specific (ug/L or ppb)
THQ	(Target hazard quotient)	= 1
RfD	(Oral reference dose)	= chemical-specific (mg/kg-day)
BW	(Body weight)	= 70 kg
AT	(Averaging time)	= 10,950 days (30 years x 365 days/year - residential) 7,665 days (21 years x 365 days/year - nonresidential)
RSC	(Relative source contribution)	= chemical-specific or 0.2 if chemical-specific data are not available
CF	(Conversion factor)	= 1000 ug/mg
EF	(Exposure frequency)	= 350 days/year (residential) 245 days/year (nonresidential)
ED	(Exposure duration)	= 30 years (residential) 21 years (nonresidential)
IR _{dw}	(Drinking water ingestion rate)	= 2 liters/day (residential) 1 liter/day (nonresidential)

Part 201 Drinking Water Criteria

PFAS	Part 201 Residential DWC (µg/L)	Part 201 Nonresidential DWC (µg/L)	2020 State Drinking Water Standard (µg/L)
PFNA	0.018	0.052	0.006
PFHxS	0.068	0.19	0.051
PFHxA	0.028	0.079	400
PFBS	150	420	0.42
HFPO-DA	0.73	2.1	0.37

PFAS Generic Criteria Development

Sec. 20120a(5) If a cleanup criterion calculated for groundwater in an aquifer *differs from* either:

(a) the state drinking water standards established pursuant to section 5 of the safe drinking water act, 1976 PA 399, MCL 325.1005, or

(b) the national secondary drinking water regulations established pursuant to 42 USC 300g-1, or

(c), if there is not national secondary drinking water regulation for a contaminant, the concentration determined by the department according to methods approved by the US EPA below which taste, odor, appearance, or other aesthetic characteristics are not adversely affected,

the cleanup criterion is the more stringent of (a), (b), or (c).

PFAS Generic Criteria Development

Calculate Generic Criteria

- Comparison to State Drinking Water Standards (MCLs)
[Sec. 20120a(5)]

PFAS Generic Criteria Development

Public Comment

- Provide a three-week period to accept written comments regarding whether the process for establishing the criteria followed the regulations under Part 201
- Review and consider the comments prior to publishing and promulgating enforceable groundwater cleanup criteria

PFAS Generic Criteria Development

Public Comment

- EGLE will accept written comments from interested parties through **December 7th** for review and consideration prior to publishing revised cleanup criteria tables.

Michigan Department of
Environment, Great Lakes, and Energy



Written comments can be sent to:

EGLE-RRD@Michigan.gov

PFAS Generic Criteria Development

Calculate Generic Criteria

- Develop revisions to cleanup criteria tables (Rule 44), footnotes (Rule 49) and publish on the department's webpage

**TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS**

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to 1 microgram per liter (ug/L). Criteria with 6 or more digits are expressed in scientific notation. For example, 200,000 is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (§324.20120a(10)). In these cases, 2 numbers are present in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based or solubility value, whichever is lower.

Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flamability and Explosivity Screening Level
Acenaphthene	83329	1,300	3,800	38	4,200 (S)	4,200 (S)	4,240	ID
Acenaphthylene	208968	52	150	ID	3,900 (S)	3,900 (S)	3,930	ID
Acetaldehyde (I)	75070	950	2,700	130	1.10E+06	2.30E+06	1.00E+09	8.90E+06
Acetate	71501	4,200	12,000	(G)	ID	ID	ID	ID
Acetic acid	64197	4,200	12,000	(G)	NLV	NLV	6.00E+09	1.0E+9 (D)
Acetone (I)	67641	730	2,100	1,700	1.0E+9 (D,S)	1.0E+9 (D,S)	1.00E+09	1.50E+07
Acetonitrile	75058	140	400	13,000 (X)	2.40E+07	4.50E+07	2.00E+08	2.10E+07
Acetophenone	98862	1,500	4,400	ID	6.1E+6 (S)	6.1E+6 (S)	6.10E+06	ID
Acrolein (I)	107028	120	330	NA	2,100	4,200	2.10E+08	6.70E+06
Acrylamide	79061	0.5 (A)	0.5 (A)	10 (X)	NLV	NLV	2.20E+09	NA
Acrylic acid	79107	3,900	11,000	NA	1.20E+07	2.80E+07	1.00E+09	1.0E+9 (D)
Acrylonitrile (I)	107131	2.6	11	2.0 (M); 1.2	34,000	1.90E+05	7.50E+07	6.40E+06
Alachlor	15972608	2.0 (A)	2.0 (A)	11 (X)	NLV	NLV	1.83E+05	ID
Aldicarb	116063	3.0 (A)	3.0 (A)	NA	NLV	NLV	6.00E+06	ID
Aldicarb sulfone	1646884	2.0 (A)	2.0 (A)	NA	NLV	NLV	7.80E+06	ID
Aldicarb sulfoxide	1646873	4.0 (A)	4.0 (A)	NA	NLV	NLV	2.80E+07	ID
Aldrin	309002	0.098	0.4	0.01 (M); 8.7E-6	180 (S)	180 (S)	180	ID
Aluminum (B)	7429905	50 (V)	50 (V)	NA	NLV	NLV	NA	ID
Ammonia	7664417	10,000 (N)	10,000 (N)	(CC)	3.20E+06	7.10E+06	5.30E+08	ID
t-Amyl methyl ether (TAME)	994058	190 (E)	190 (E)	NA	2.60E+05	5.70E+05	2.64E+06	NA
Aniline	62533	53	220	4.0 (M); 3.0	NLV	NLV	3.60E+07	NA
Anthracene	120127	43 (S)	43 (S)	ID	43 (S)	43 (S)	43.4	ID
Antimony	7440360	6.0 (A)	6.0 (A)	130 (X)	NLV	NLV	NA	ID
Arsenic	7440382	10 (A)	10 (A)	10	NLV	NLV	NA	ID
Asbestos (BB)	1332214	7.0 MFL (A)	7.0 MFL (A)	NA	NLV	NLV	NA	NA
Atrazine	1912249	3.0 (A)	3.0 (A)	7.3	NLV	NLV	70,000	ID
Azobenzene	103333	23	94	ID	6,400 (S)	6,400 (S)	6,400	ID

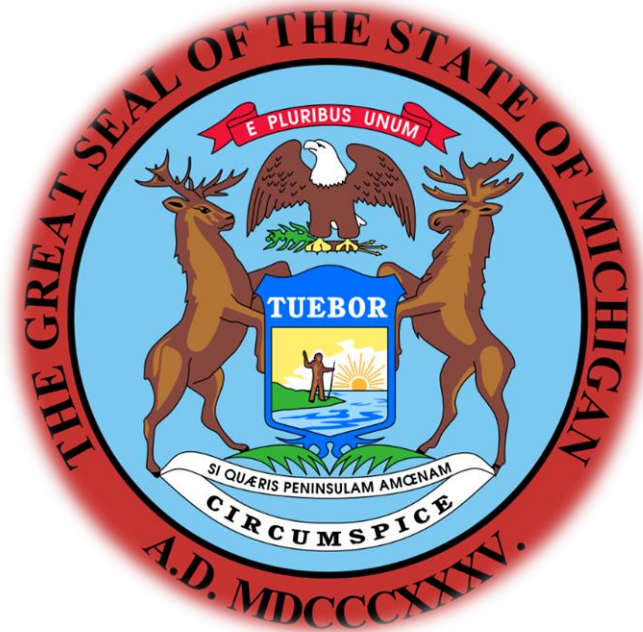
Revise
Rules
and
Publish on
EGLE
webpage

PFAS Generic Criteria Development

Sec. 20120a(23)

- Within 30 days after publishing the new generic cleanup criteria, the department shall initiate rule-making to promulgate rules for the new criteria by filing a rule-making request under section 39 of the administrative procedures act, 1969 PA 306, MCL 24.239. The rule-making request shall only include the revisions necessary to promulgate the new generic cleanup criteria.
- The new generic cleanup criteria published pursuant to this subsection take effect and are legally enforceable when published by the department if the department also initiates rule-making to promulgate rules for the new criteria within 30 days.

Rules Promulgation Process



PFAS Generic Criteria Development

Sec. 20120a(23) The new generic cleanup criteria published pursuant to this subsection remain effective and legally enforceable until:

- Replaced by a final rule
- The director directs the department to withdraw the rule request
- The time limitation in the administrative procedures act, is not met.

Michigan Department of
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