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Appendix K

HAPEM4 Results

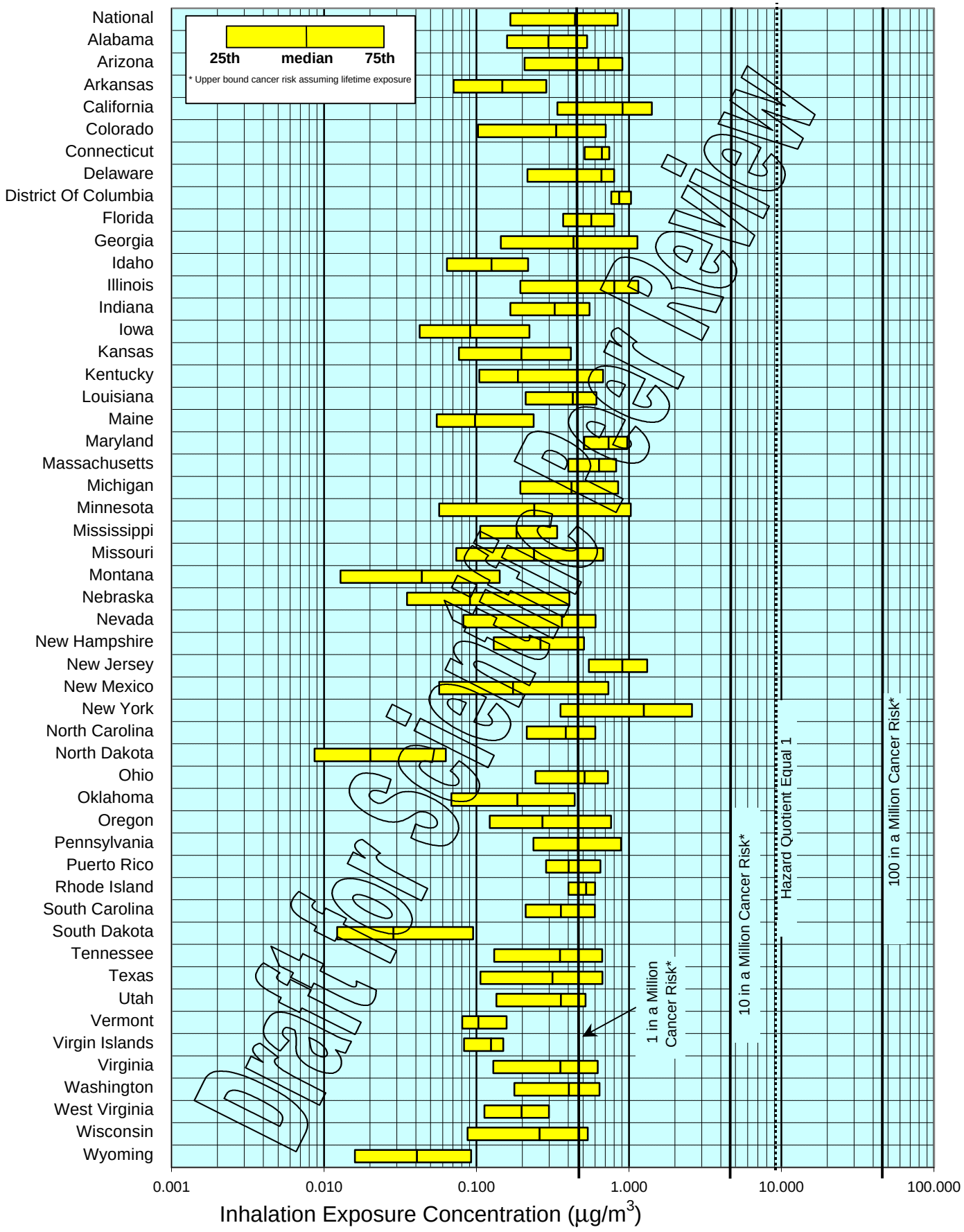
Statewide Exposure Concentration Estimate Charts / Percent Contribution Charts

(Charts presented in alphabetical order by pollutant)

(The "Page 2" referred to on each chart has been provided at end of the appendix.)

US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Acetaldehyde - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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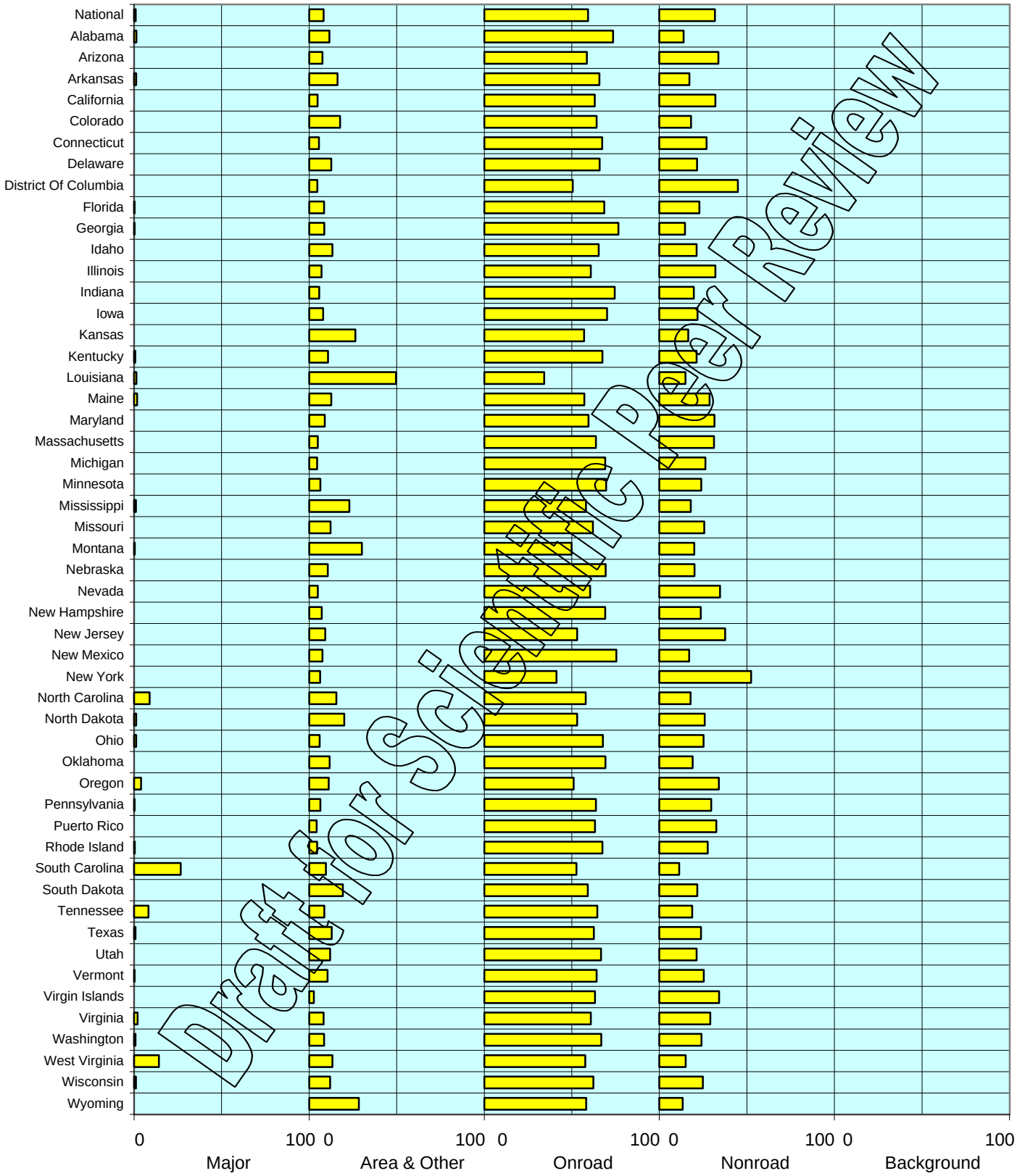
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Acetaldehyde - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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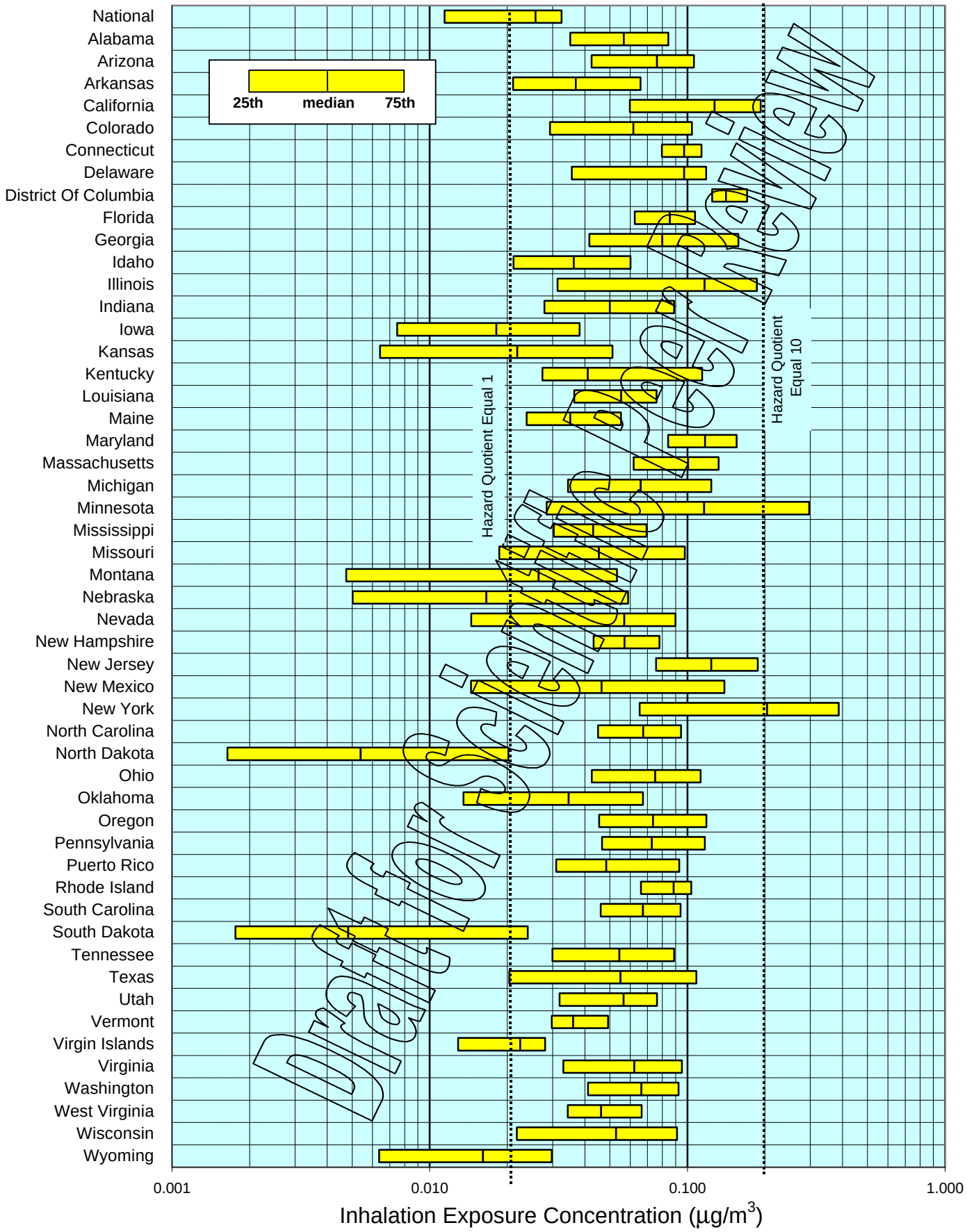
1996 Modeled Exposure Concentrations
Acrolein - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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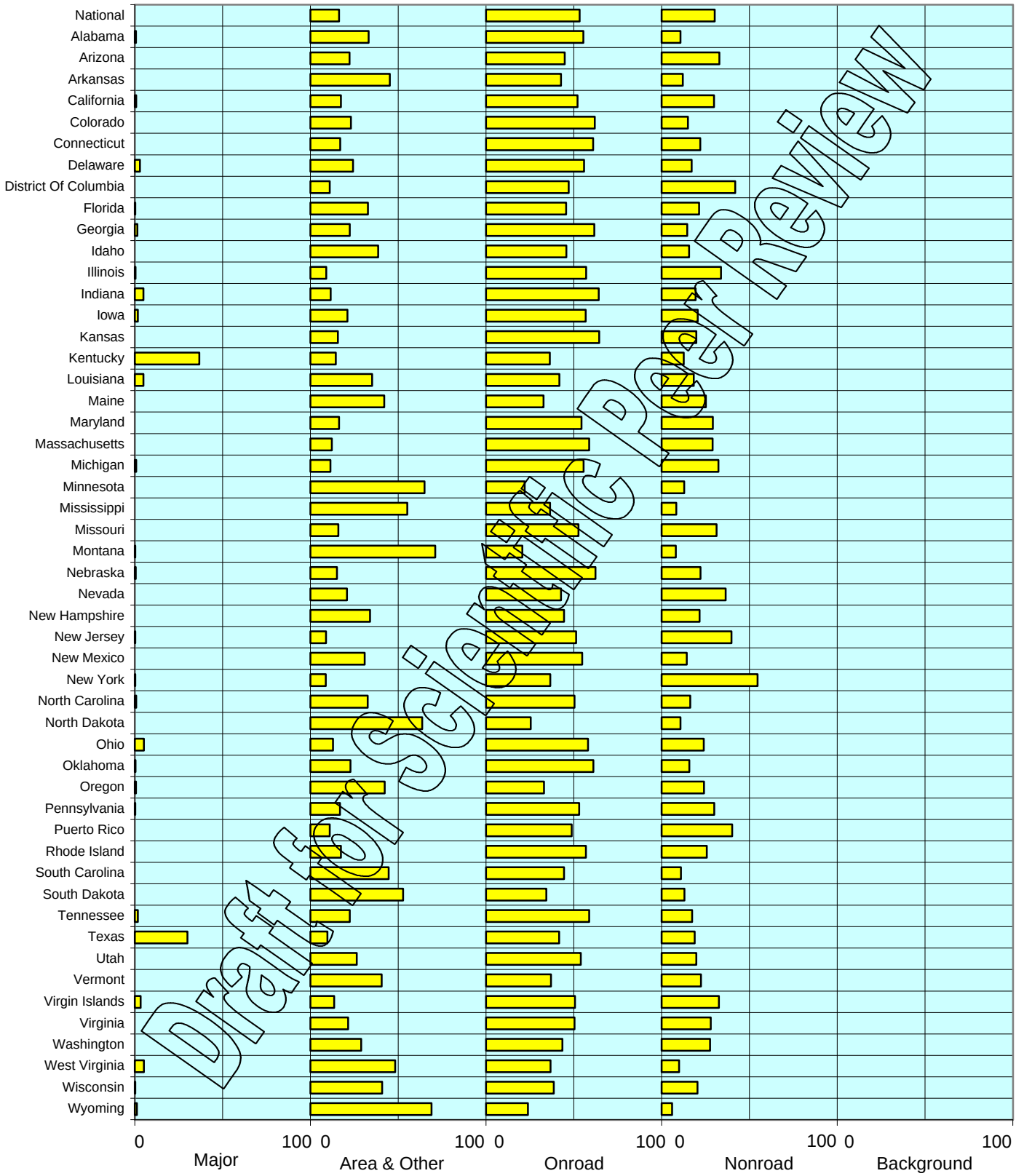
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Acrolein - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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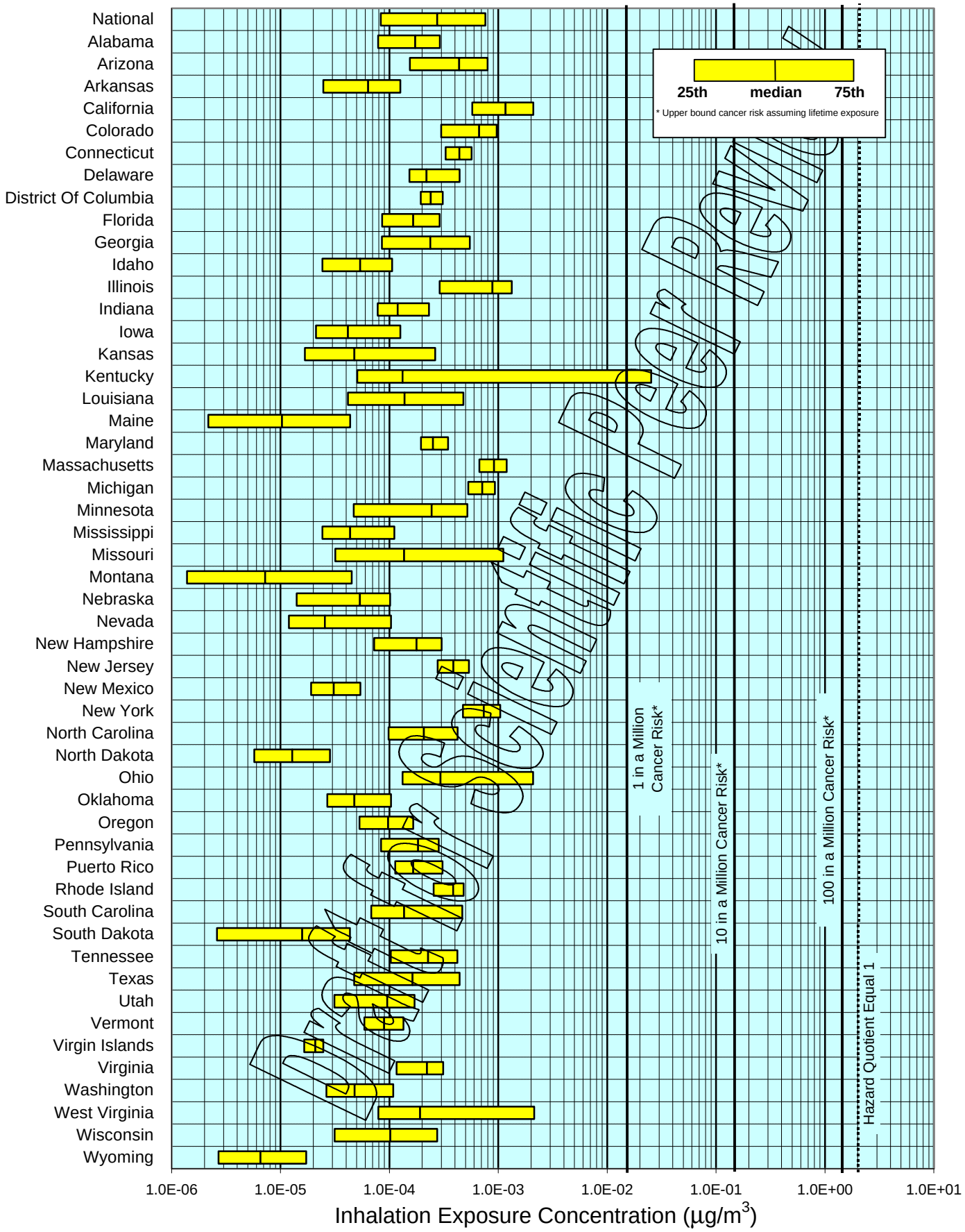
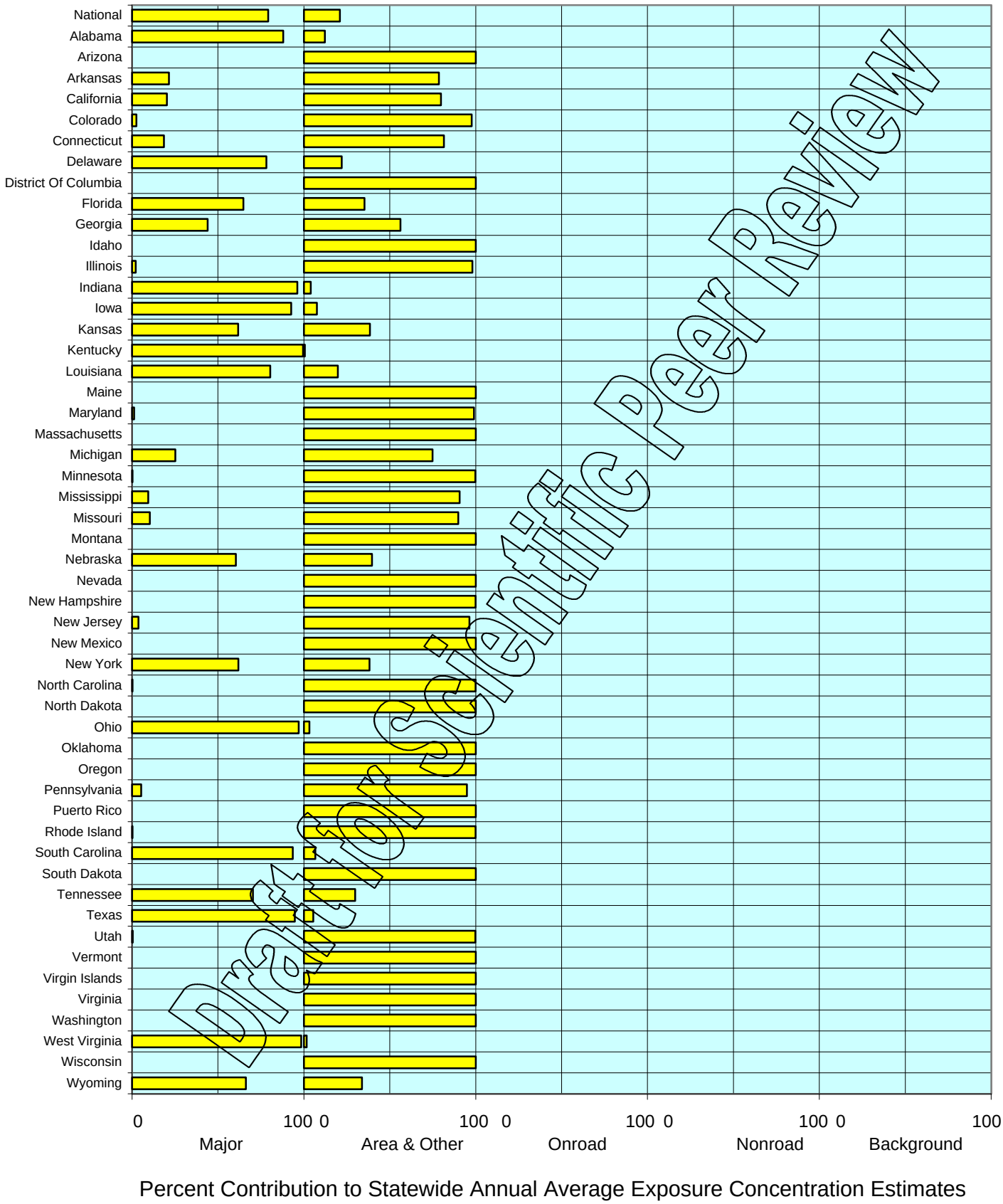
1996 Modeled Exposure Concentrations
Acrylonitrile - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Acrylonitrile - Statewide Source Sector Contribution Estimates
(For Limitations On The Use of These Data See Page 2)



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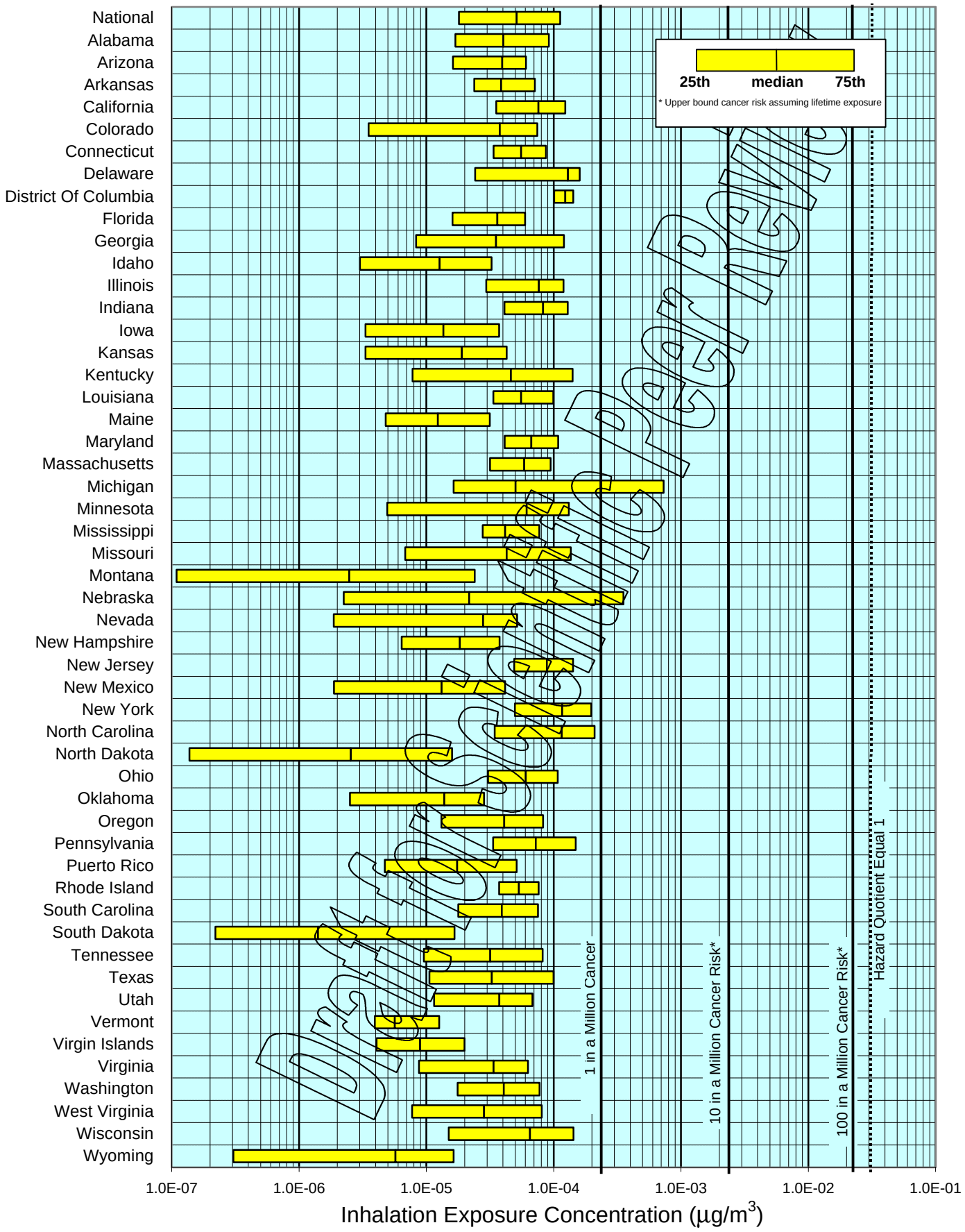
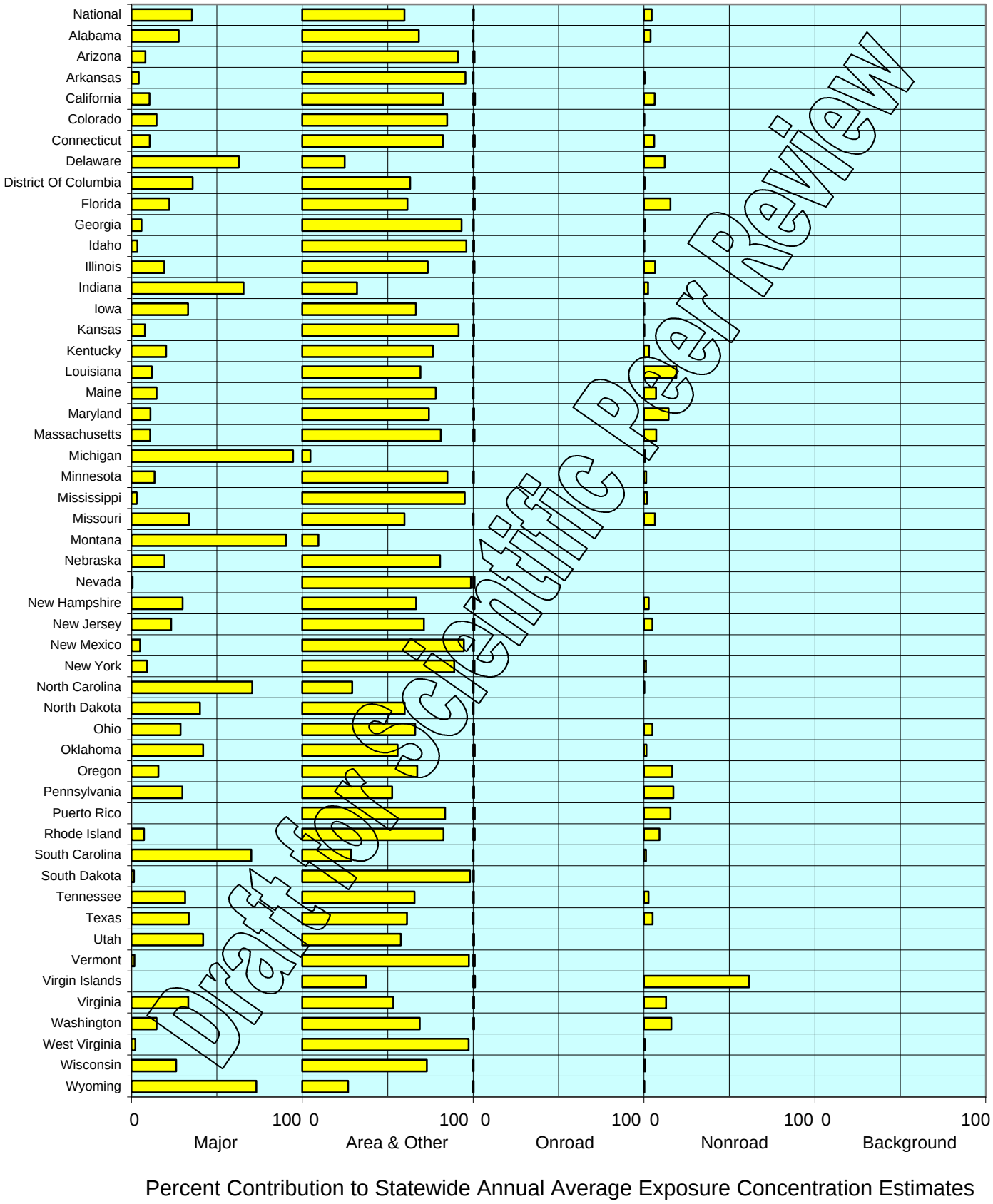
1996 Modeled Exposure Concentrations
Arsenic - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Arsenic - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



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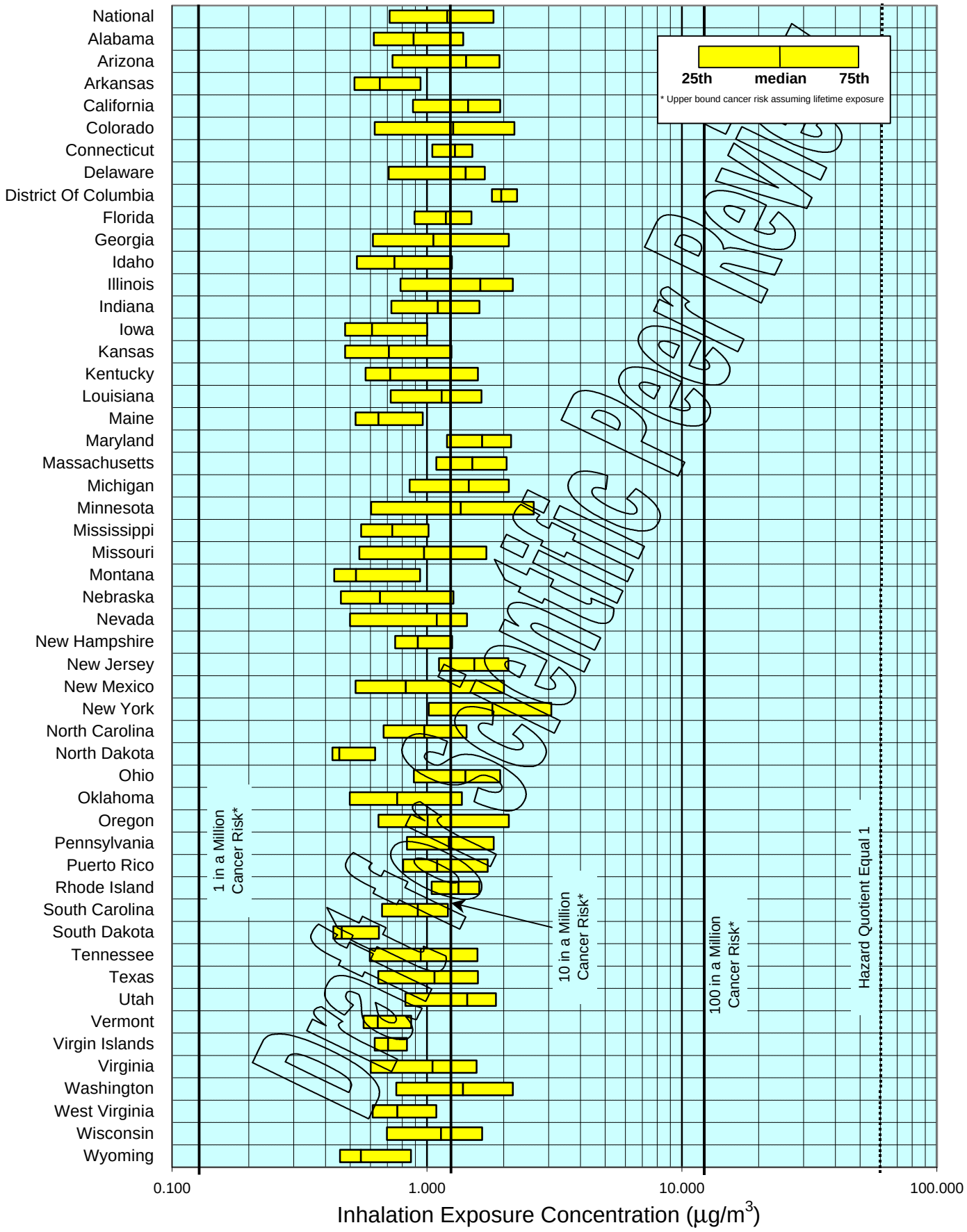
1996 Modeled Exposure Concentrations
Benzene - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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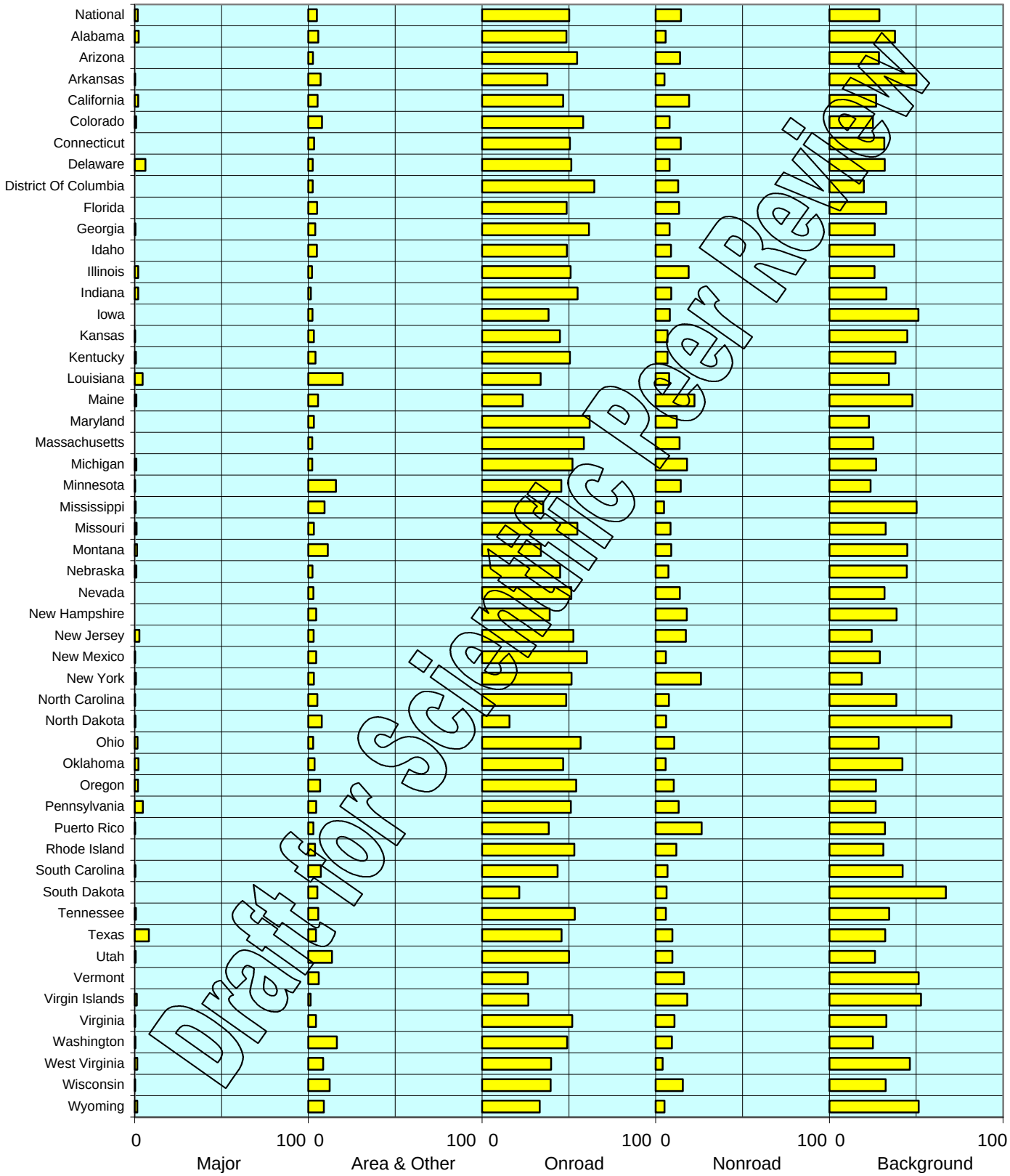
1996 Modeled Exposure Concentrations
Benzene - Statewide Source Sector Contribution Estimates
(For Limitations On The Use of These Data See Page 2)



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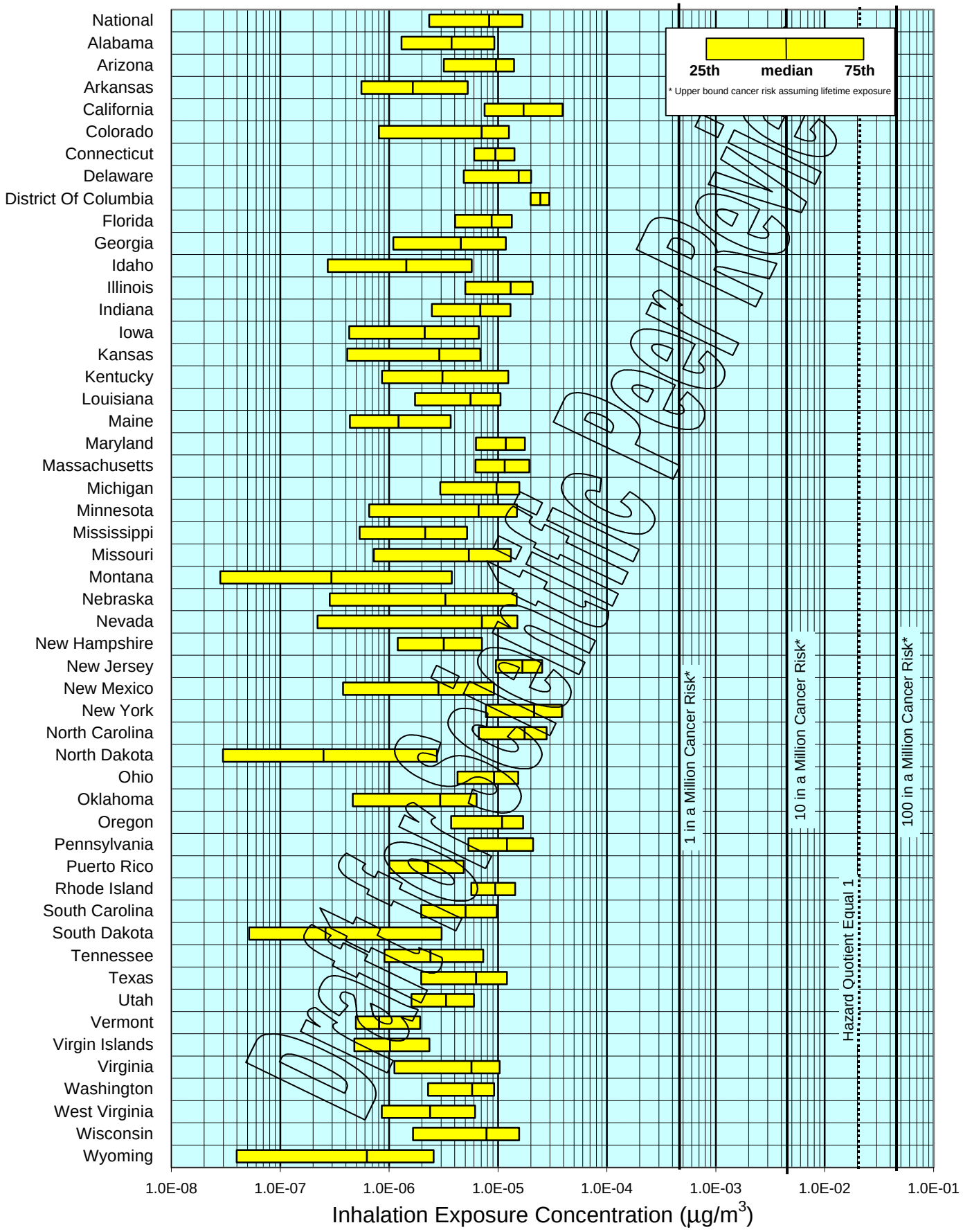
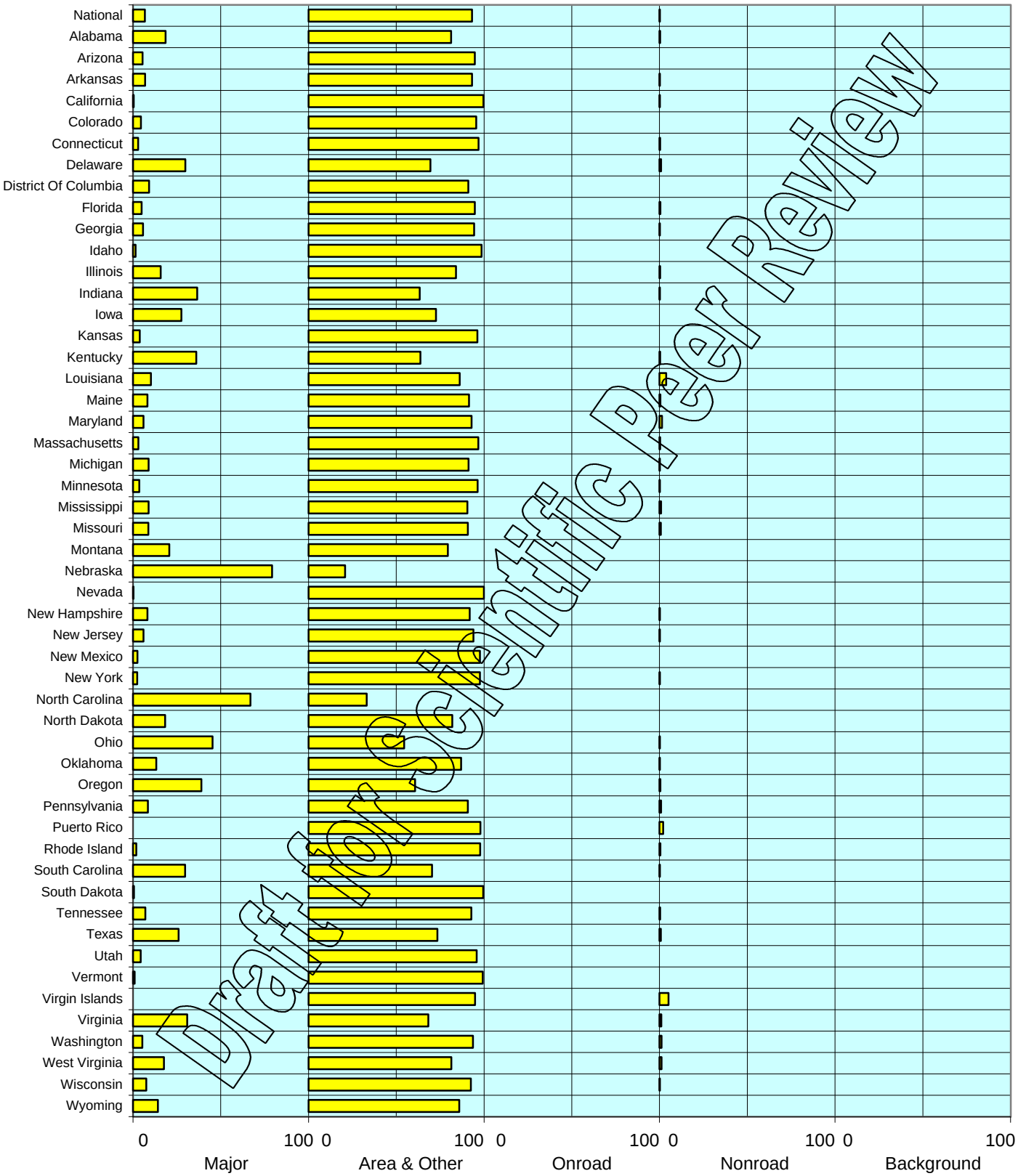
1996 Modeled Exposure Concentrations
Beryllium - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Beryllium - Statewide Source Sector Contribution Estimates
(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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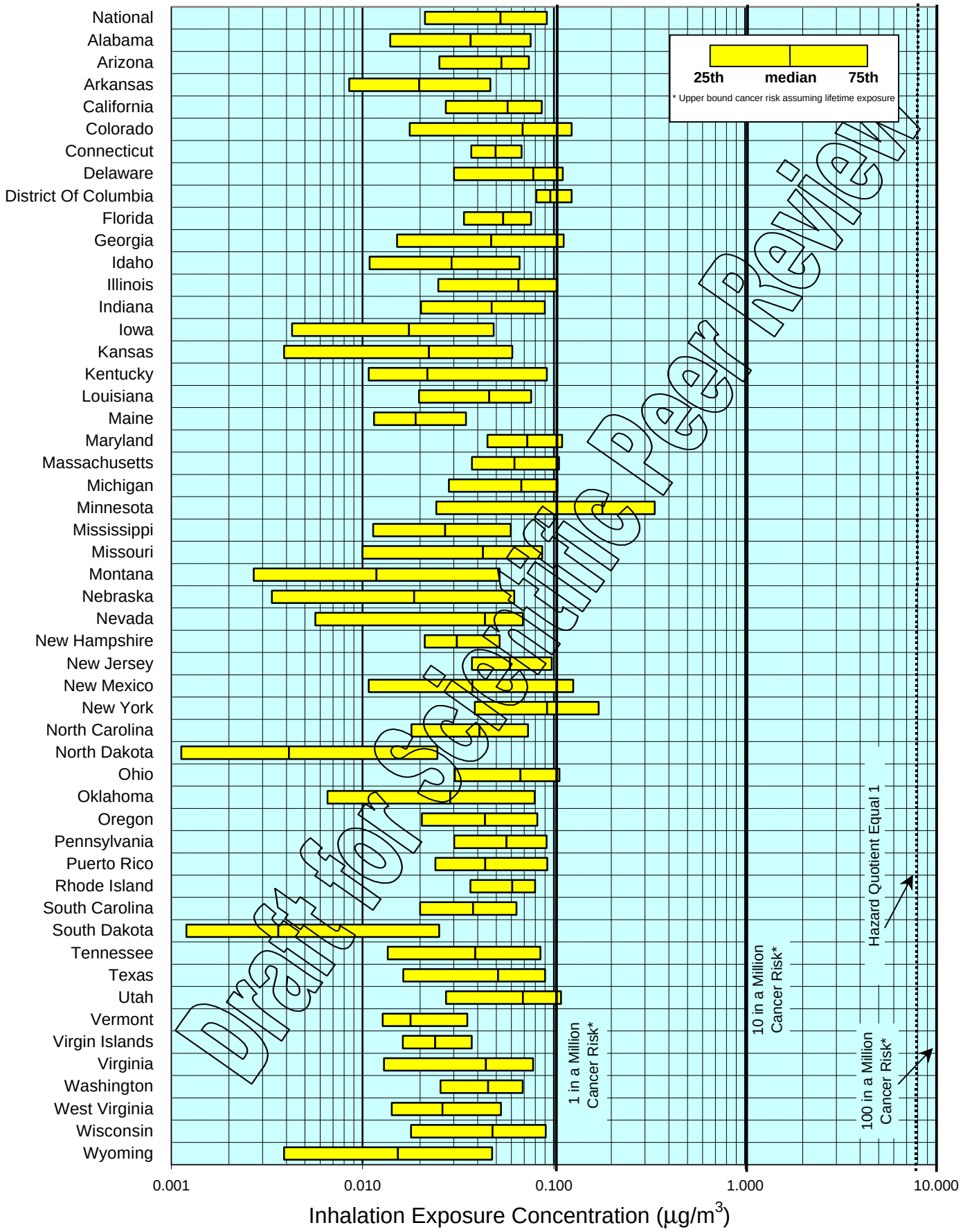
1996 Modeled Exposure Concentrations
1,3-Butadiene - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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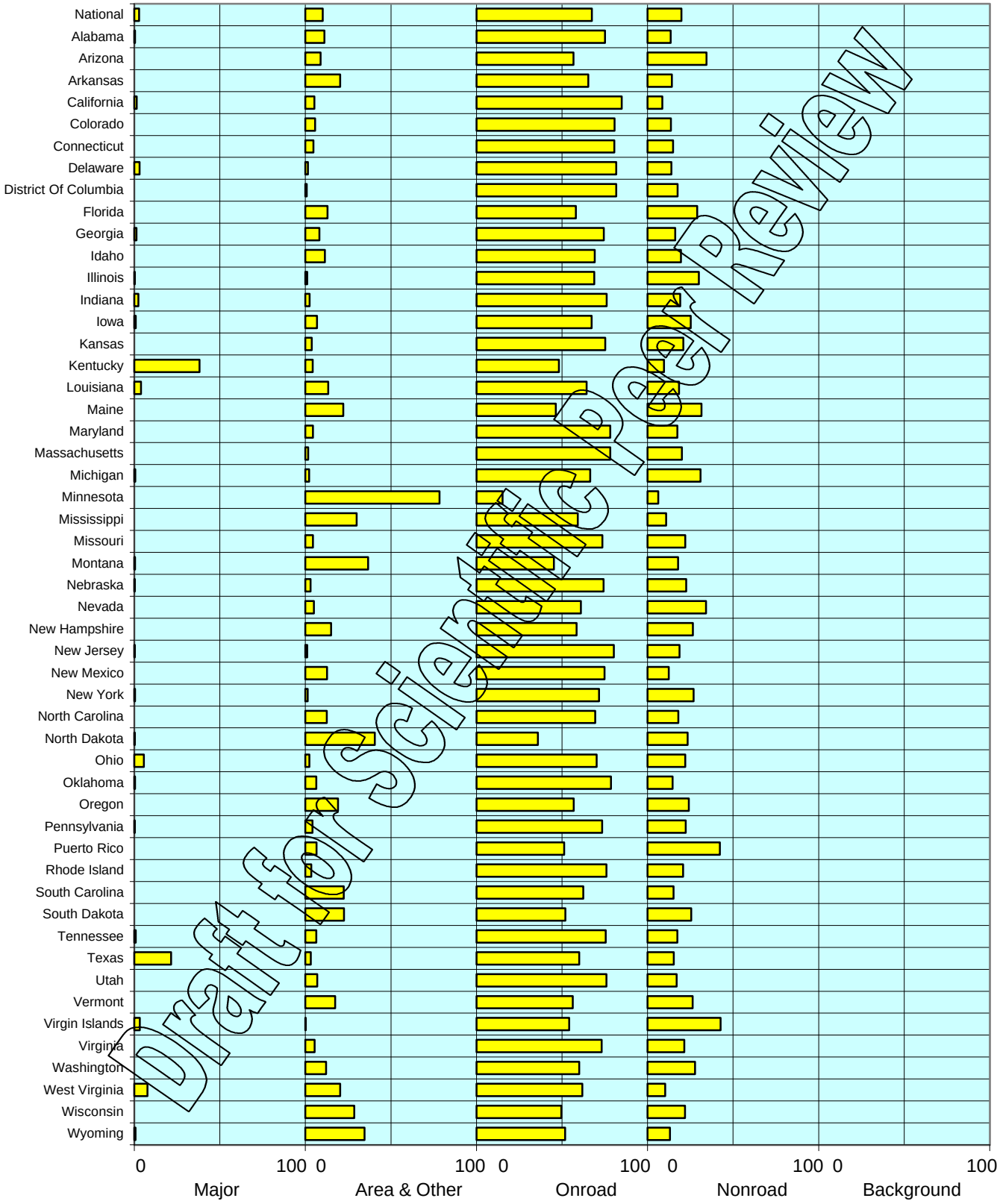
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
1,3-Butadiene - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)

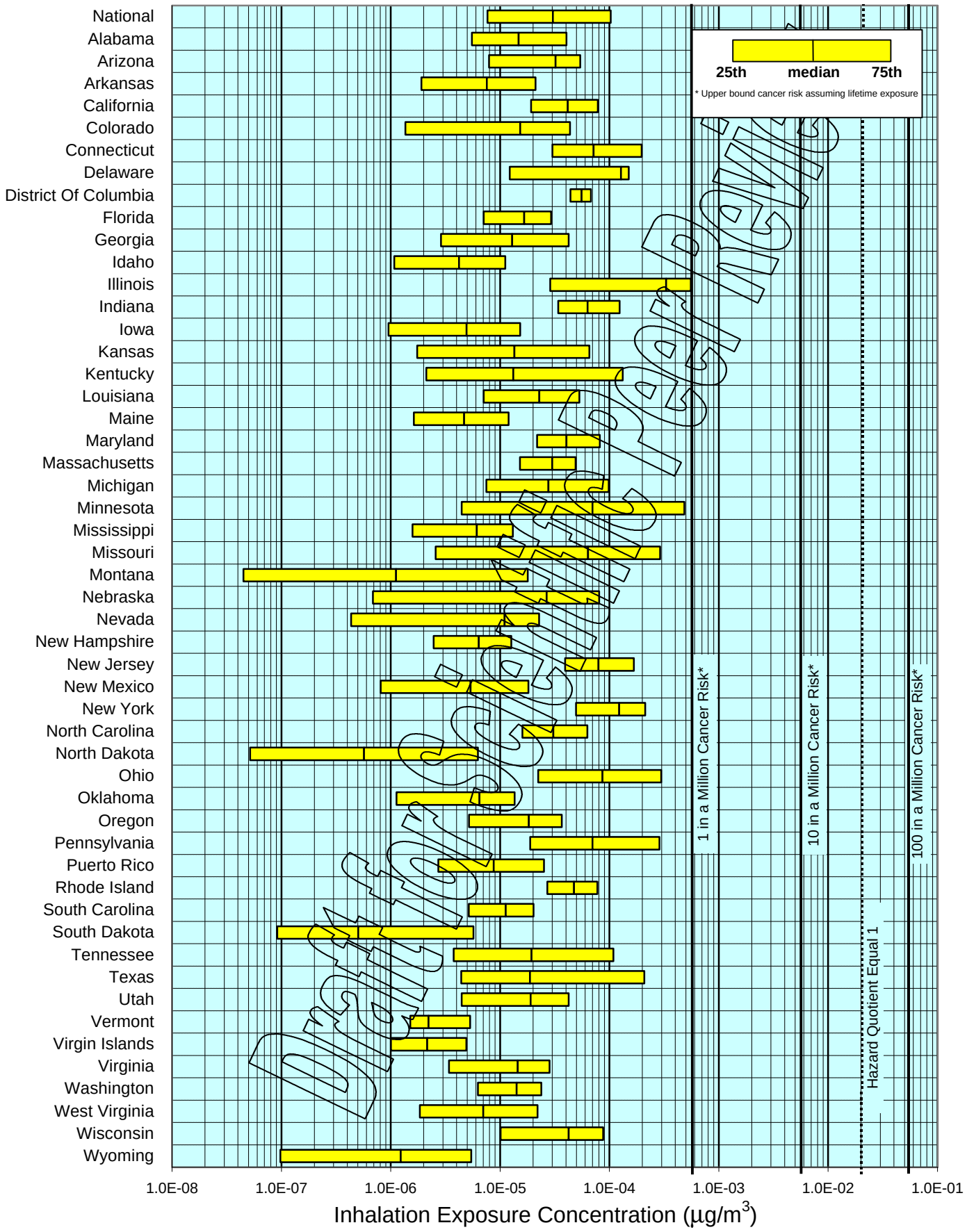


Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

Draft for Scientific Peer Review

US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Cadmium - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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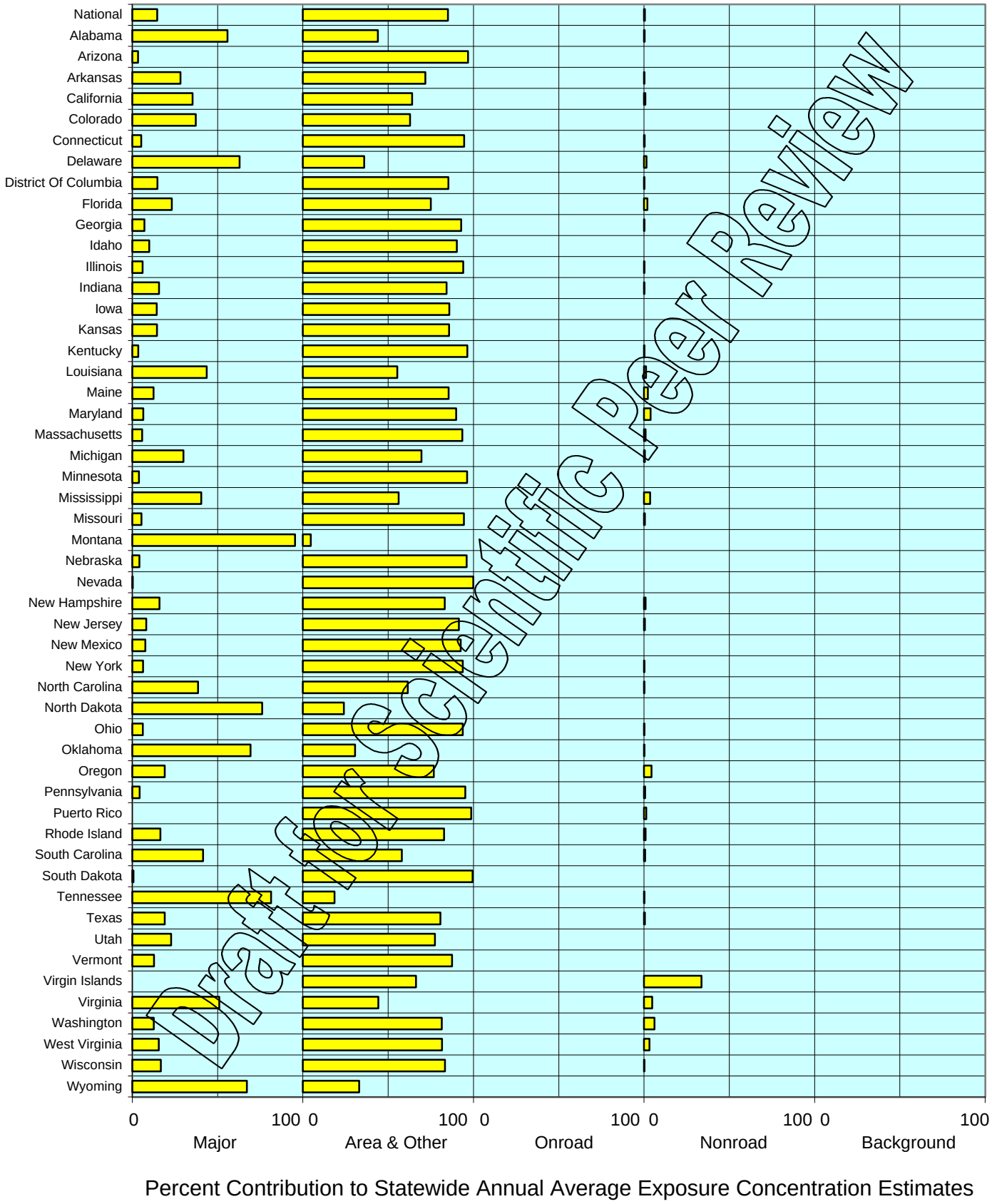
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Cadmium - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



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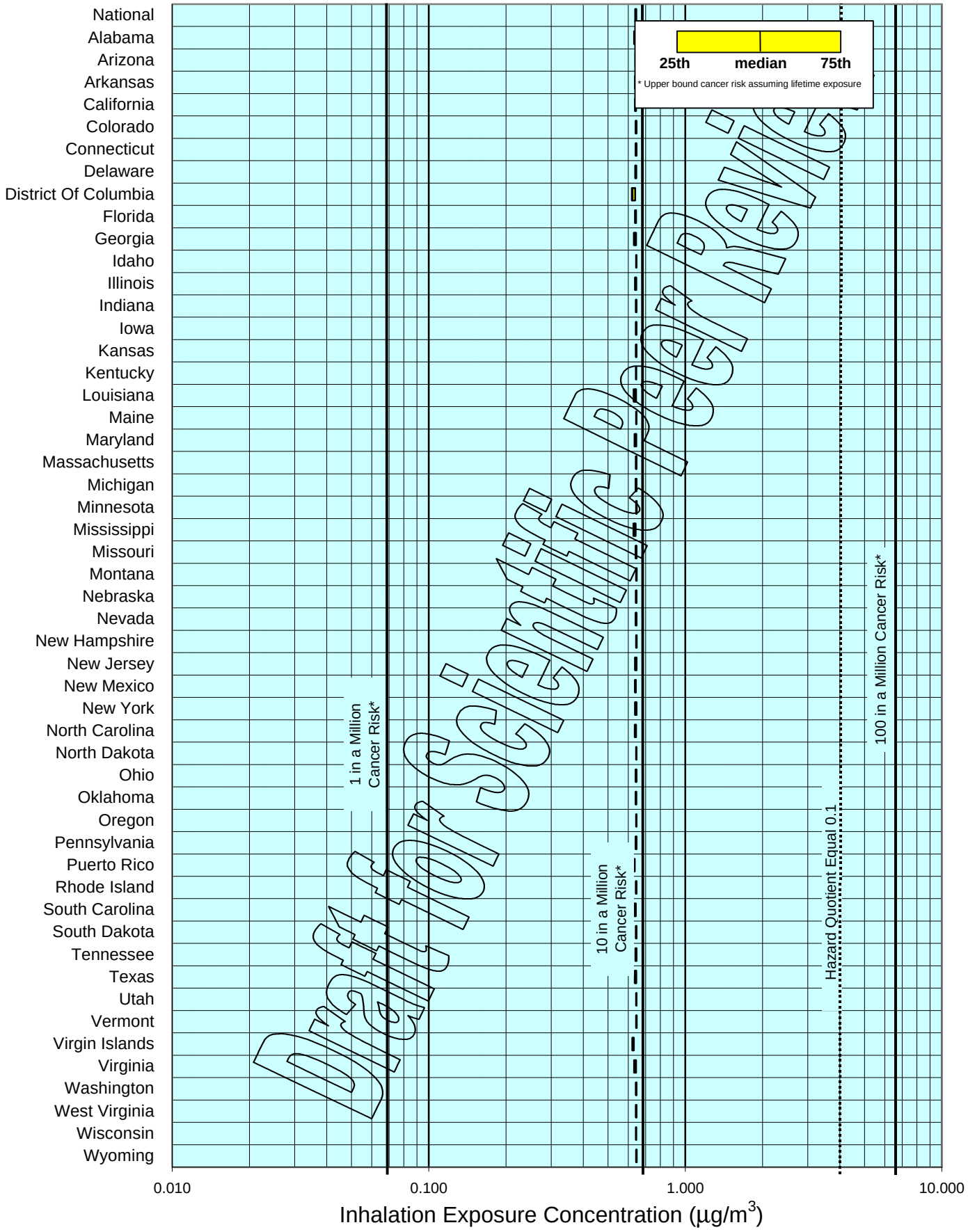
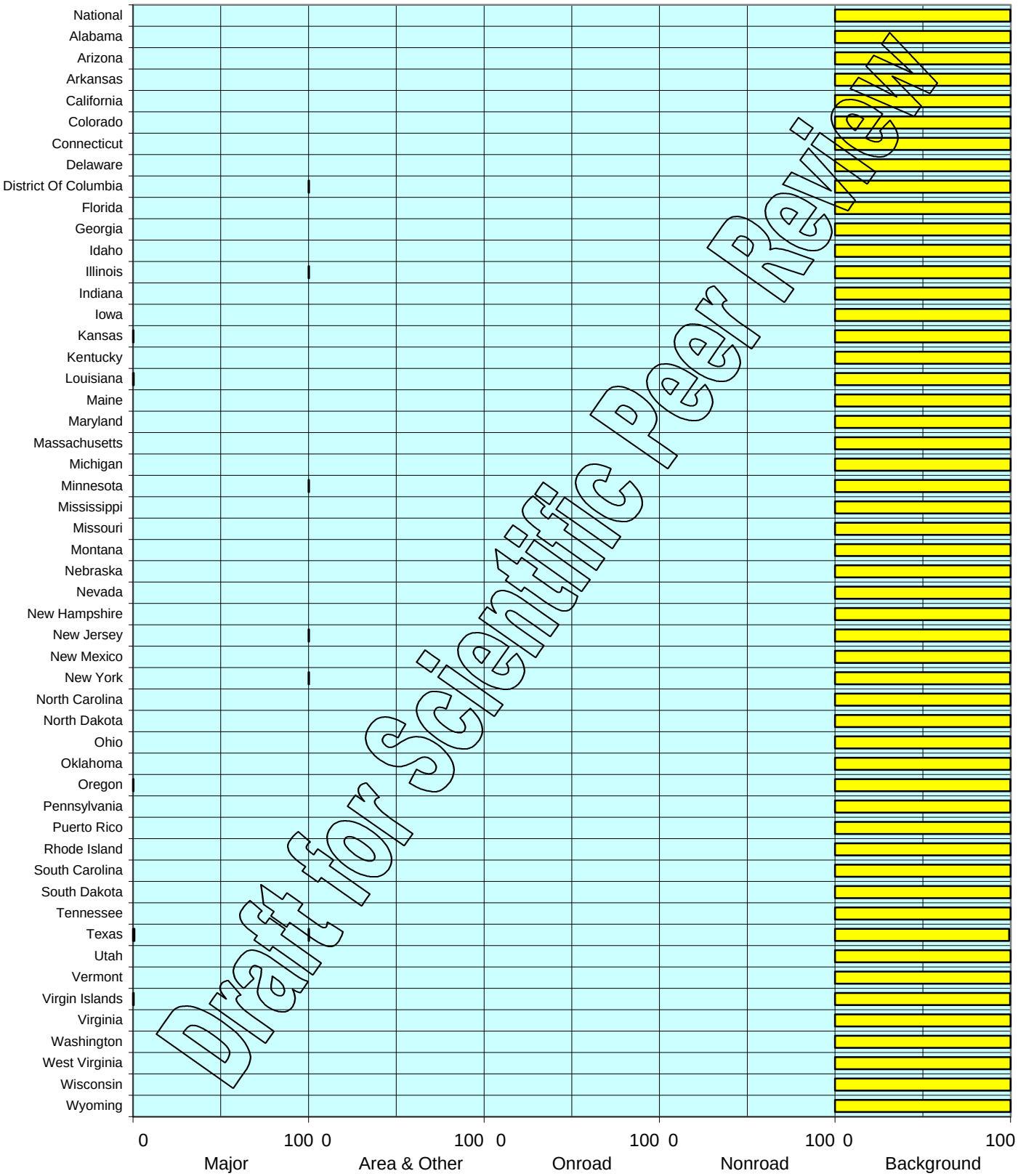
1996 Modeled Exposure Concentrations
Carbon Tetrachloride - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Carbon Tetrachloride - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



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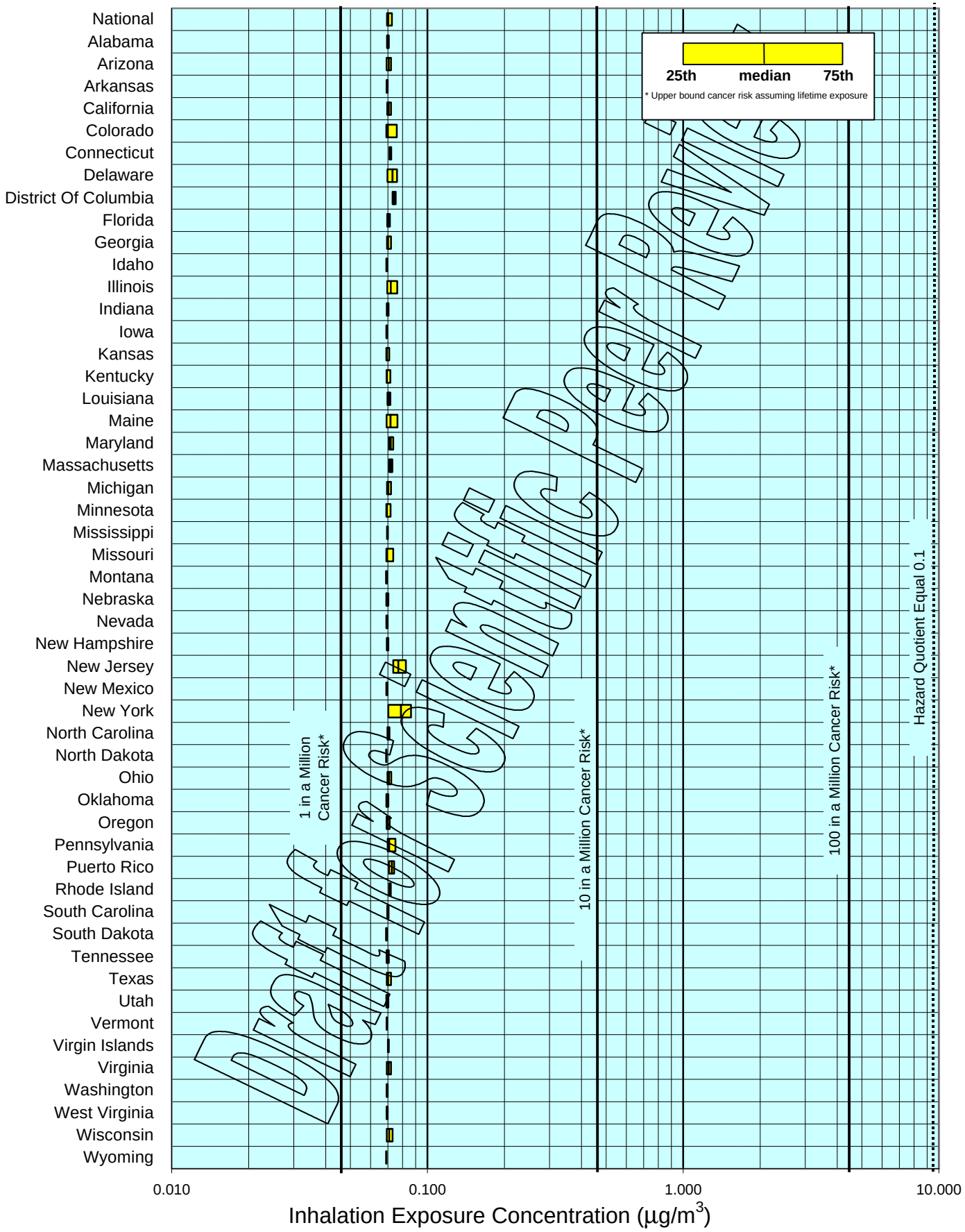
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Chloroform - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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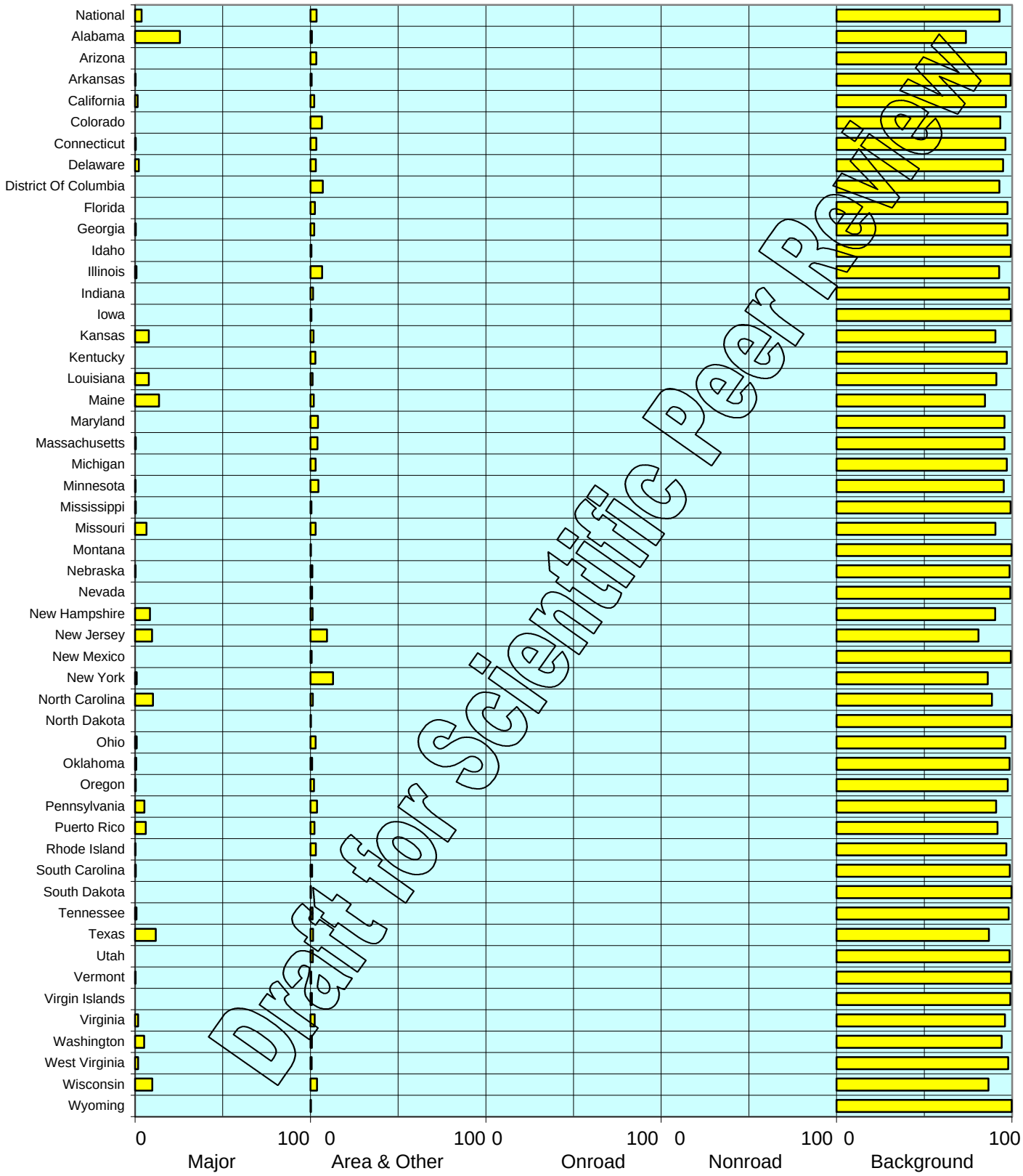
1996 Modeled Exposure Concentrations
Chloroform - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

Draft for Scientific Peer Review

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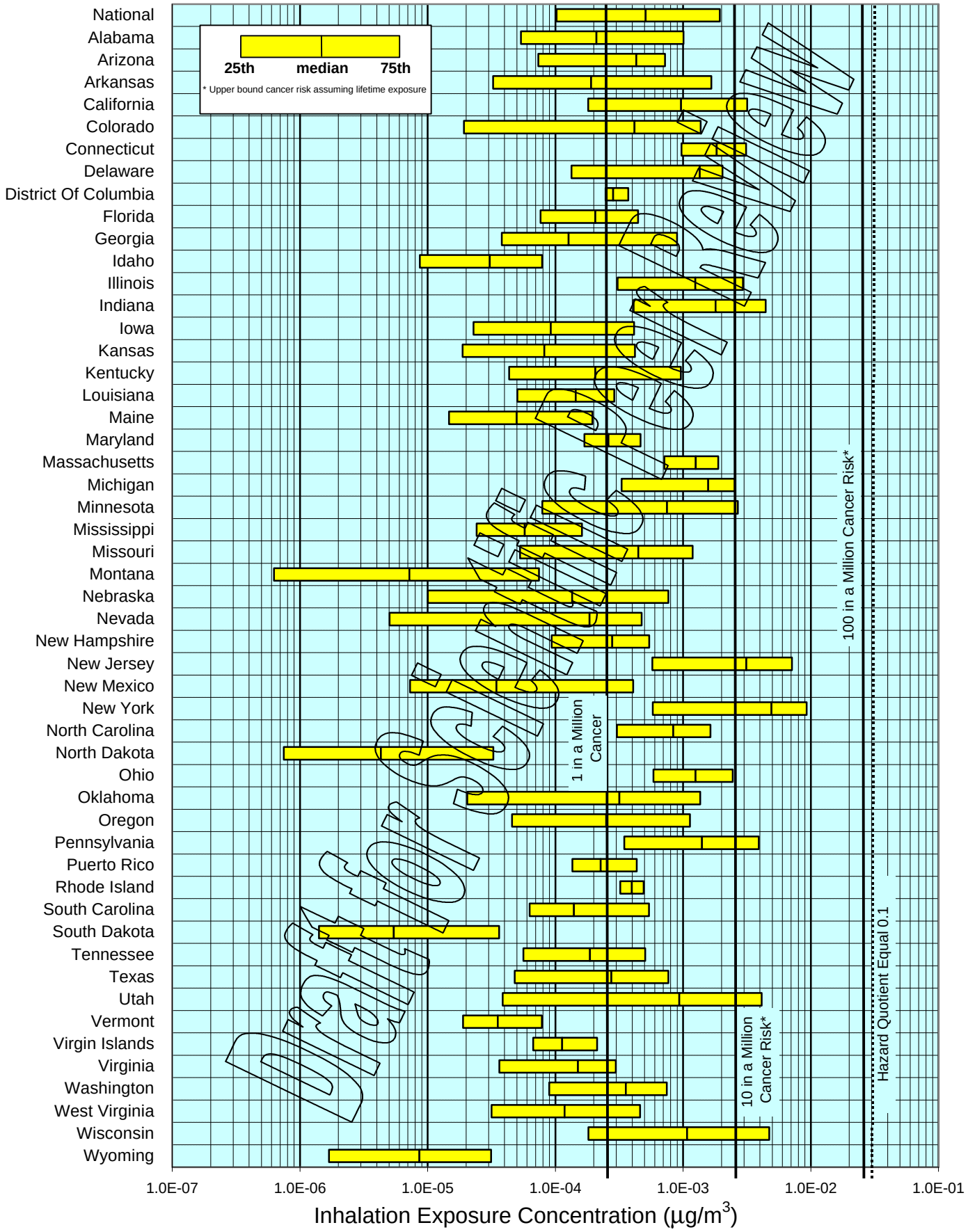
1996 Modeled Exposure Concentrations
Chromium - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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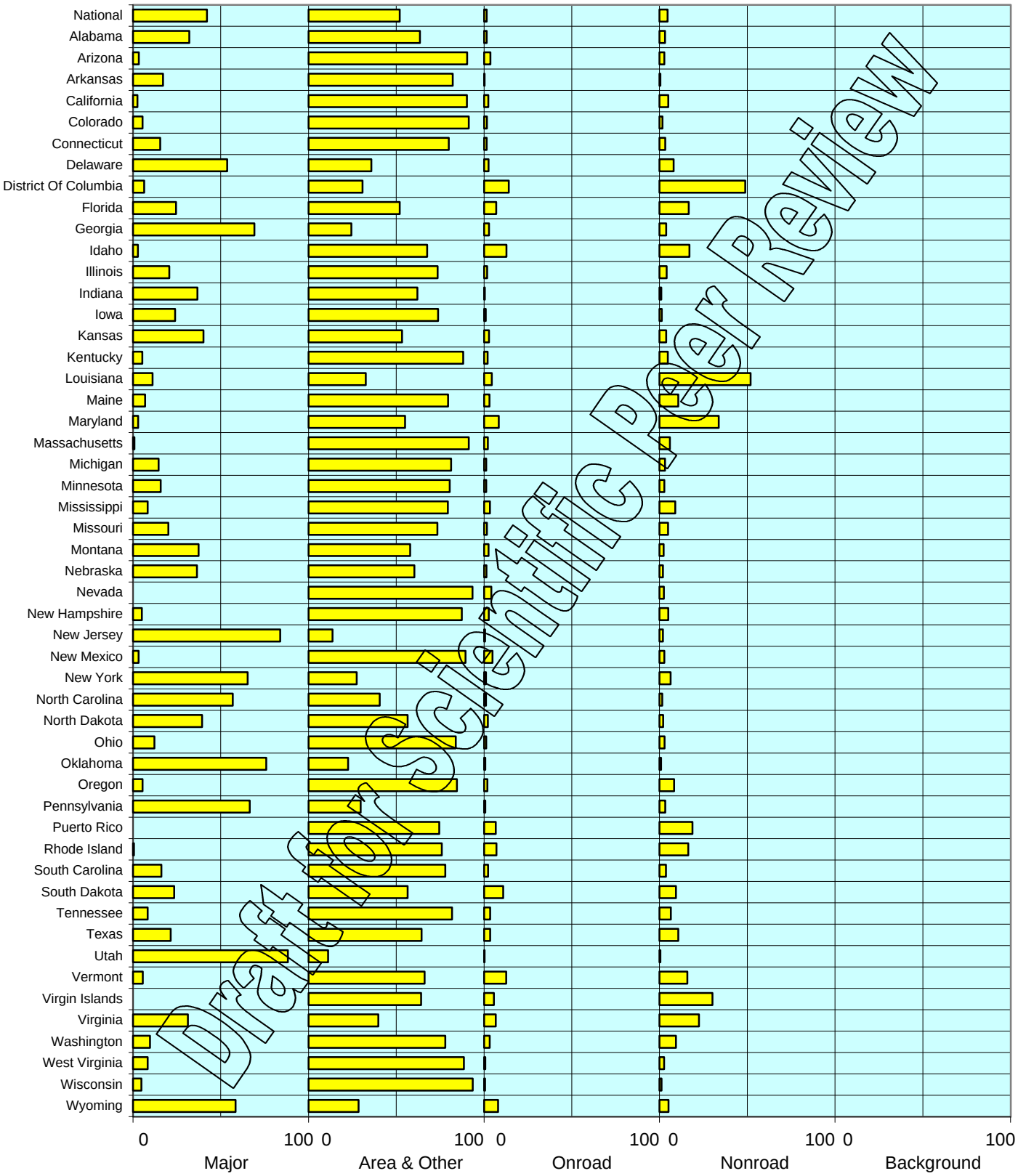
1996 Modeled Exposure Concentrations
Chromium - Statewide Source Sector Contribution Estimates
(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

Draft for Scientific Peer Review

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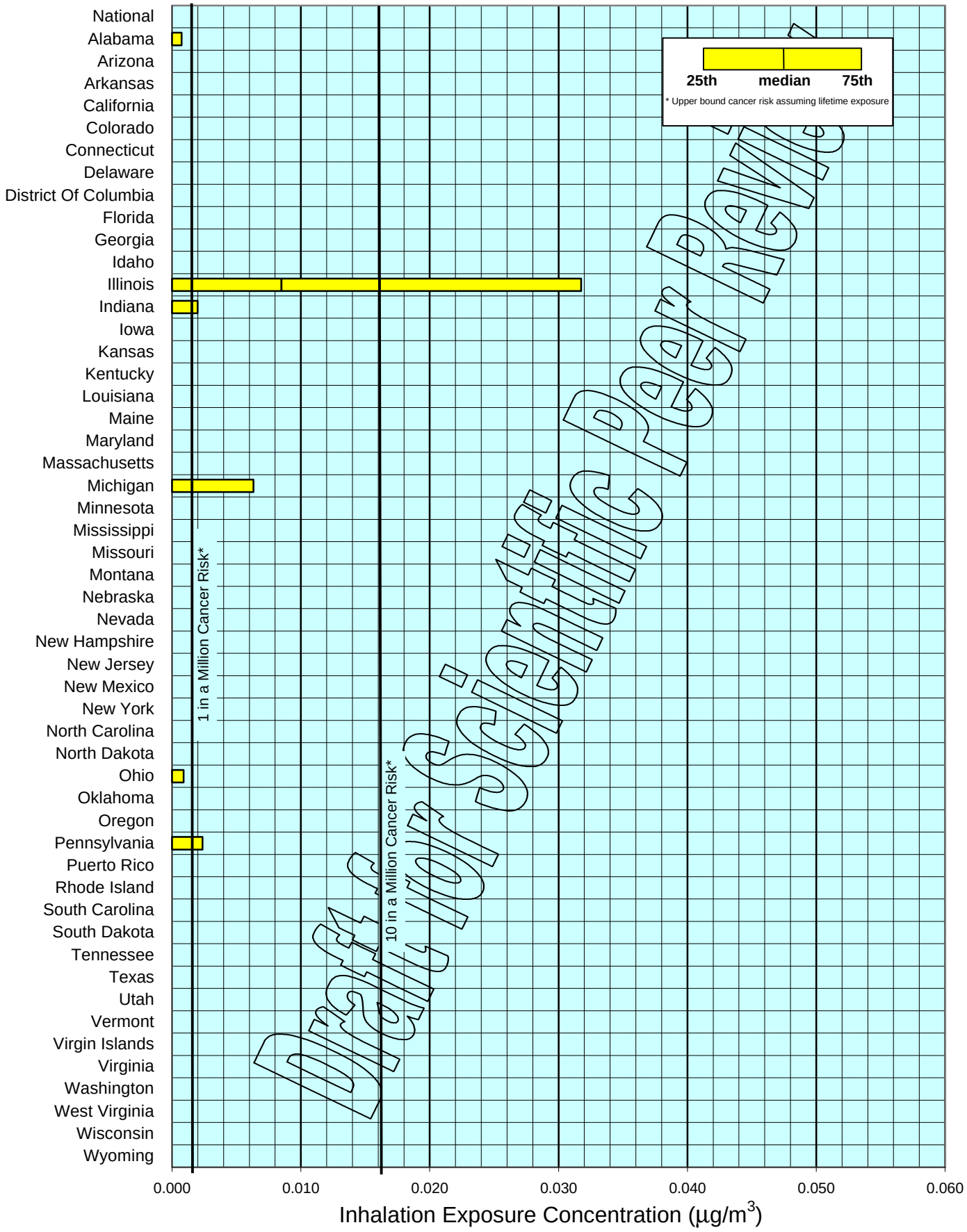
1996 Modeled Exposure Concentrations
Coke Oven Emissions - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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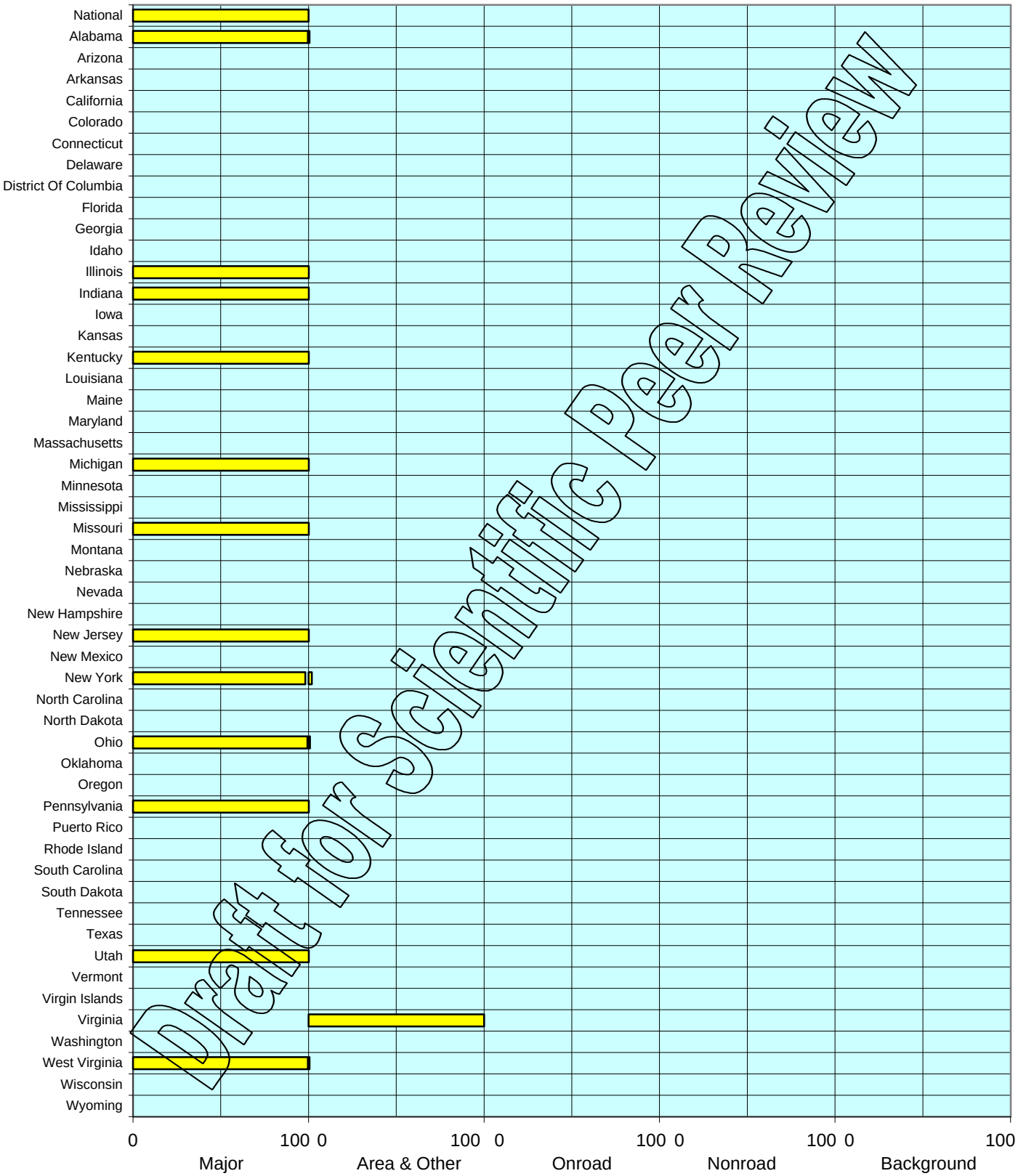
1996 Modeled Exposure Concentrations
Coke Oven Emissions - Statewide Source Sector Contribution Estimates
(For Limitations On The Use of These Data See Page 2)



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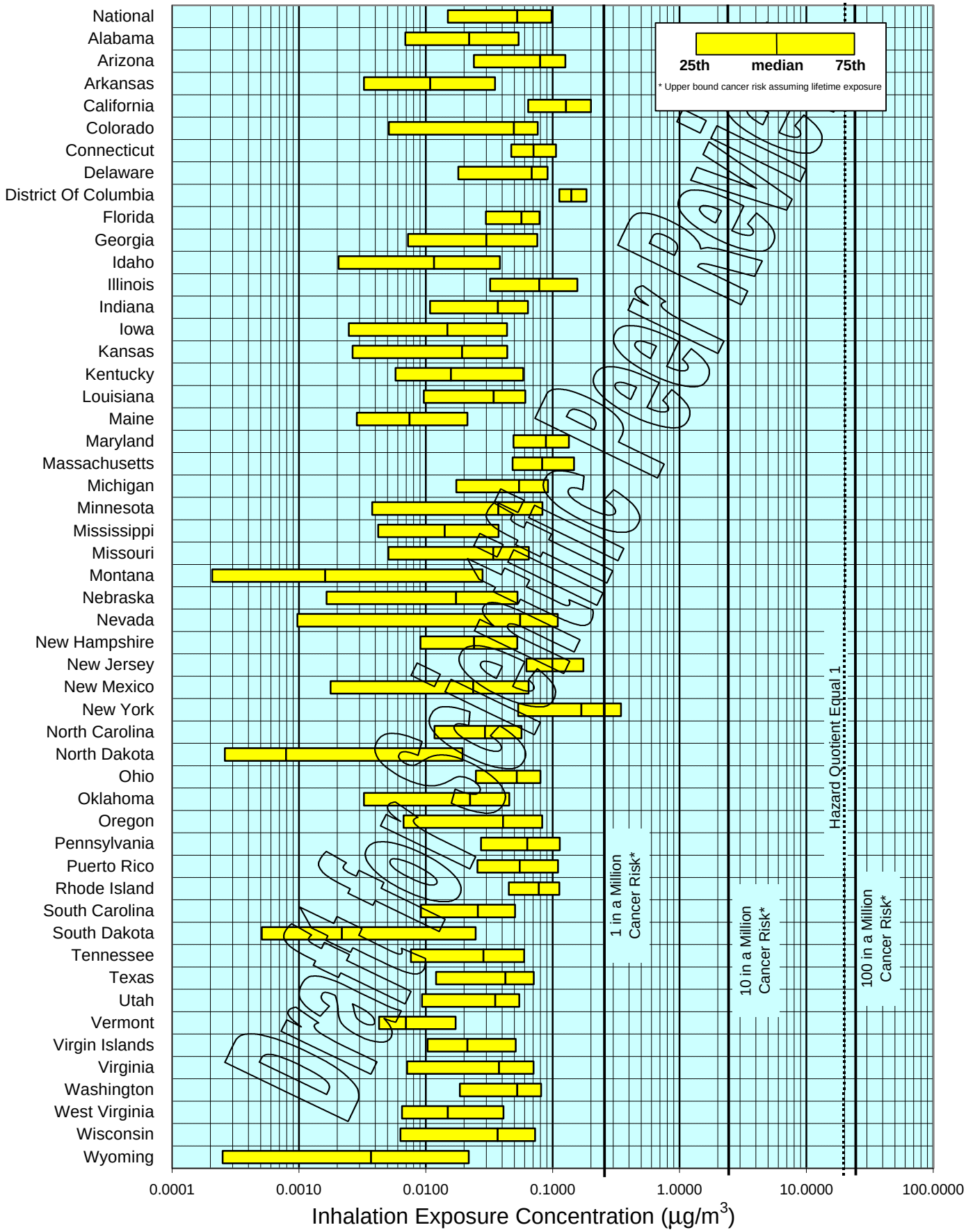
1996 Modeled Exposure Concentrations
1,3-Dichloropropene - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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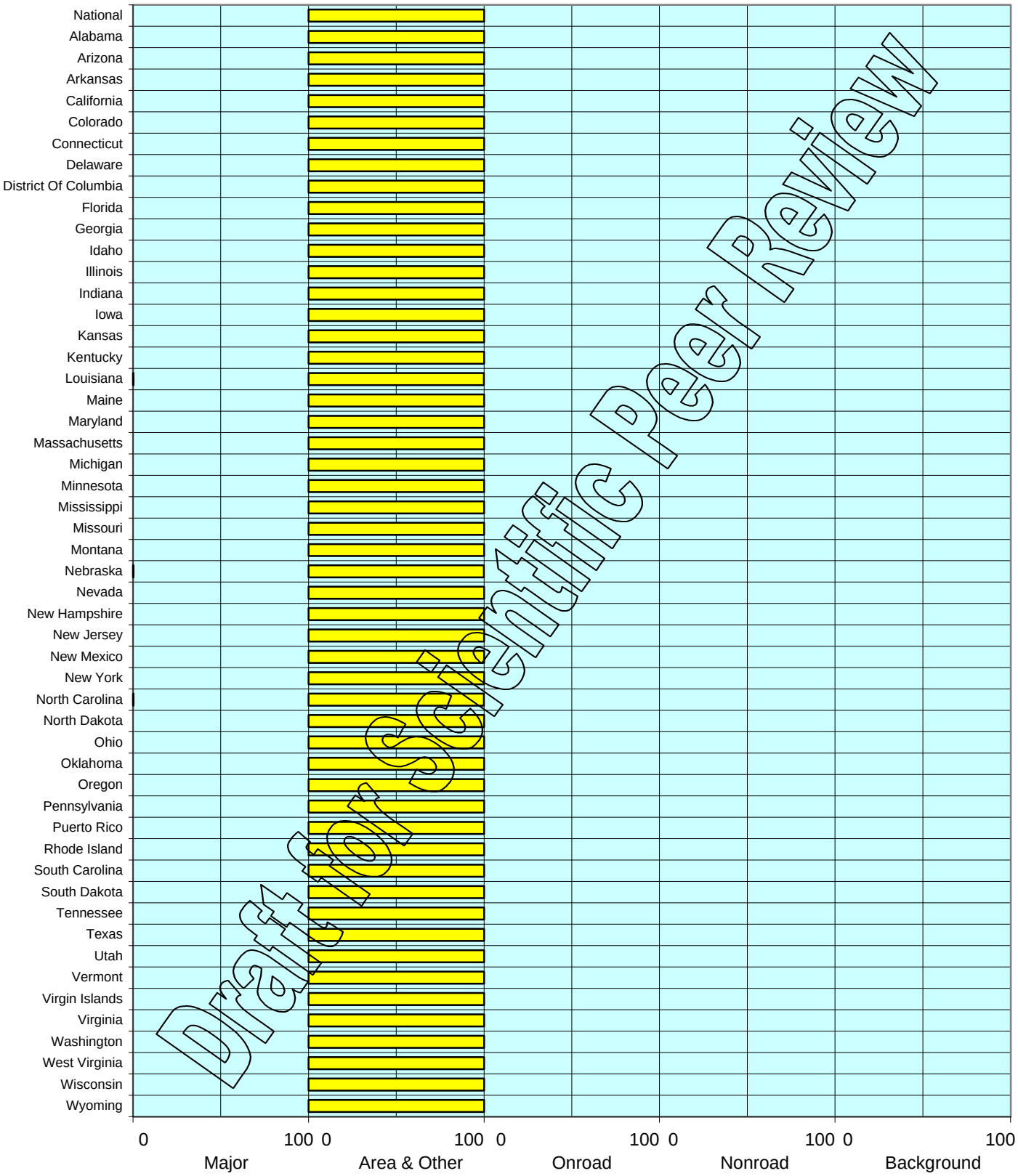
1996 Modeled Exposure Concentrations
1,3-Dichloropropene - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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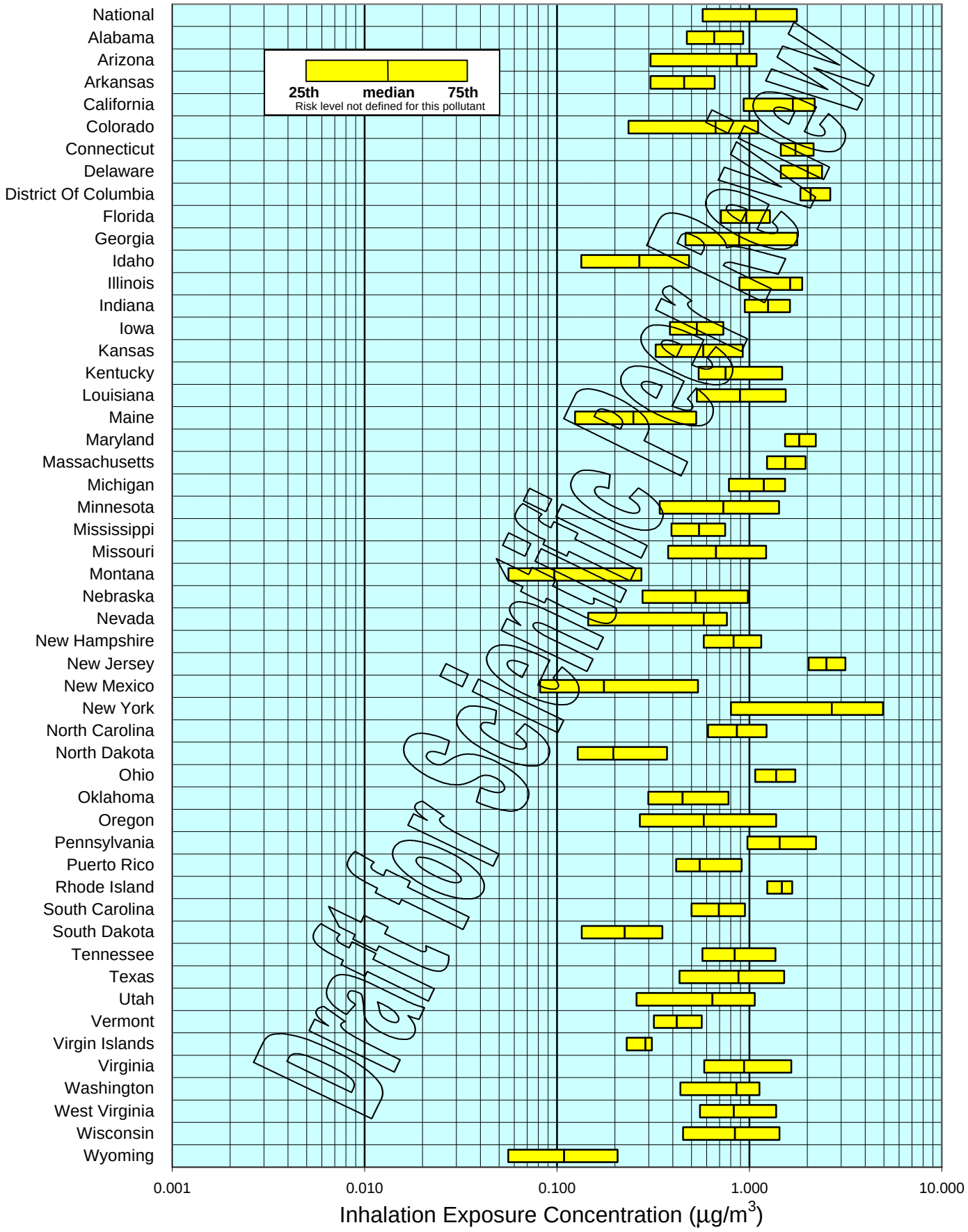
1996 Modeled Exposure Concentrations
Diesel Particulate Matter - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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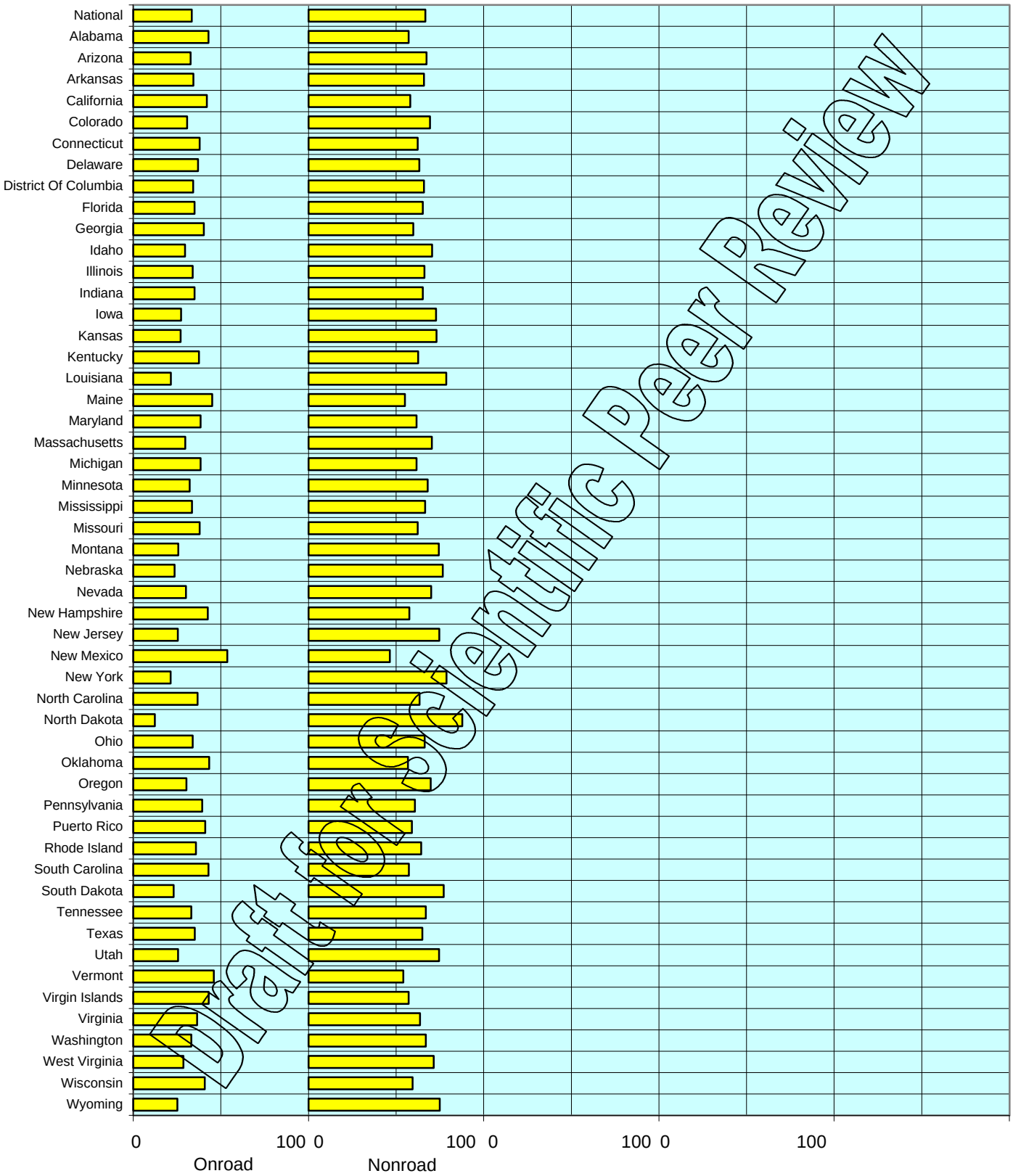
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Diesel Particulate Matter - Statewide Source Sector Contribution Estimates
(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

Draft for Scientific Peer Review

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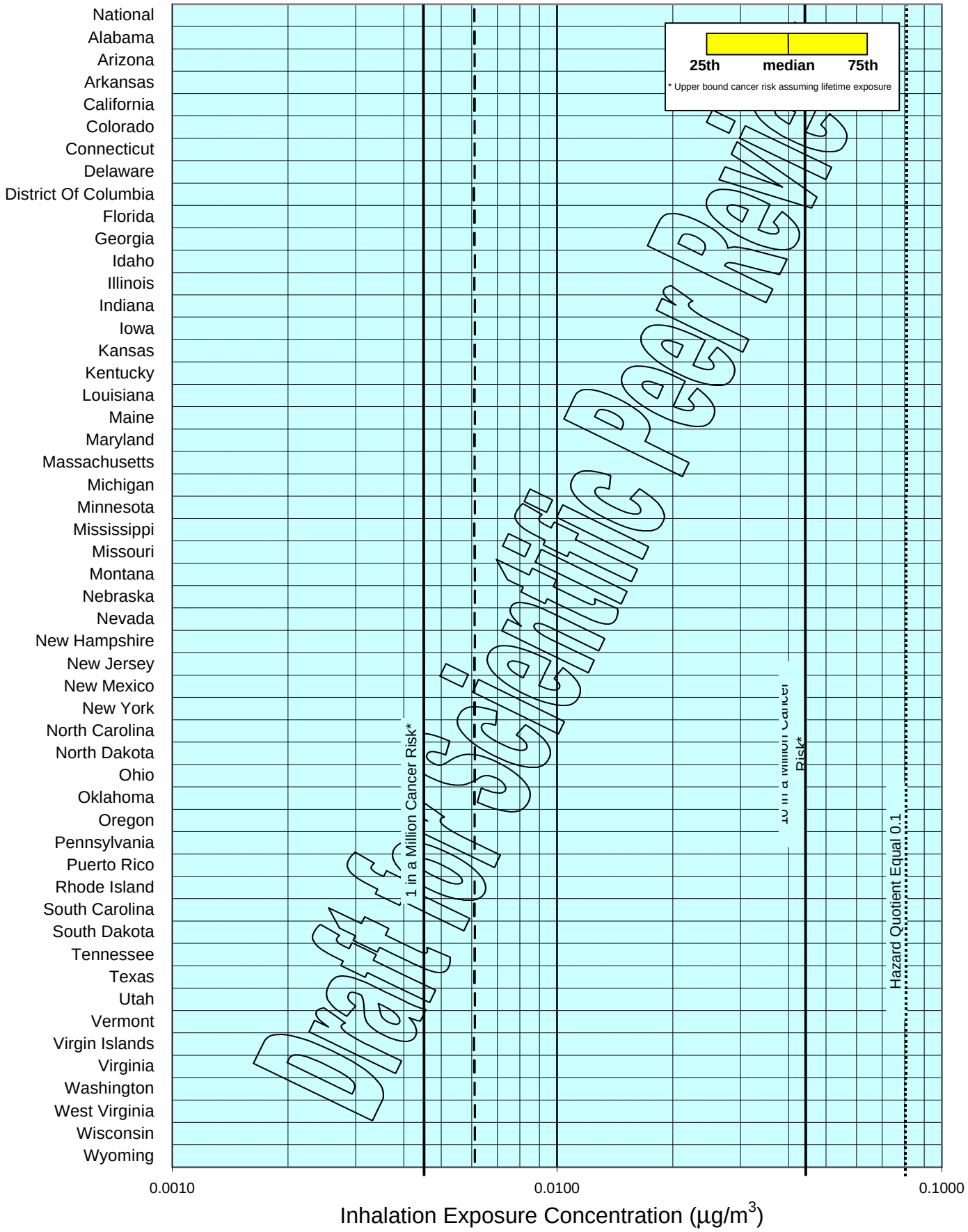
1996 Modeled Exposure Concentrations
Ethylene Dibromide - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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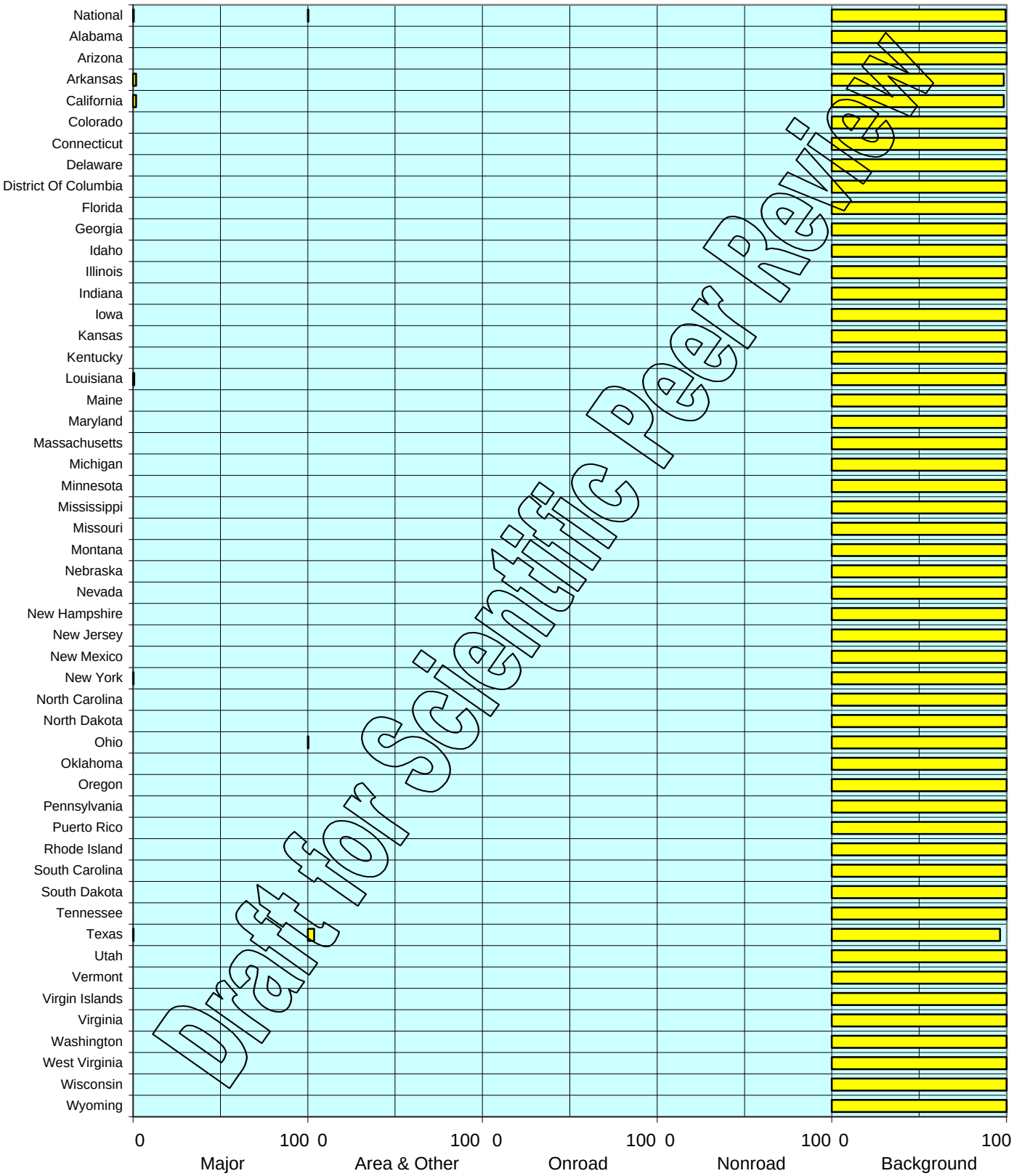
1996 Modeled Exposure Concentrations
Ethylene Dibromide - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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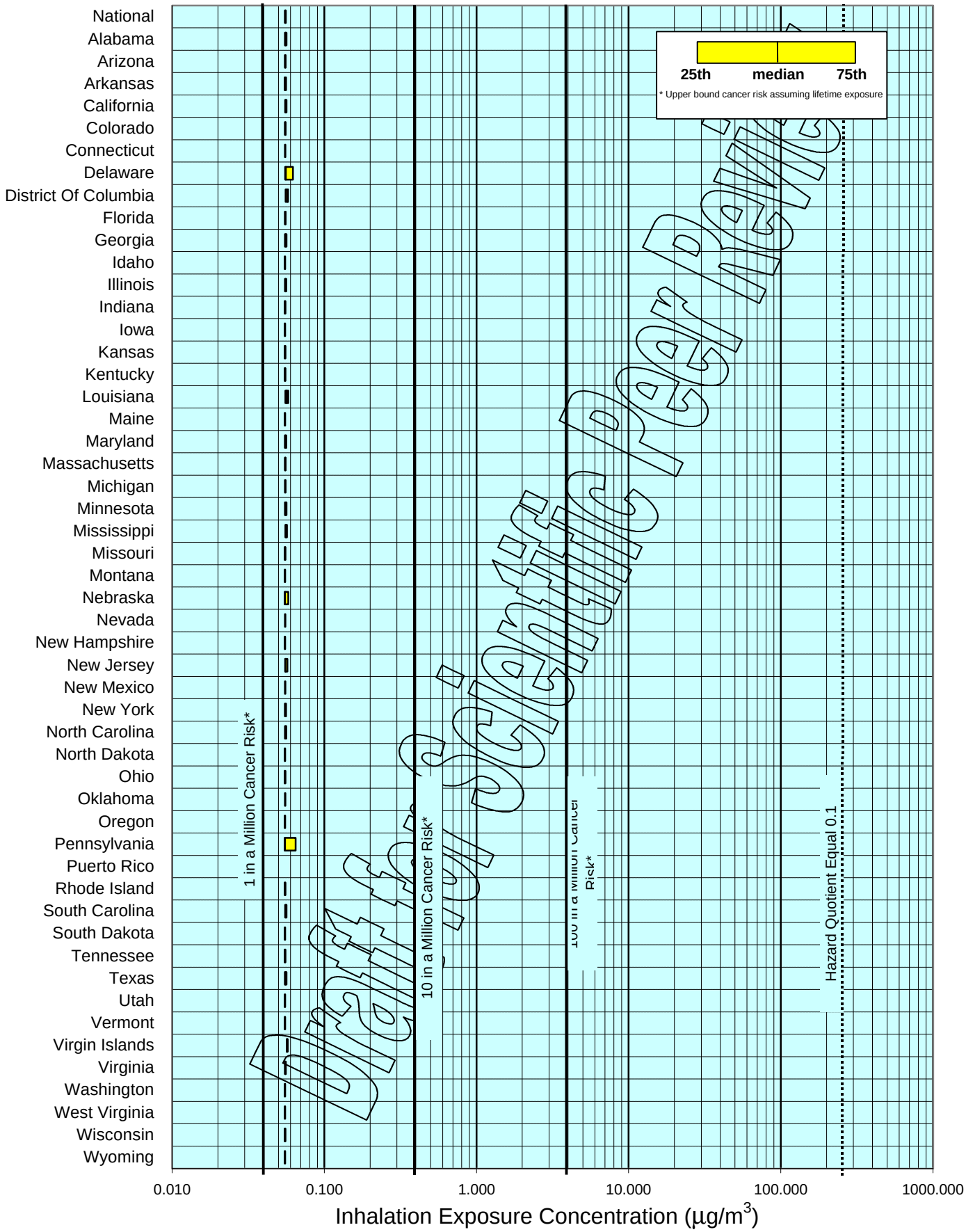
1996 Modeled Exposure Concentrations
Ethylene Dichloride - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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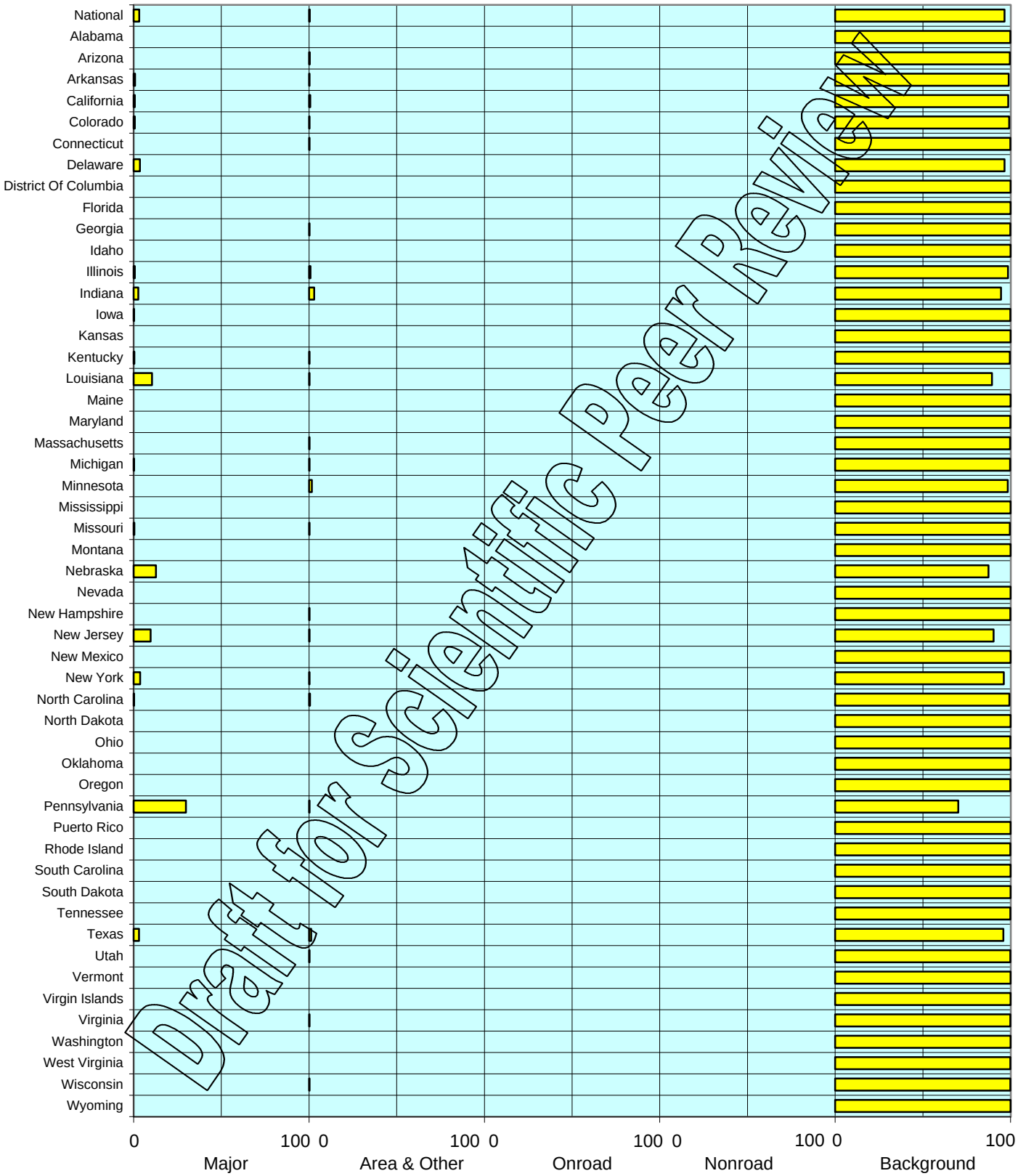
1996 Modeled Exposure Concentrations
Ethylene Dichloride - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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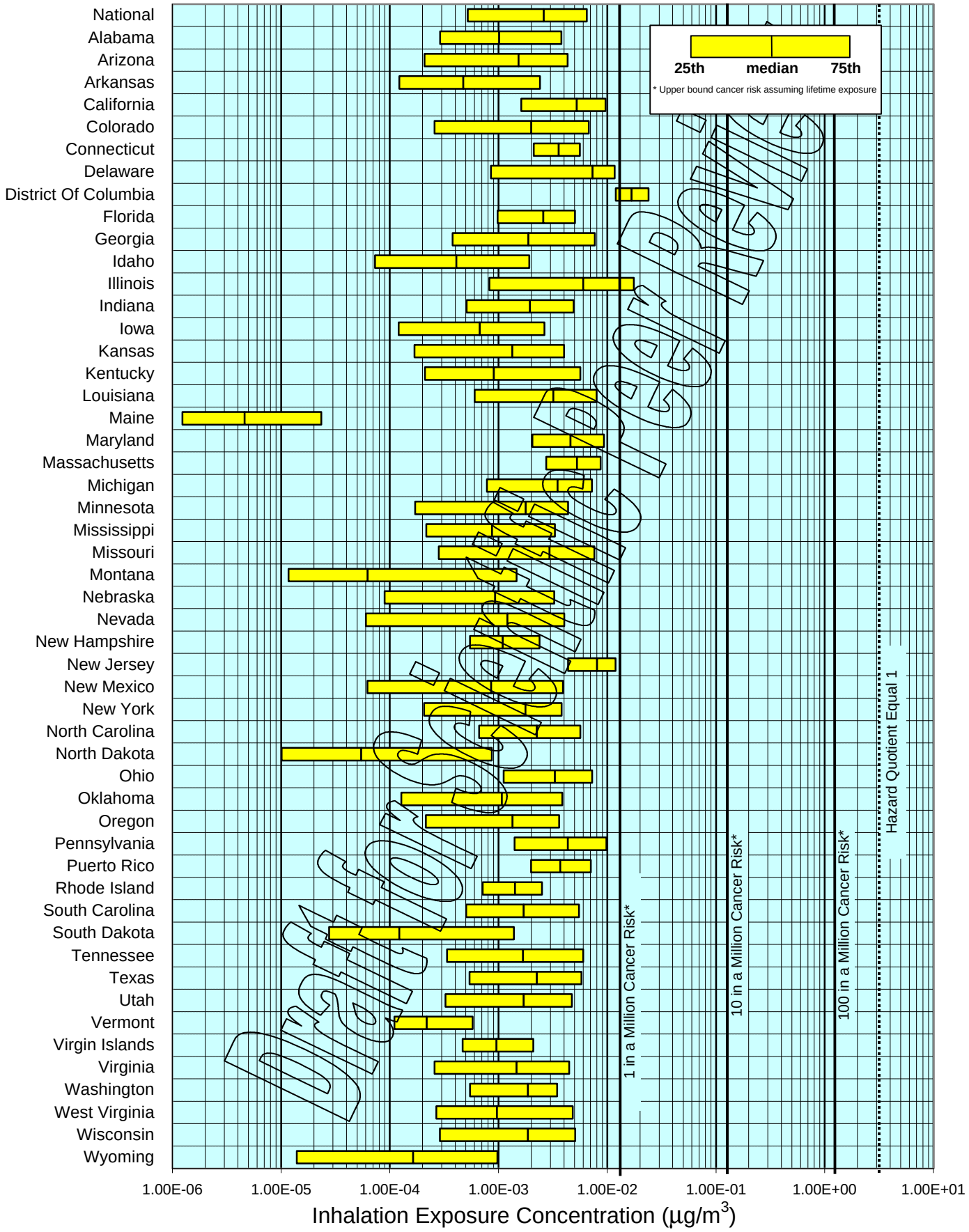
US EPA ARCHIVE DOCUMENT

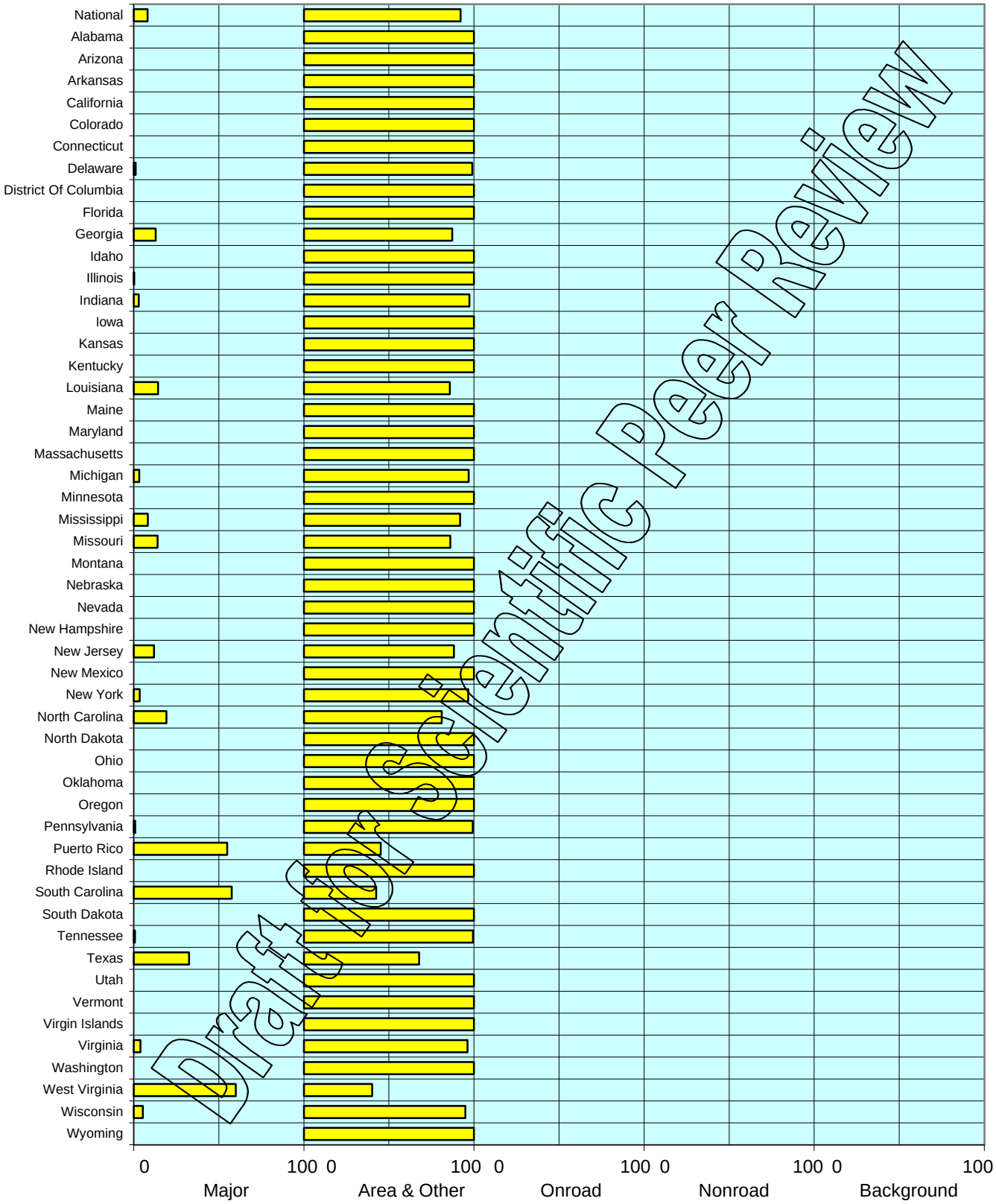
1996 Modeled Exposure Concentrations
Ethylene Oxide - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Ethylene Oxide - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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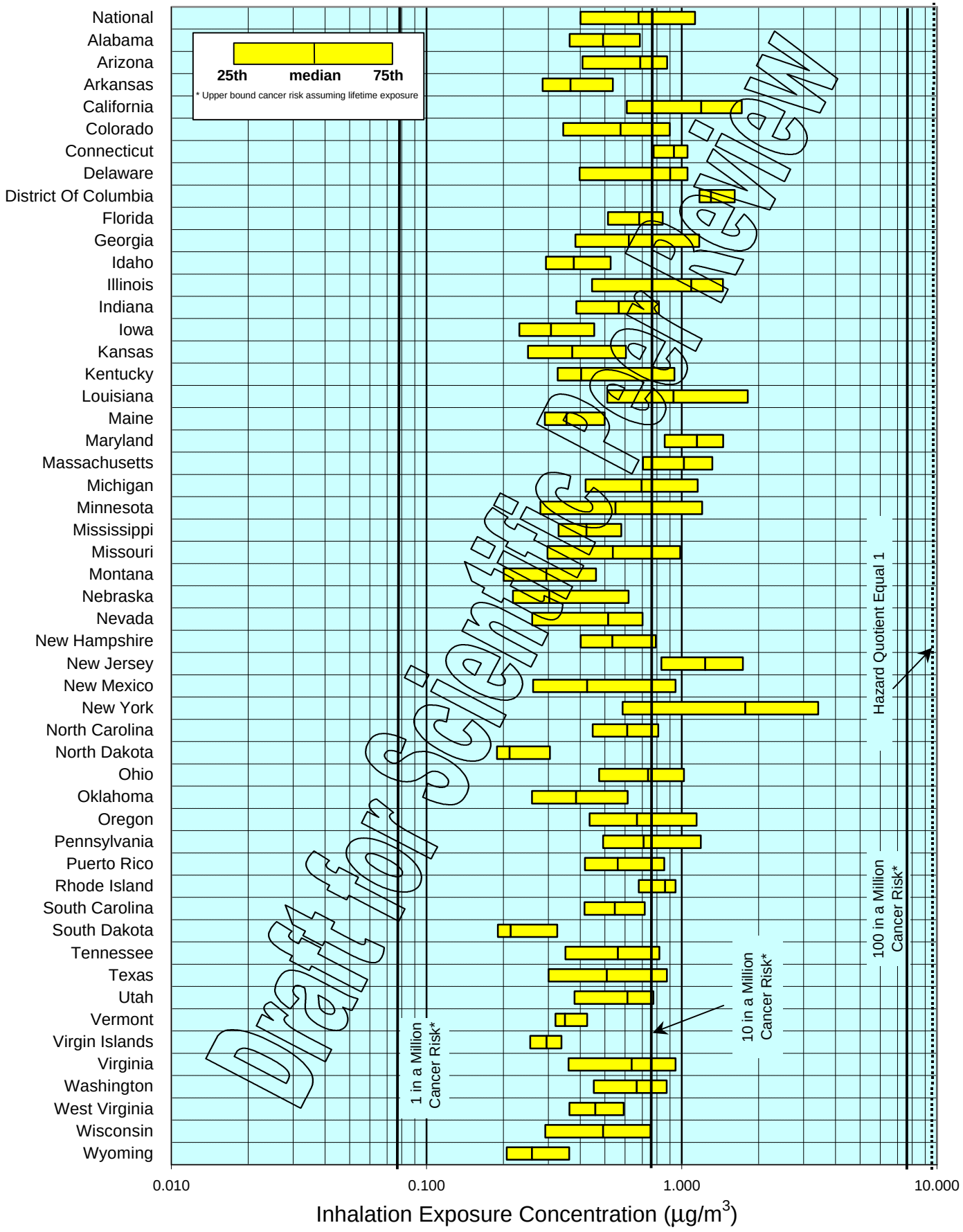
1996 Modeled Exposure Concentrations
Formaldehyde - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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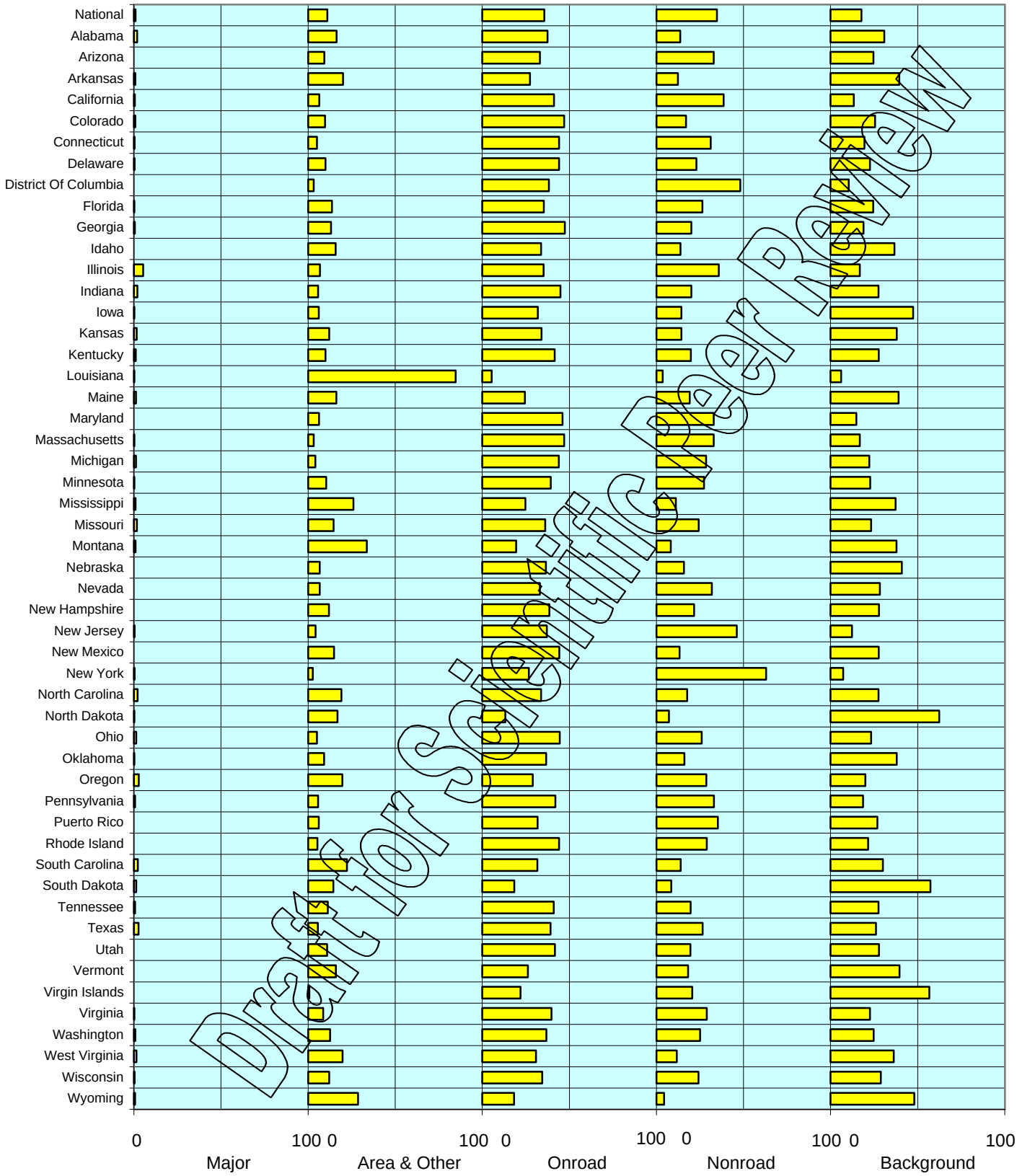
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Formaldehyde - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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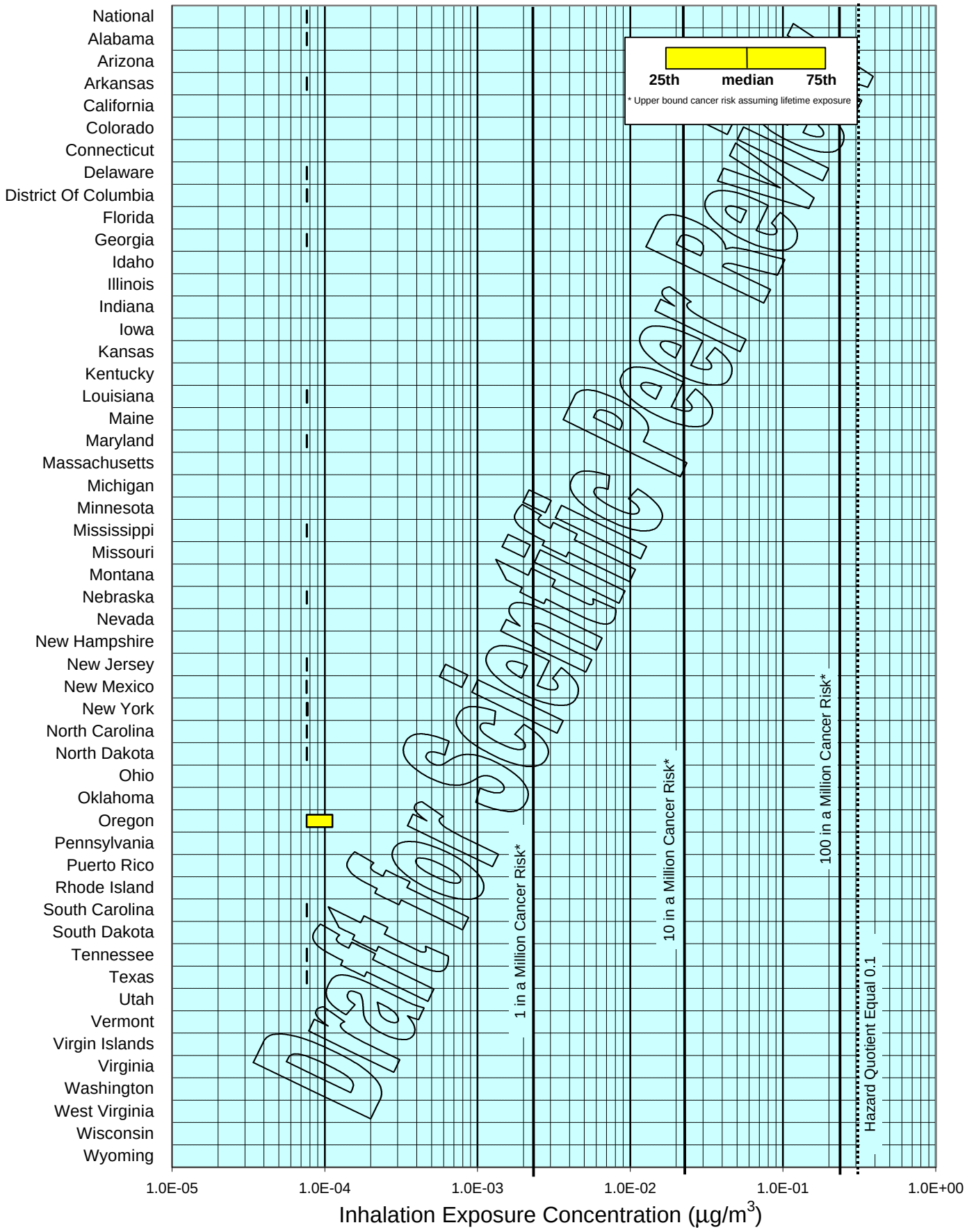
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Hexachlorobenzene - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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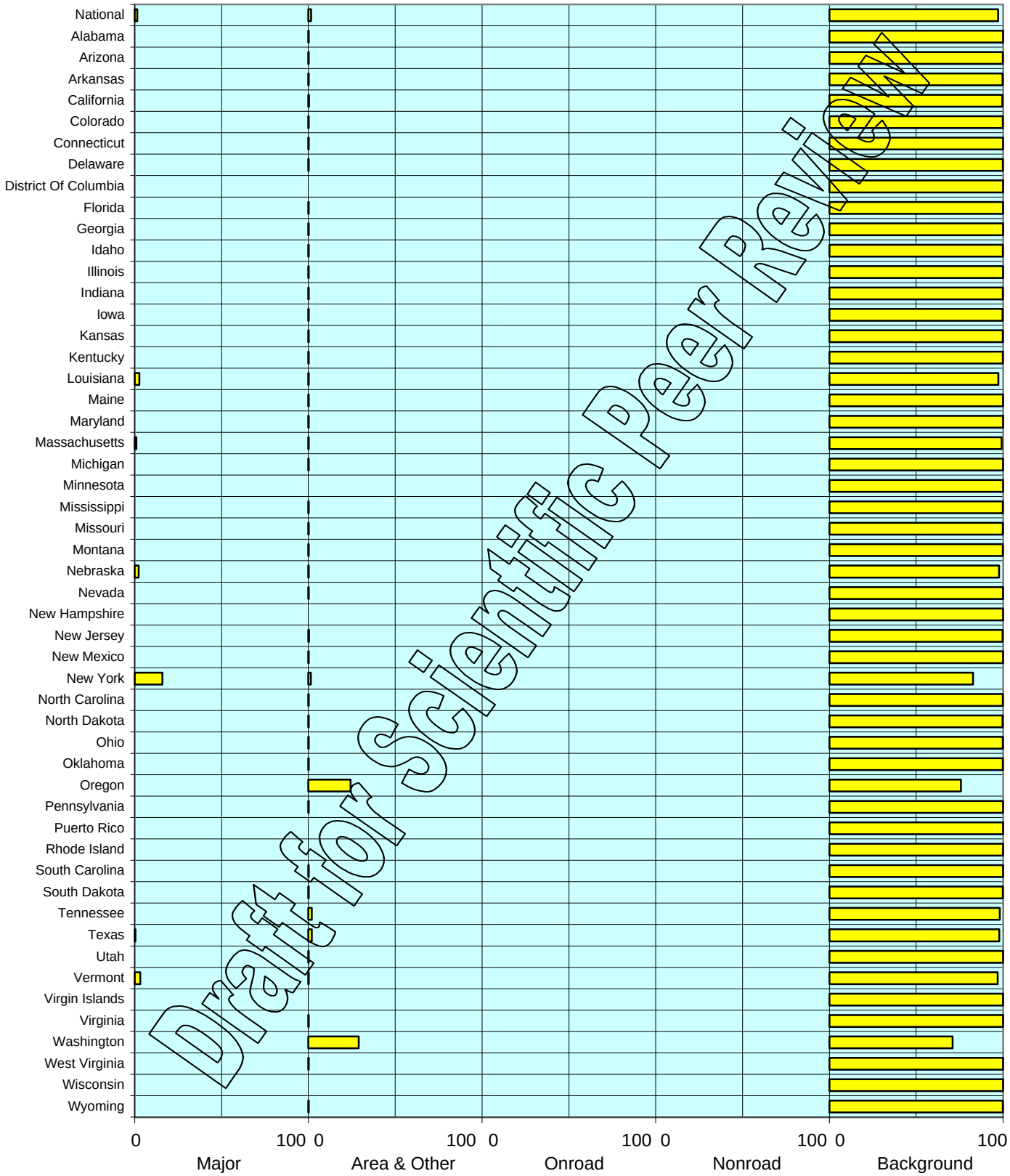
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Hexachlorobenzene - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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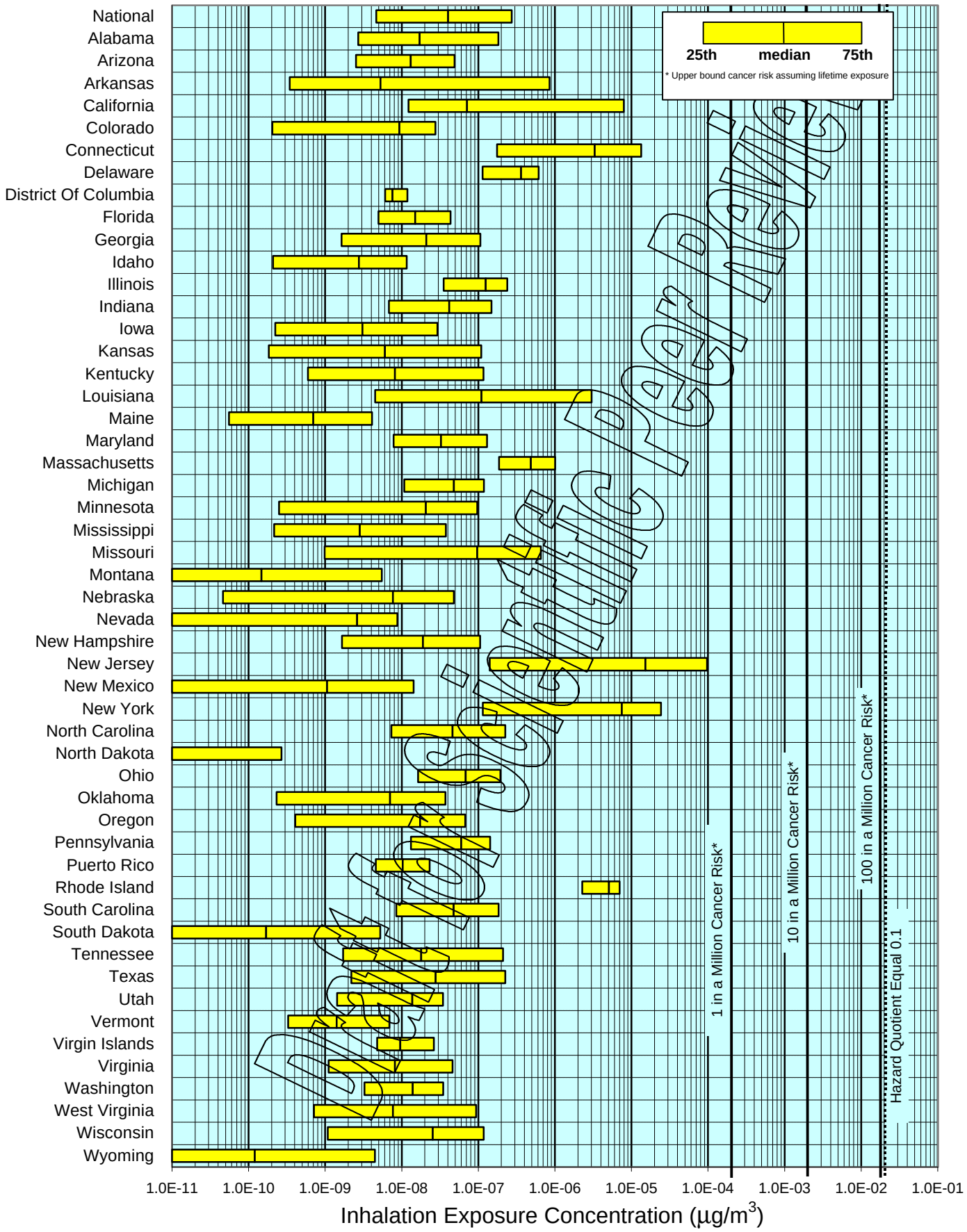
US EPA ARCHIVE DOCUMENT

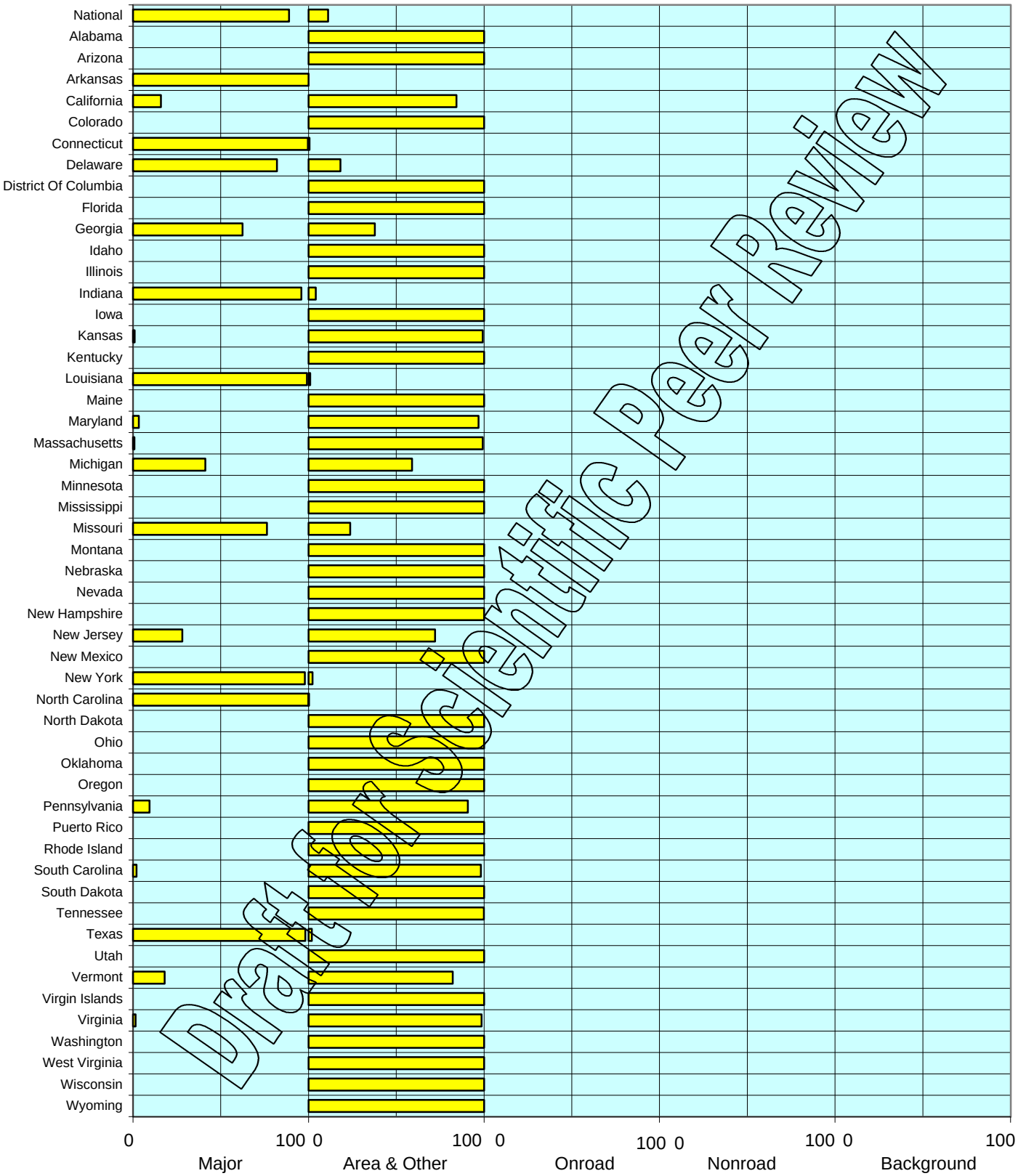
1996 Modeled Exposure Concentrations
Hydrazine - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Hydrazine - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



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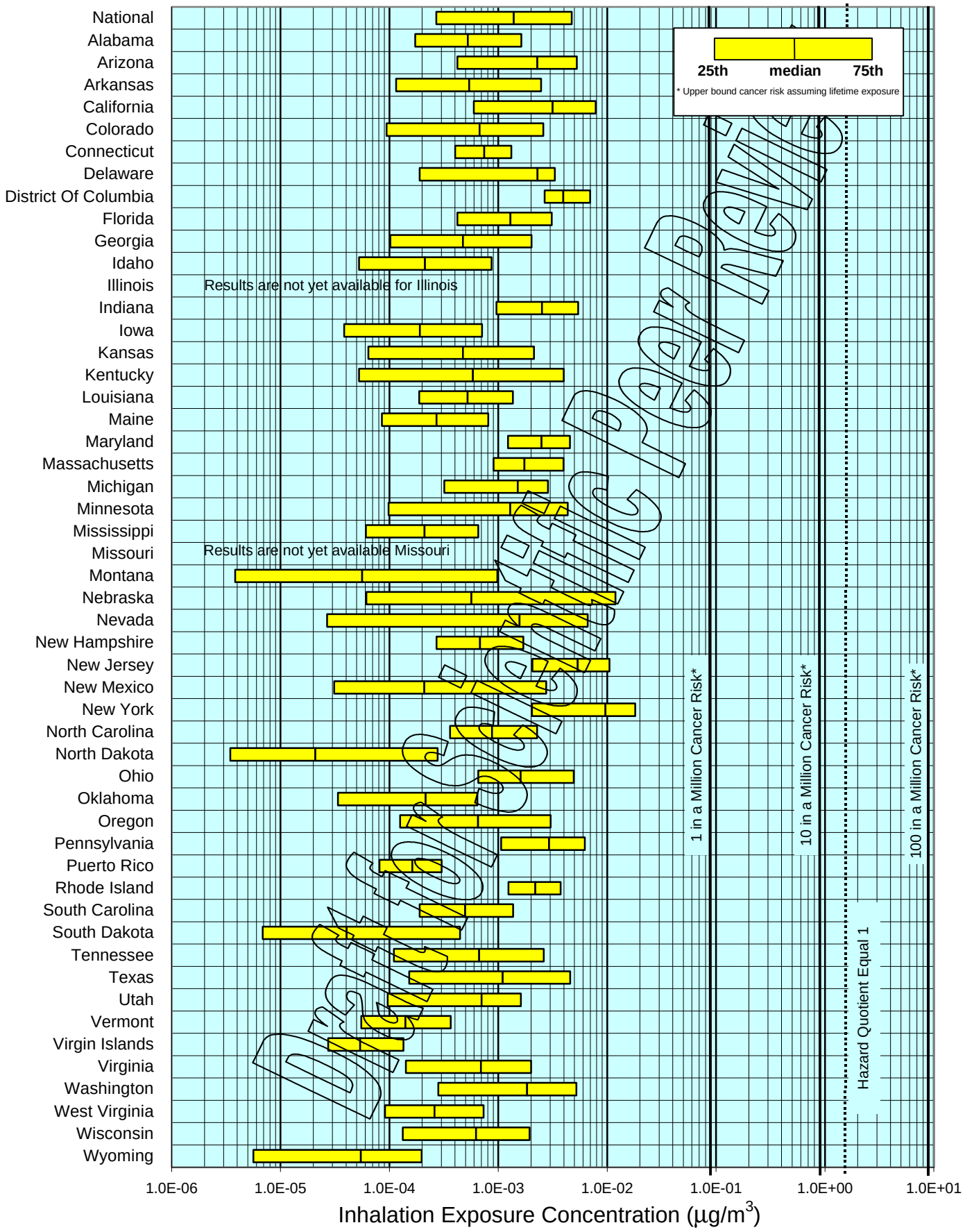
US EPA ARCHIVE DOCUMENT

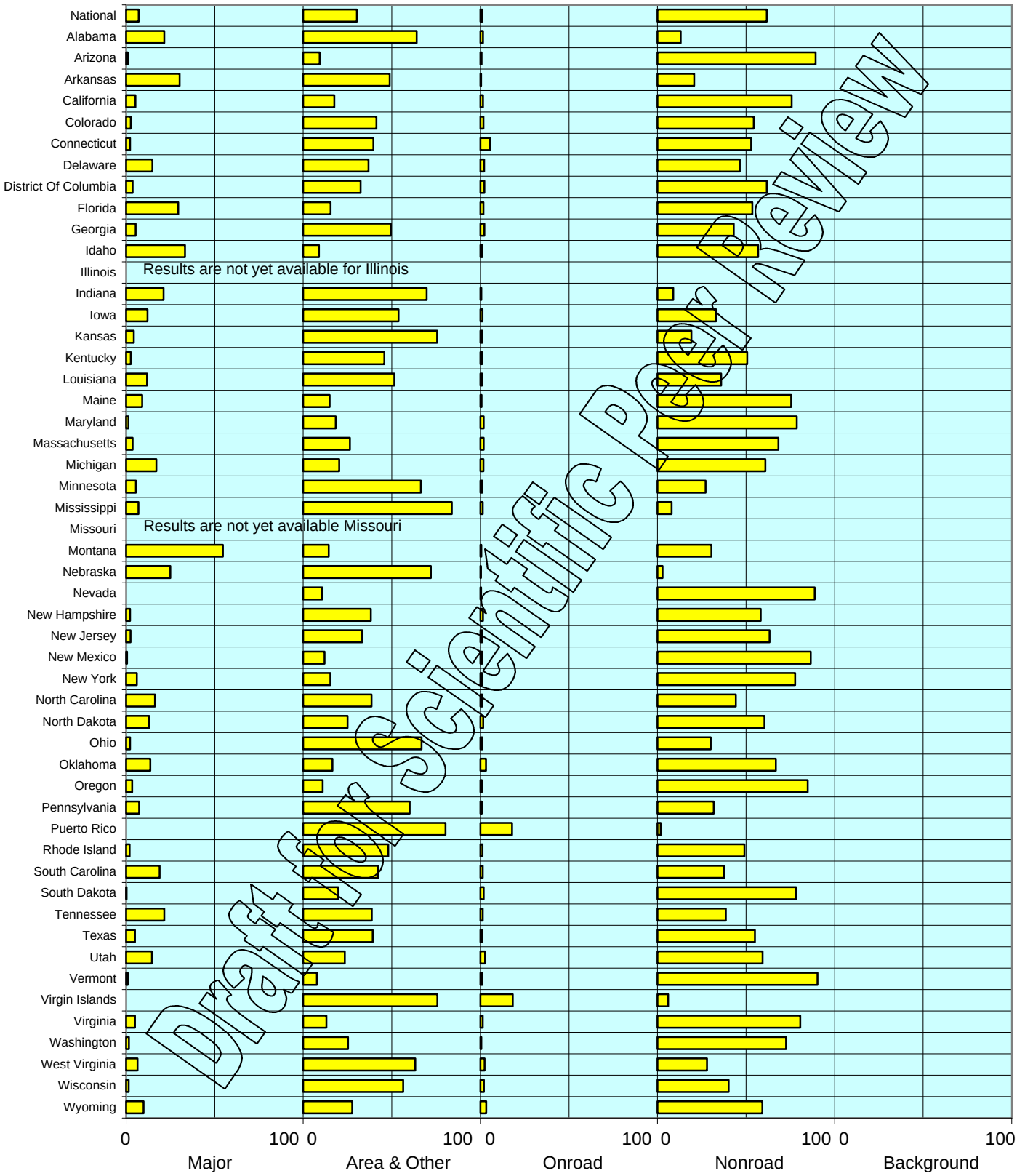
1996 Modeled Exposure Concentrations
Lead - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Lead - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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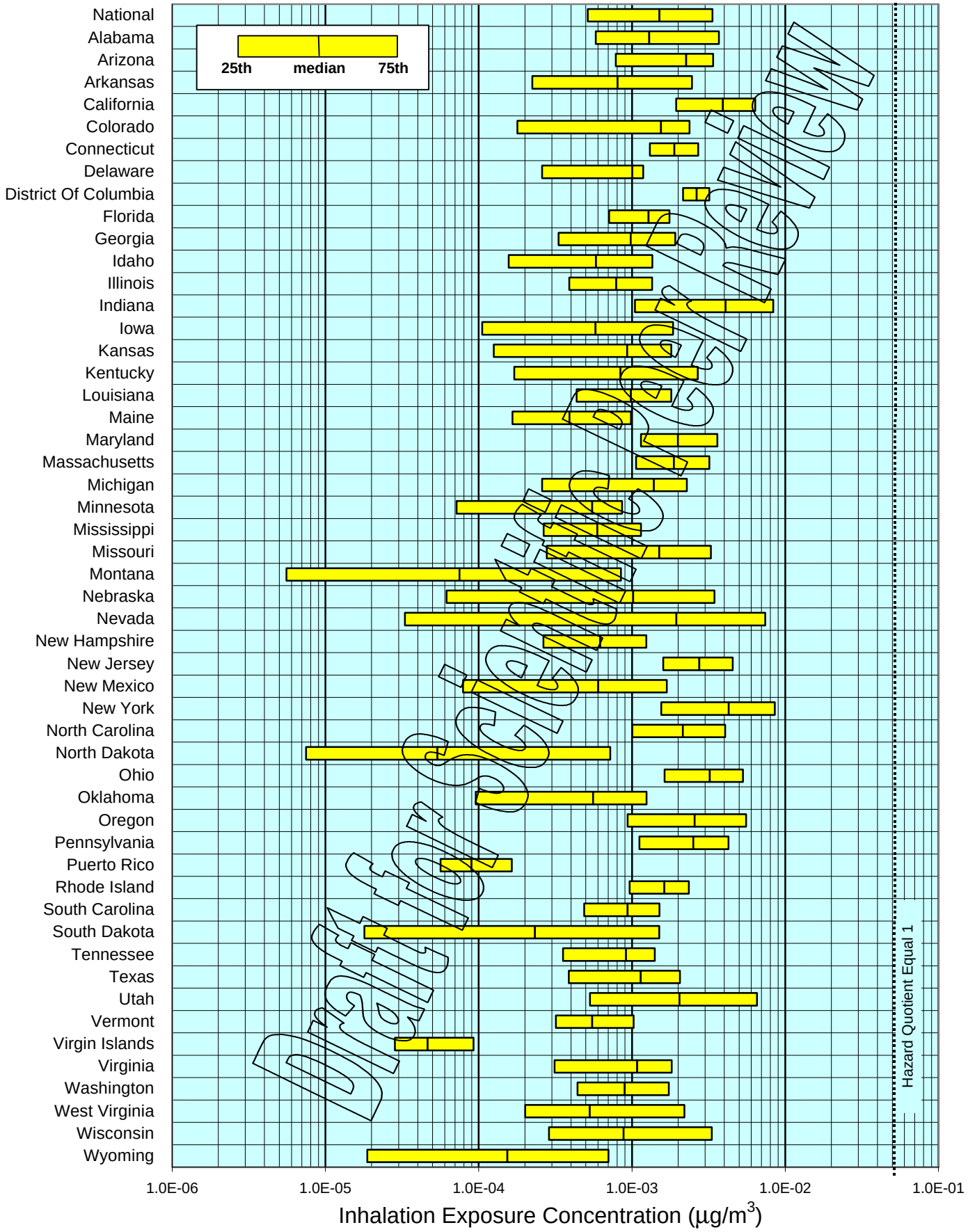
1996 Modeled Exposure Concentrations
Manganese - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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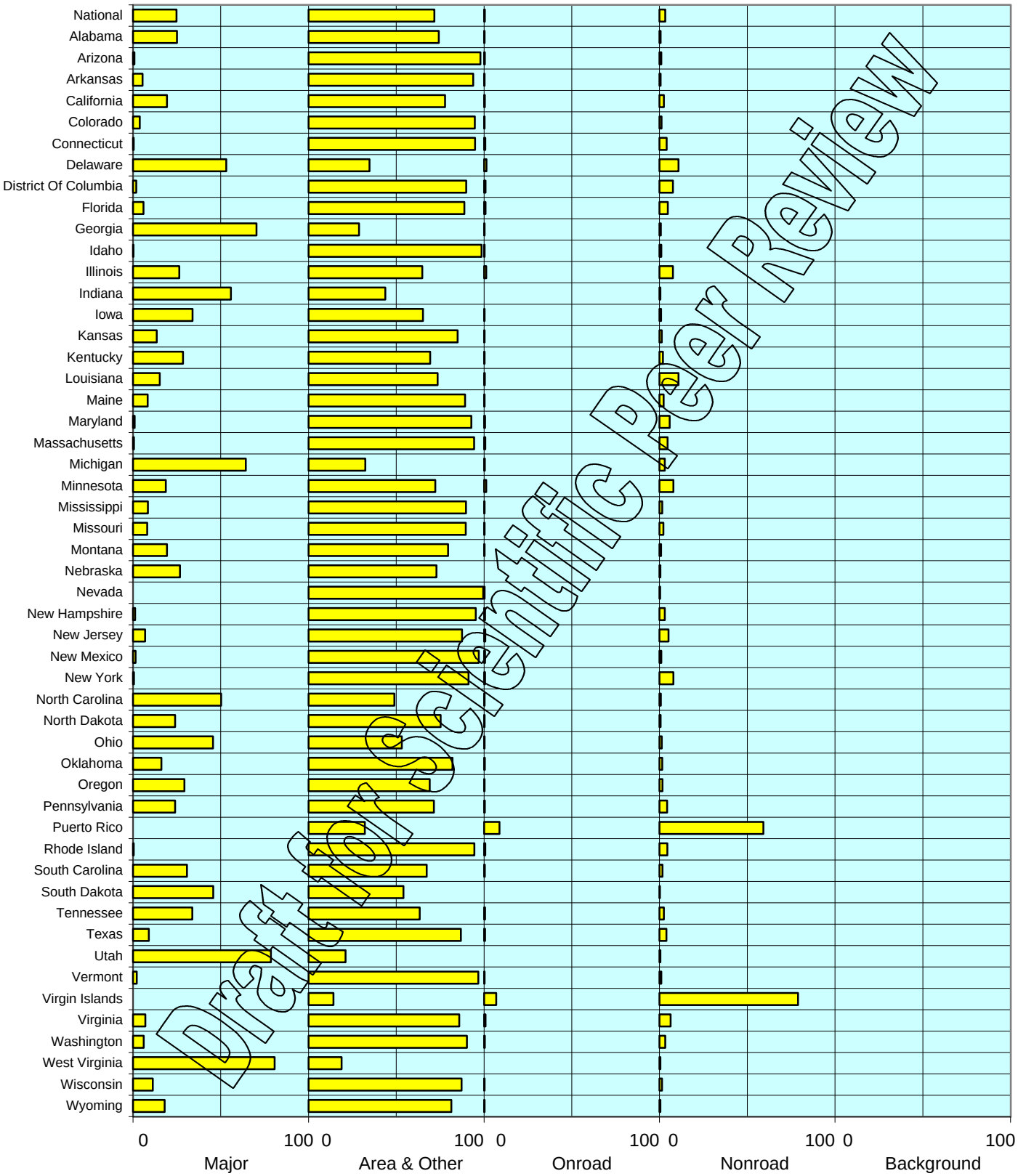
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Manganese - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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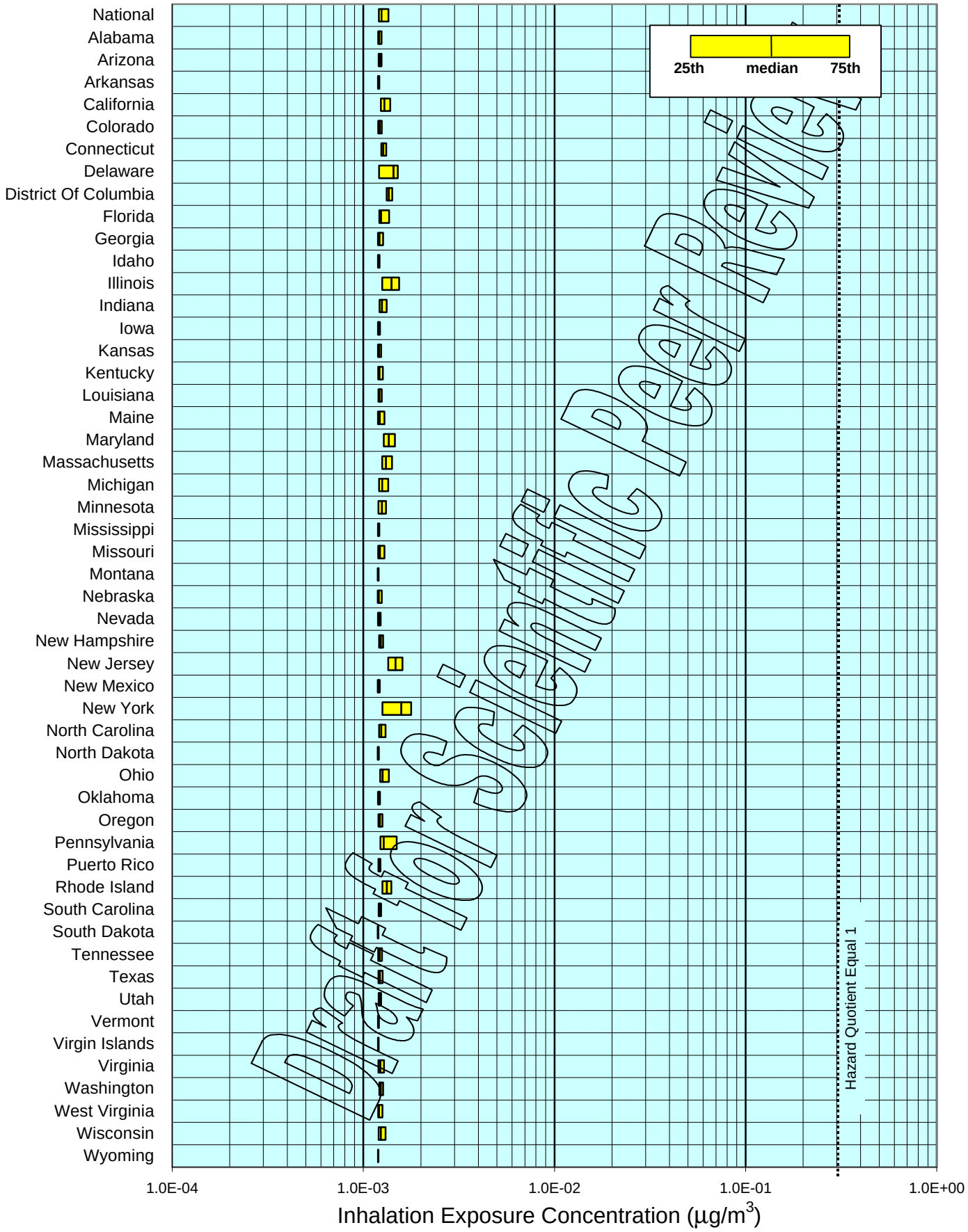
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Mercury - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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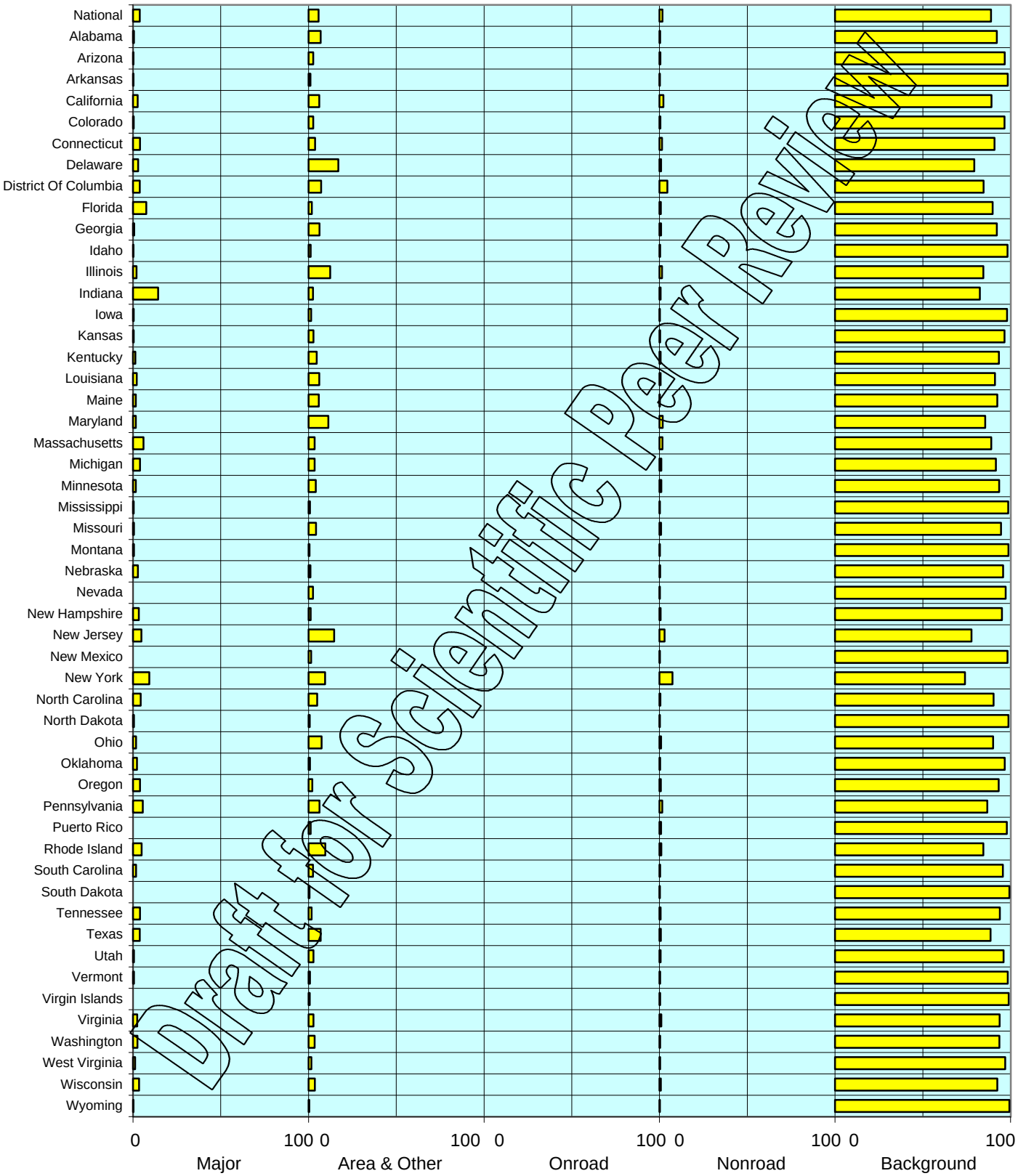
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Mercury - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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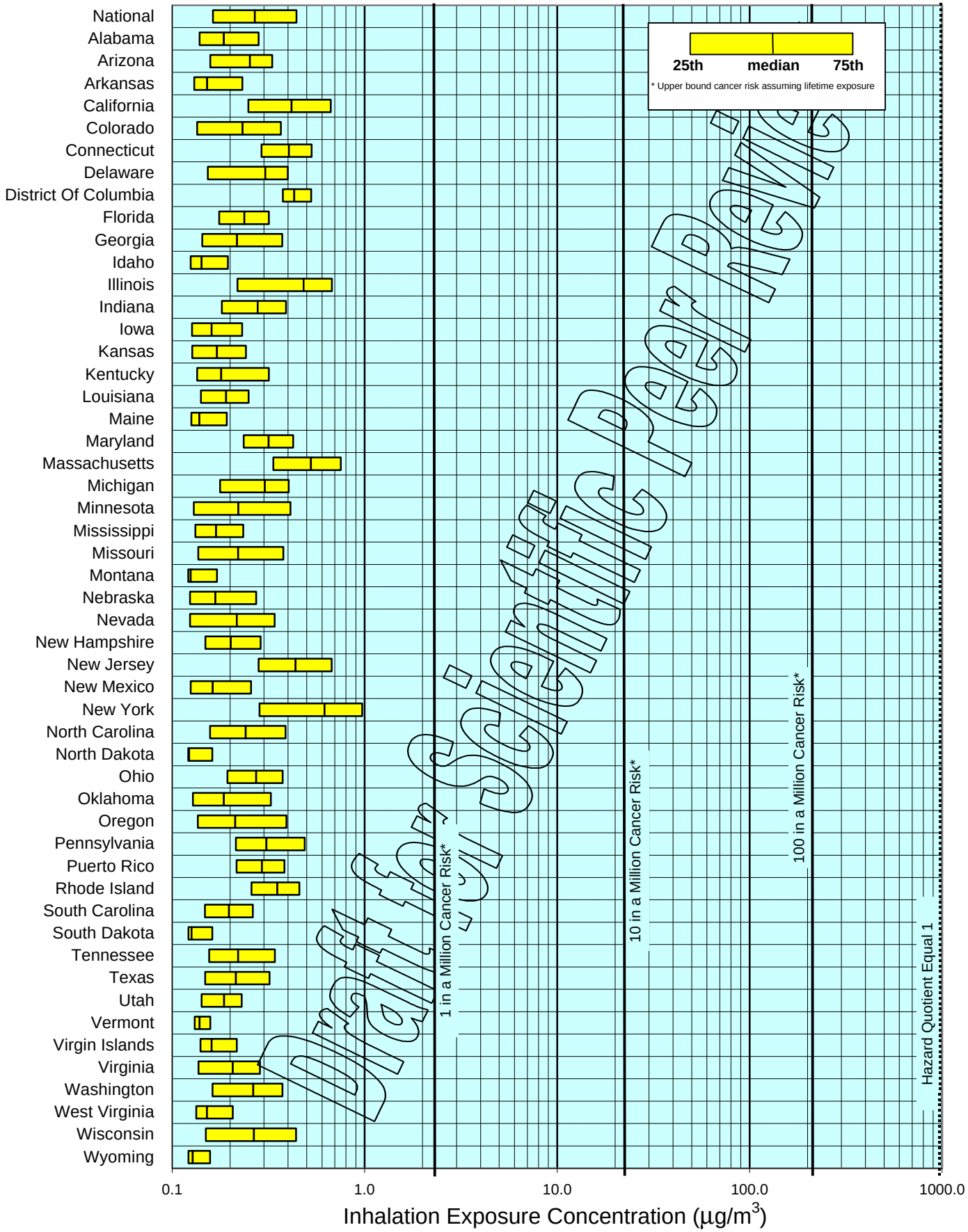
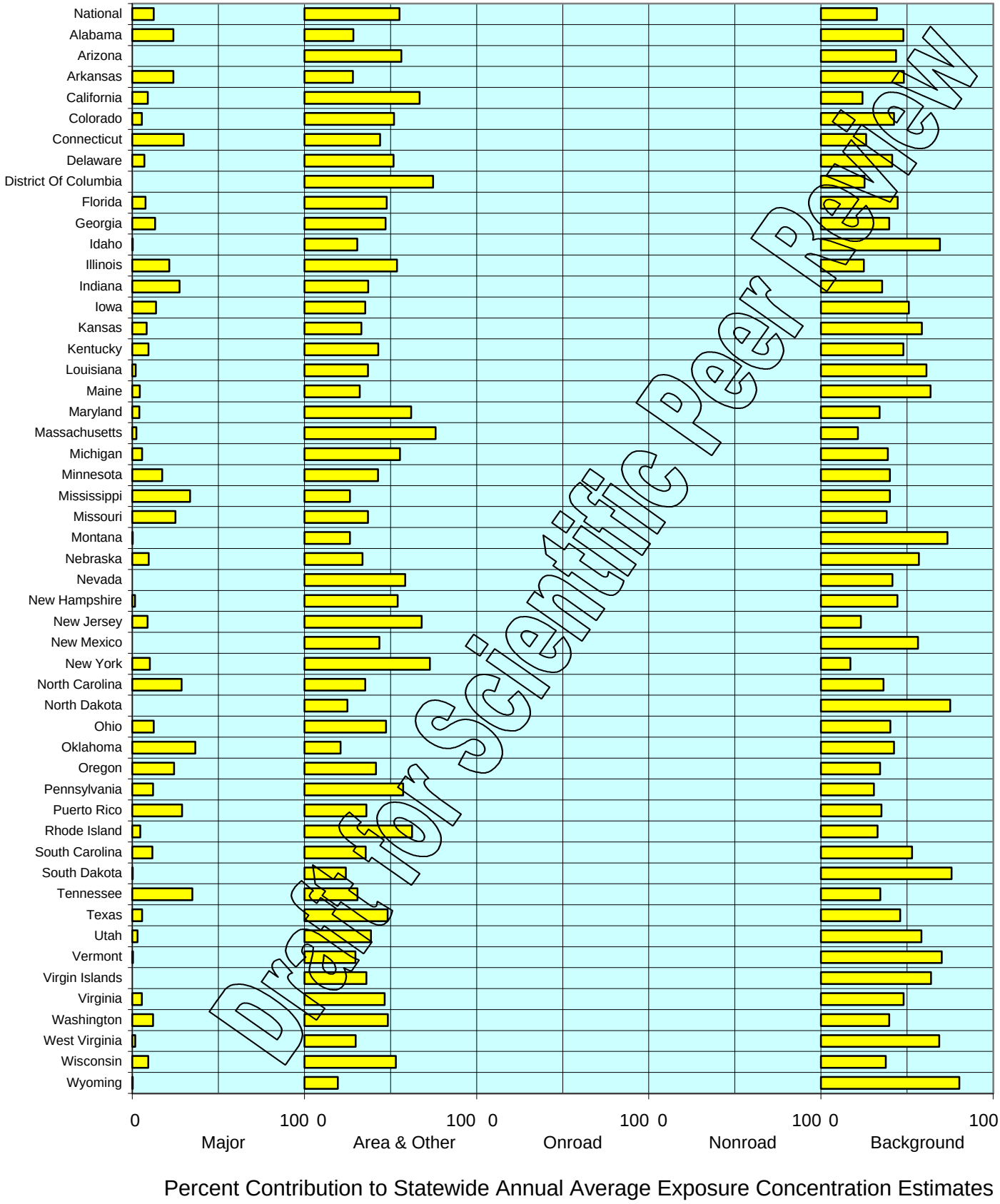
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Methylene Chloride - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Methylene Chloride - Statewide Source Sector Contribution Estimates
(For Limitations On The Use of These Data See Page 2)



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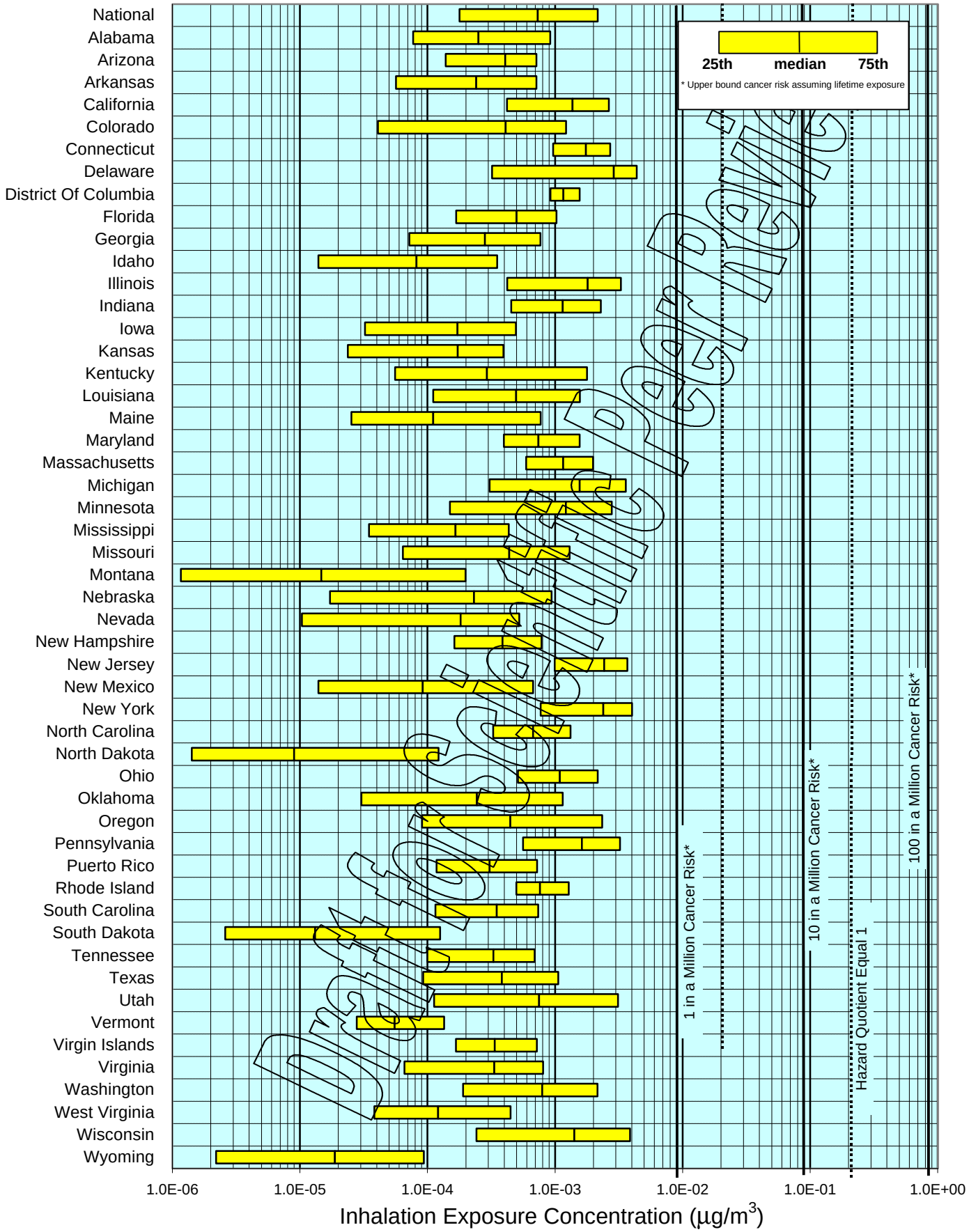
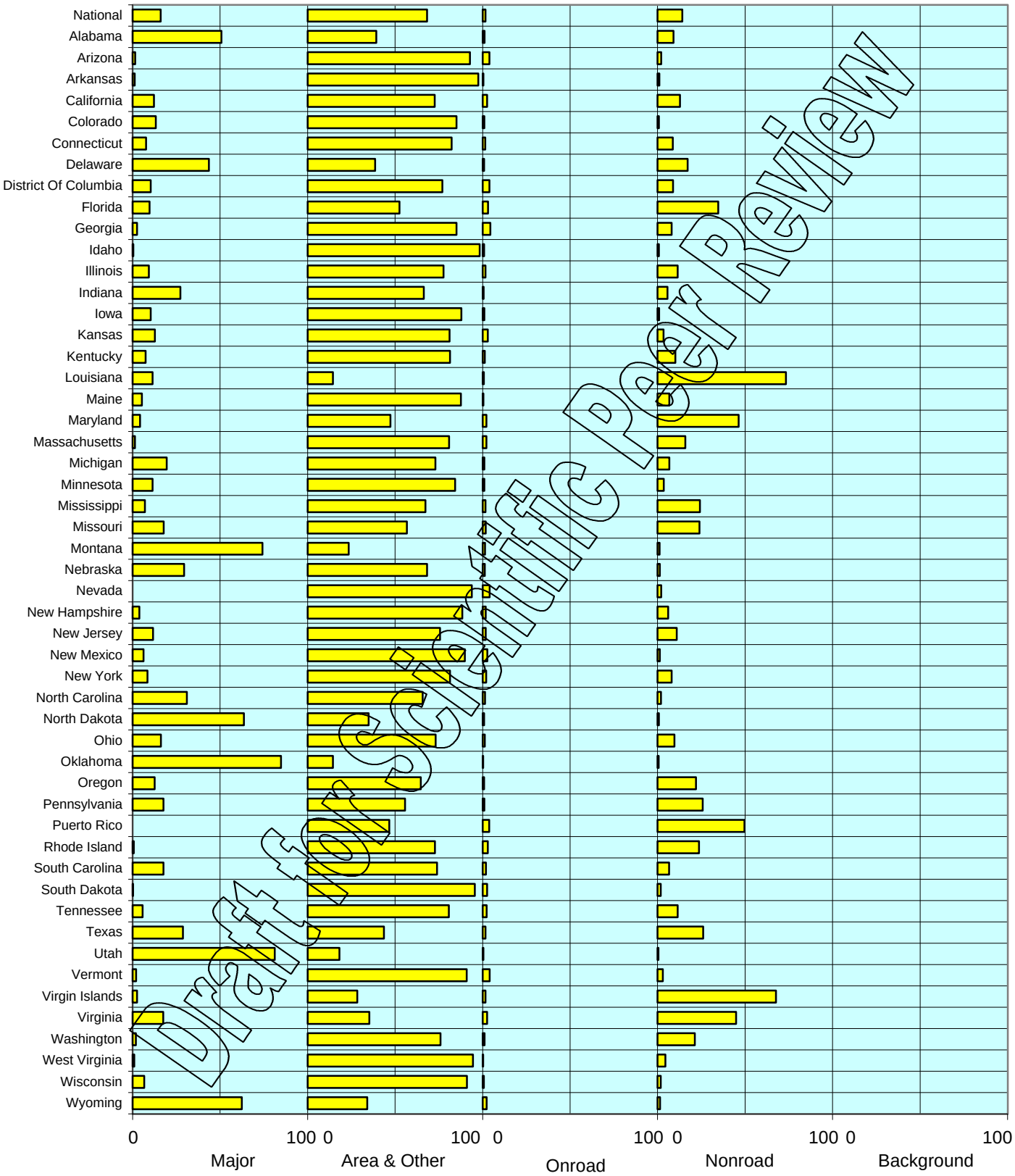
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Nickel - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Nickel - Statewide Source Sector Contribution Estimates
(For Limitations On The Use of These Data See Page 2)



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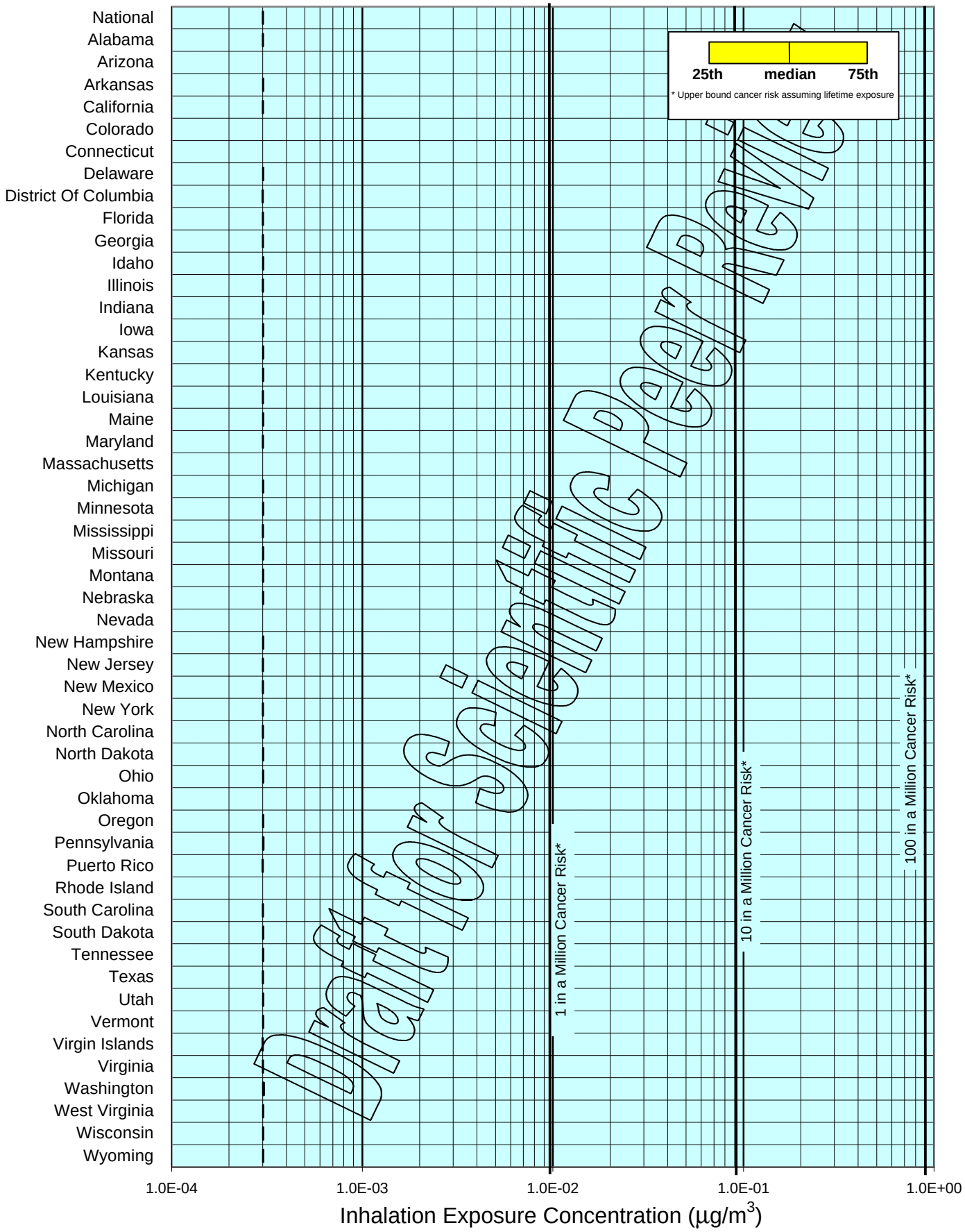
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
PCBs - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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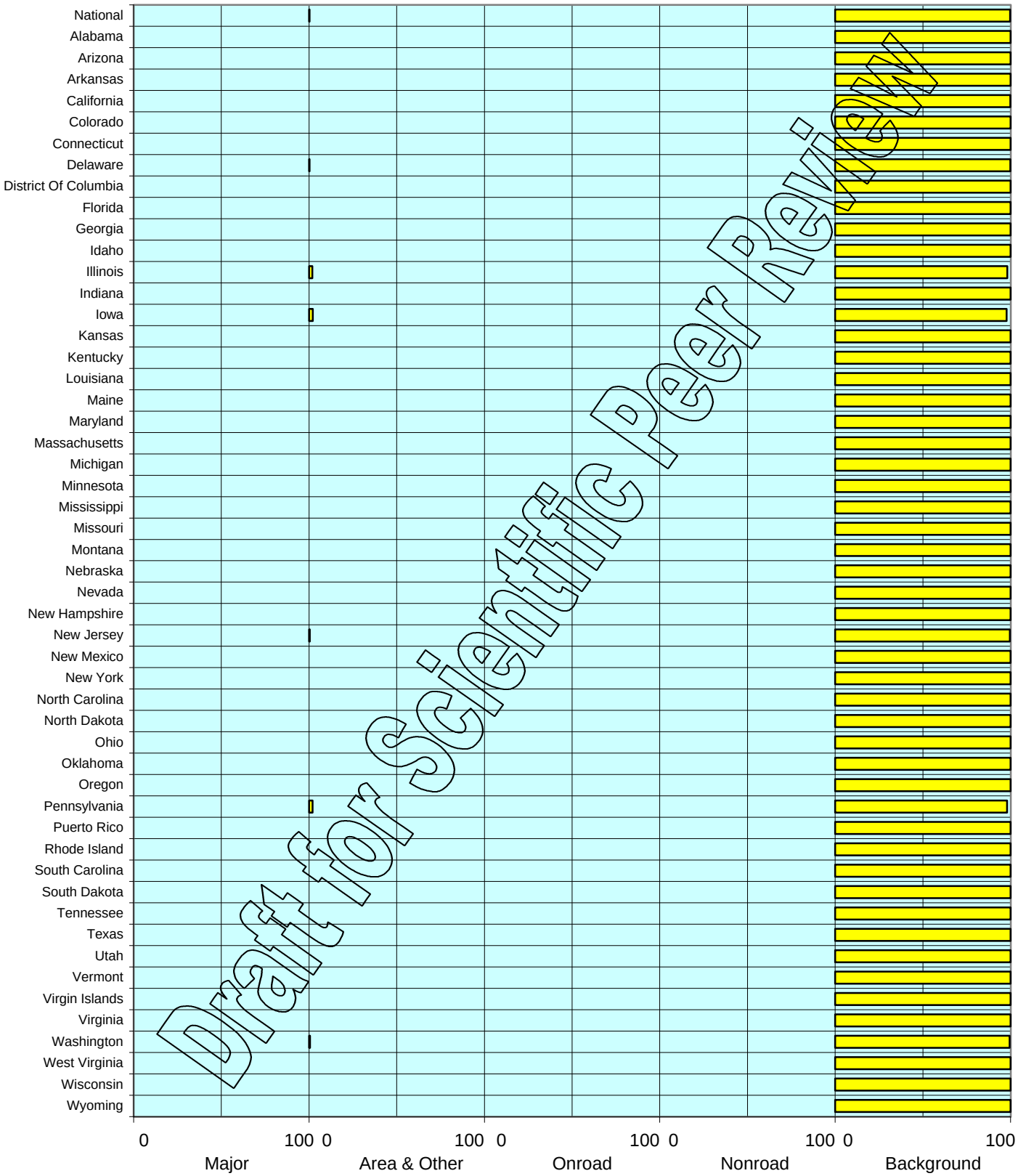
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
PCBs - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



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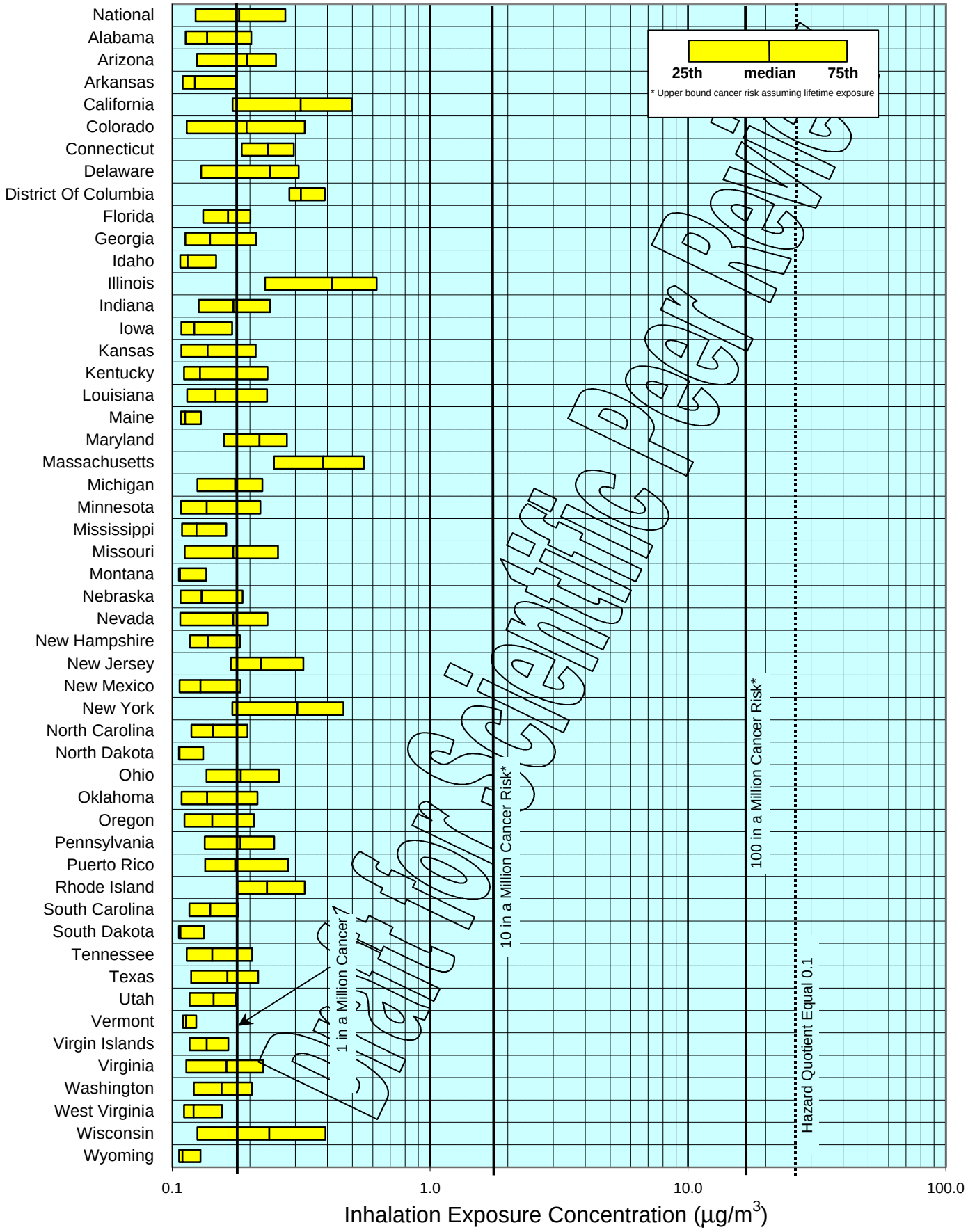
US EPA ARCHIVE DOCUMENT

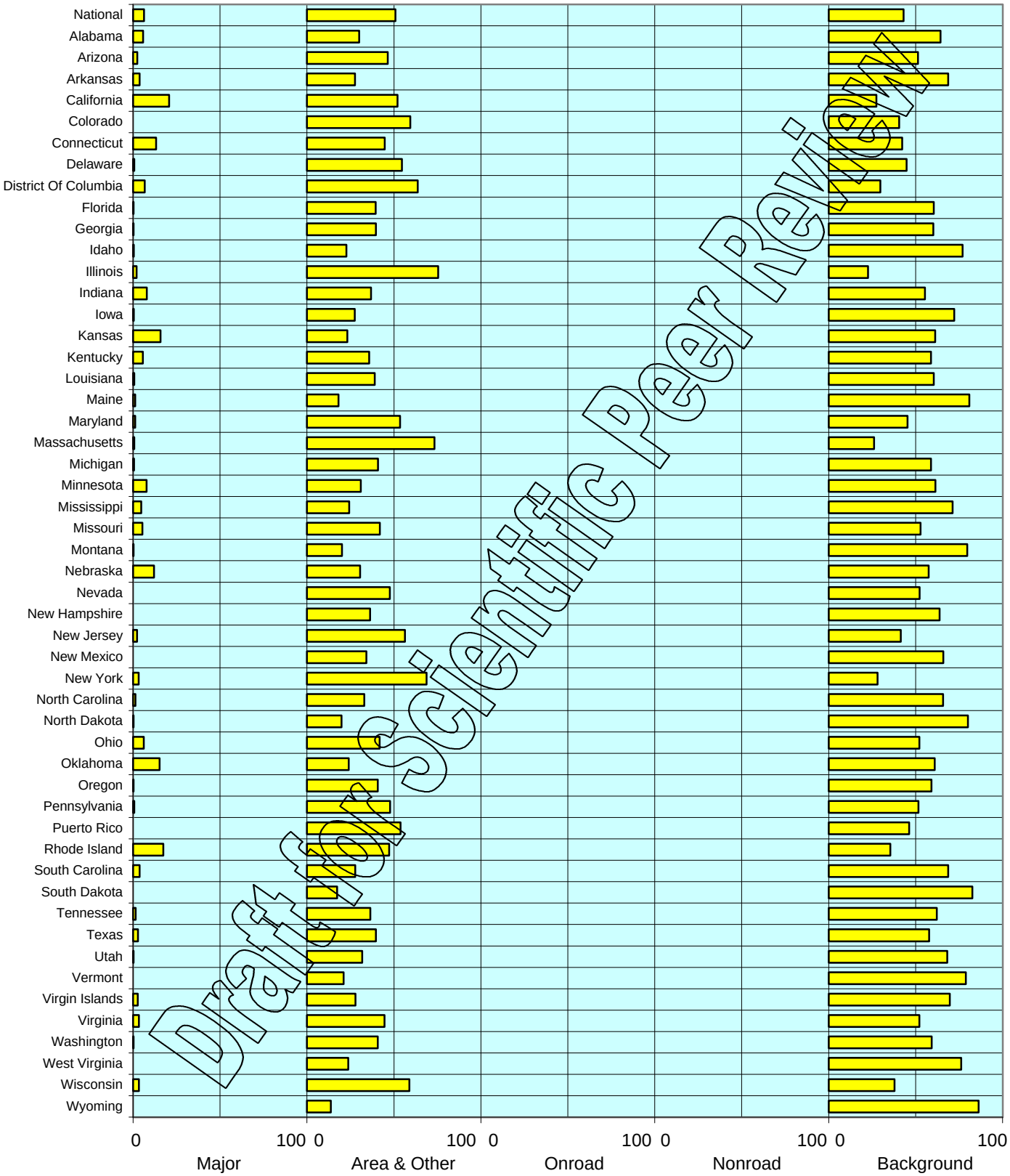
1996 Modeled Exposure Concentrations
Perchloroethylene - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Perchloroethylene - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



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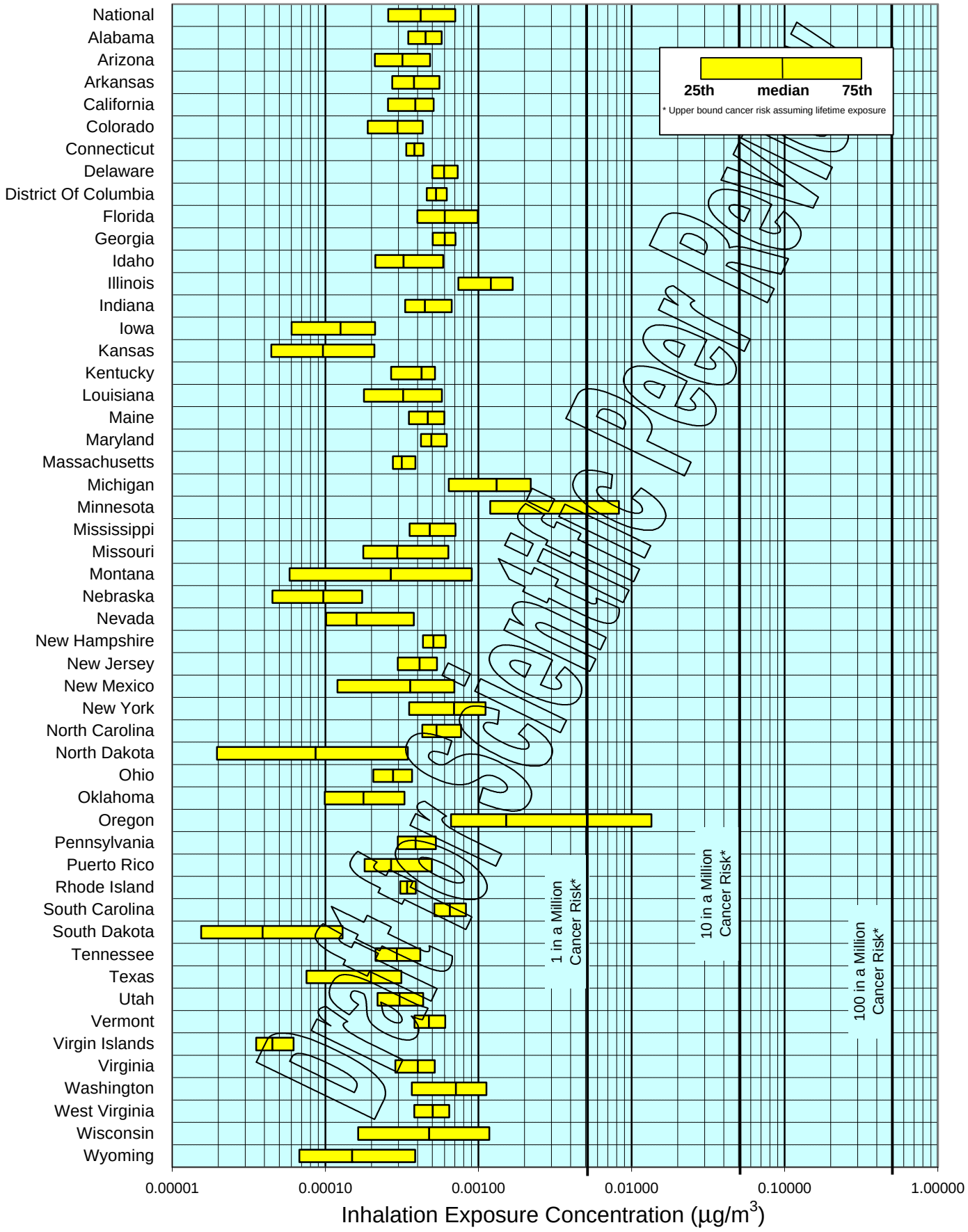
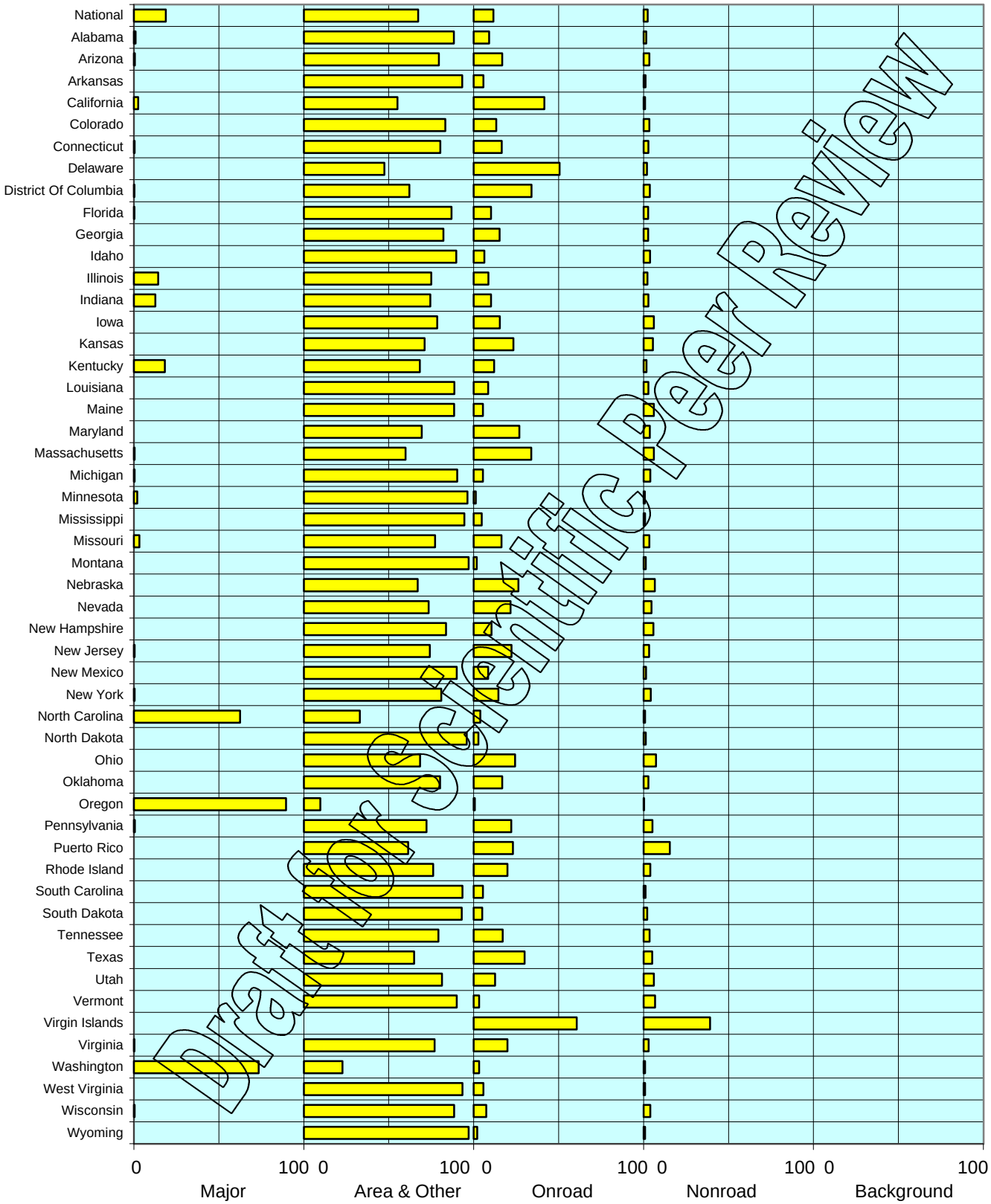
1996 Modeled Exposure Concentrations
POM (7-PAH) - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
POM (7-PAH) - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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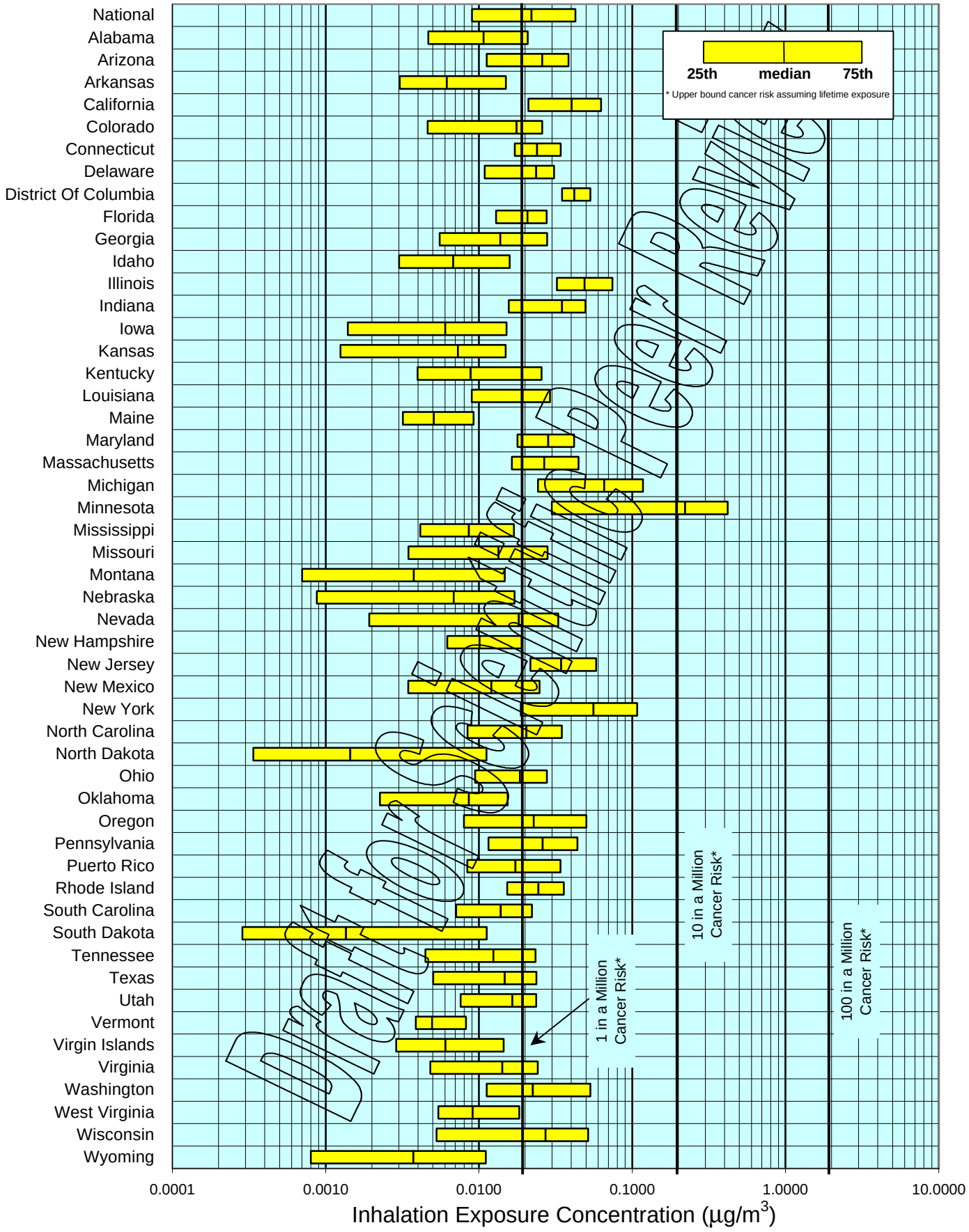
1996 Modeled Exposure Concentrations
POM (total) - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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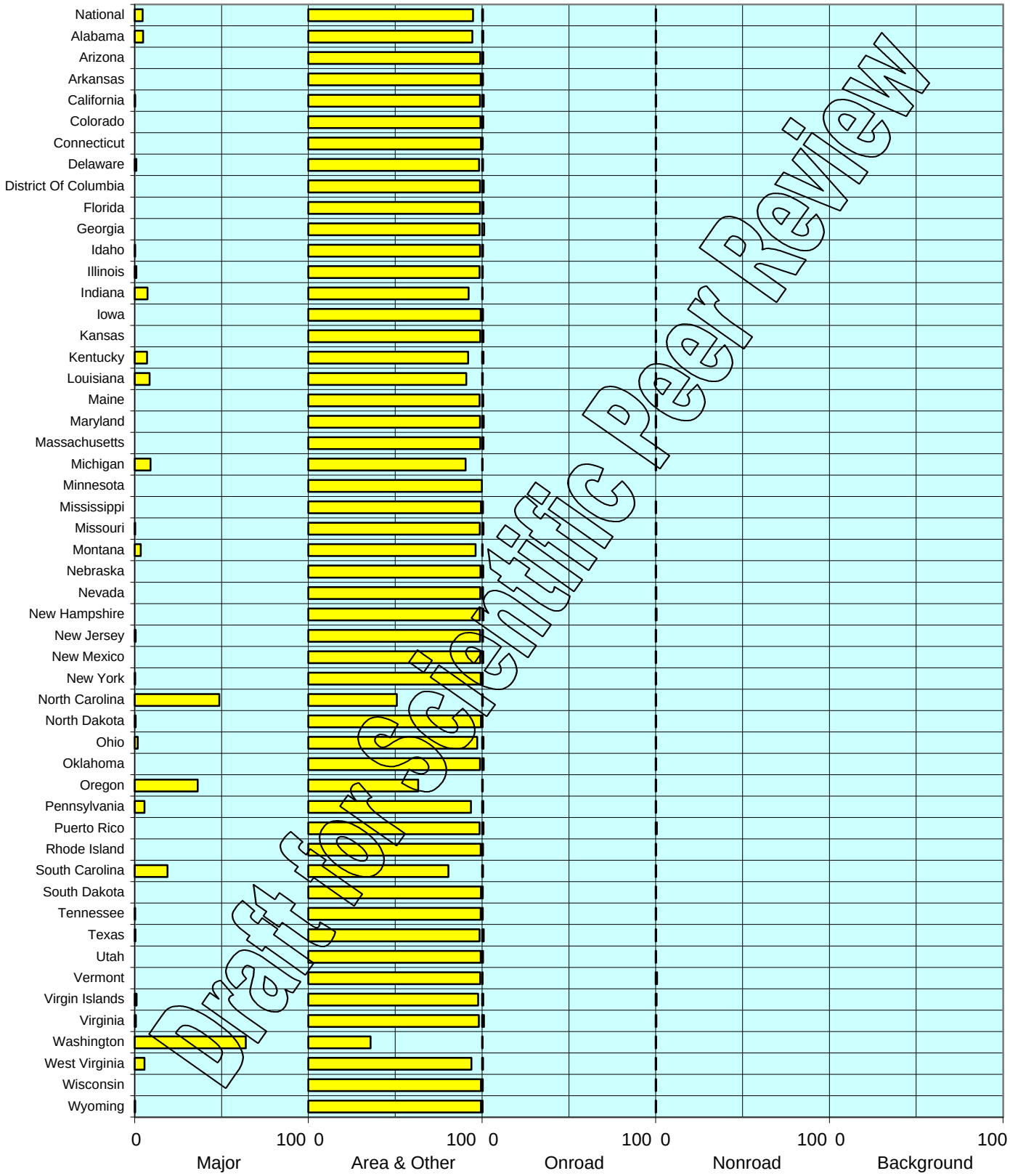
US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
POM (total) - Statewide Source Sector Contribution Estimates
(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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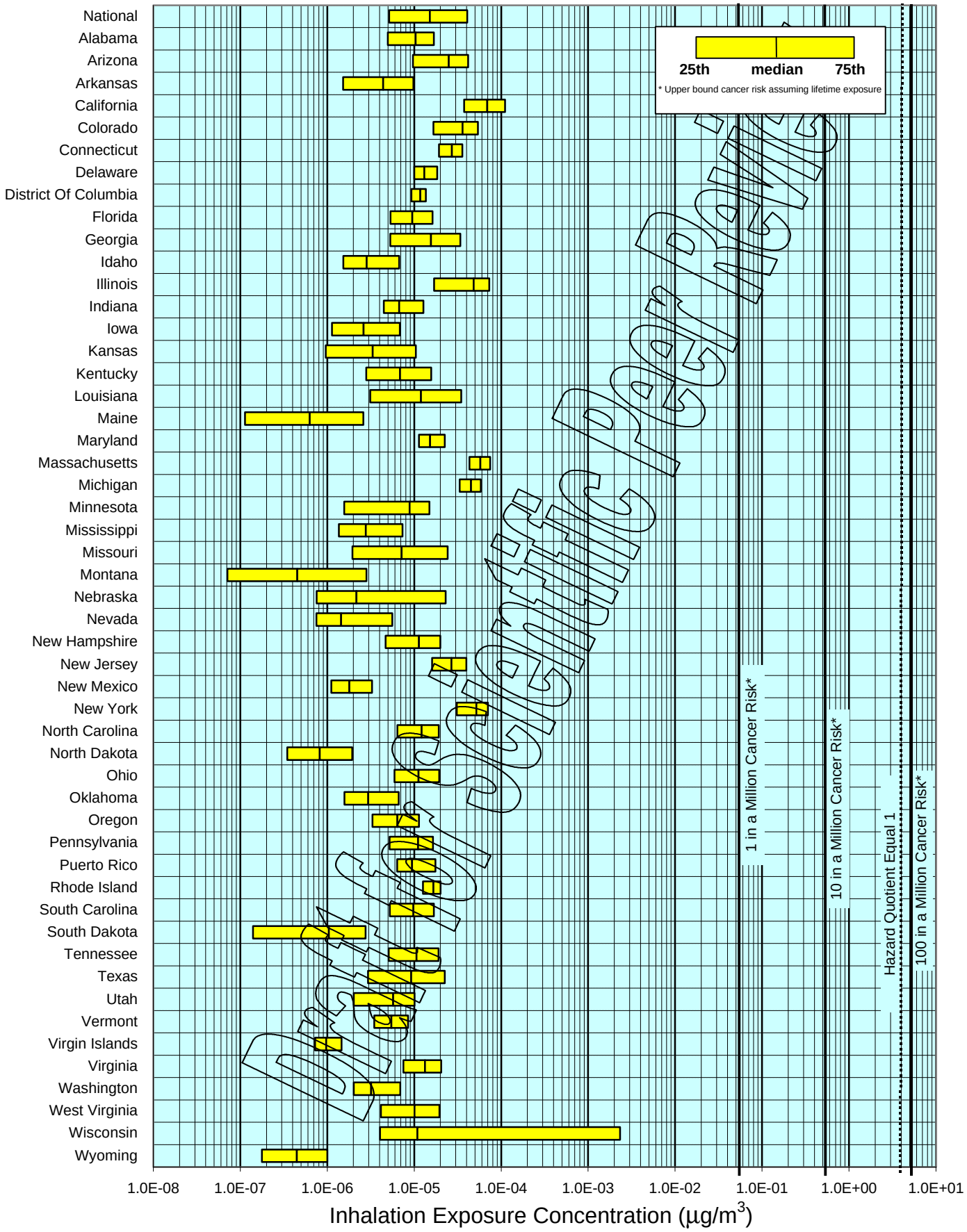
US EPA ARCHIVE DOCUMENT

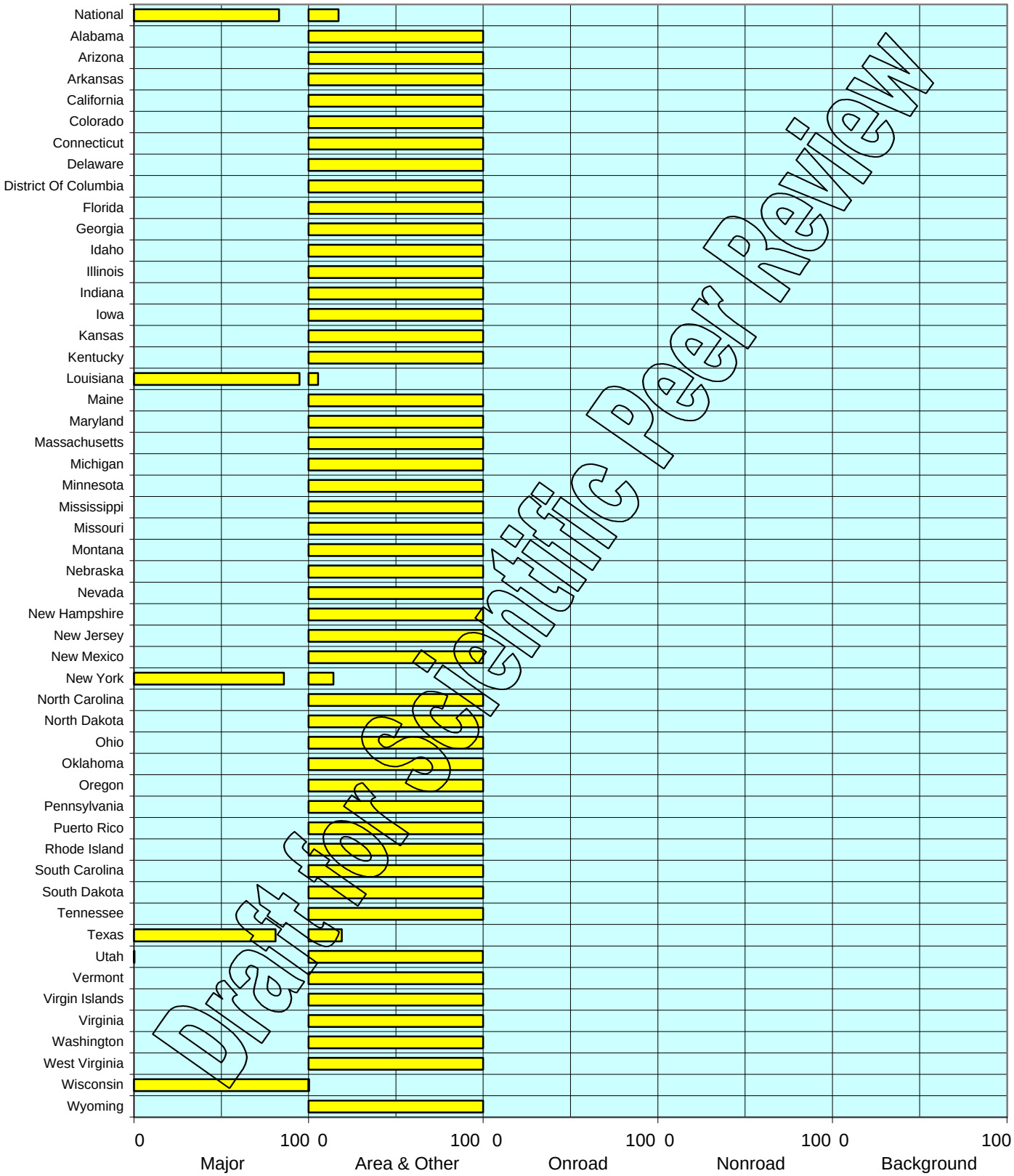
1996 Modeled Exposure Concentrations
Propylene Dichloride - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Propylene Dichloride - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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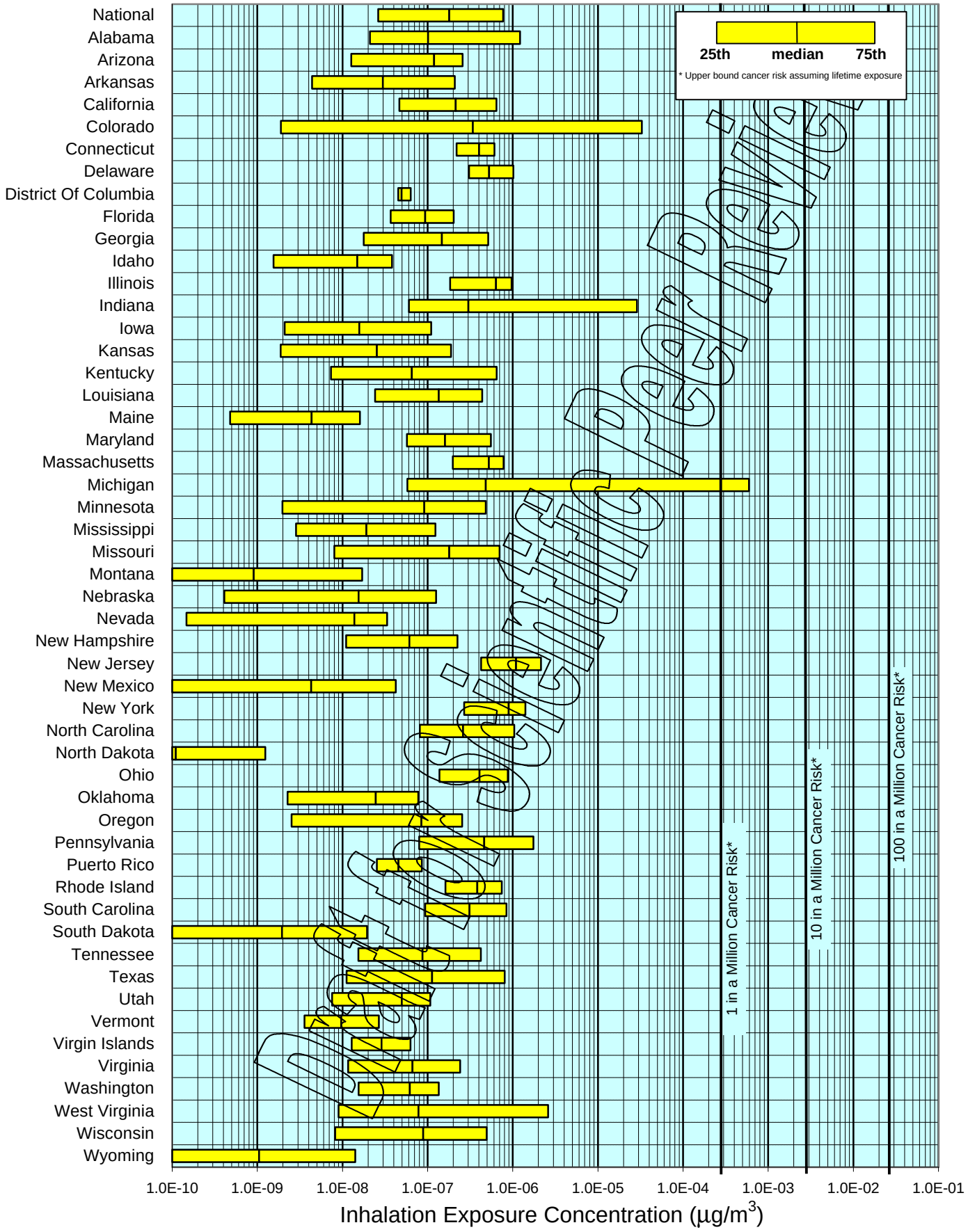
1996 Modeled Exposure Concentrations
Quinoline - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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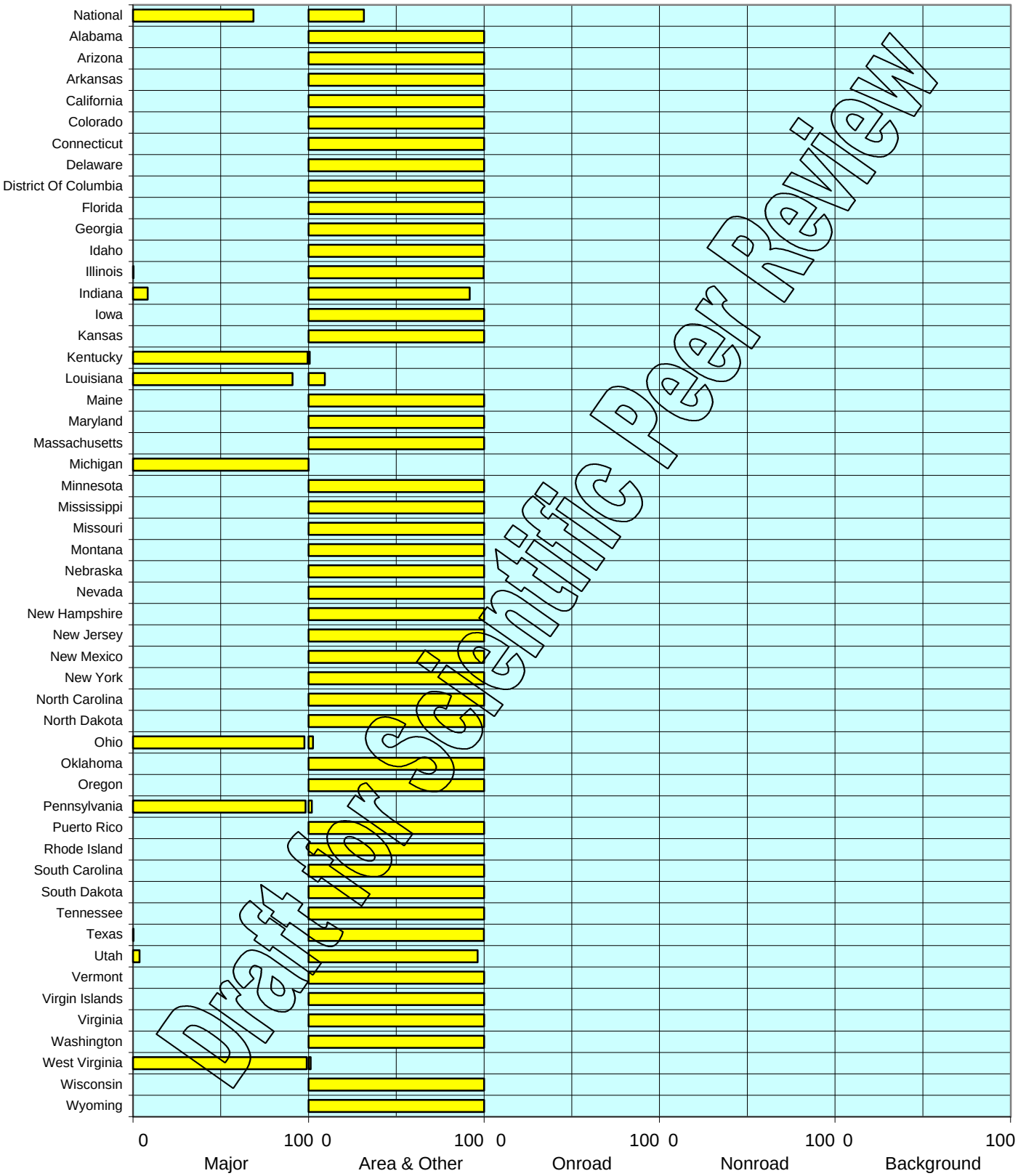
1996 Modeled Exposure Concentrations
Quinoline - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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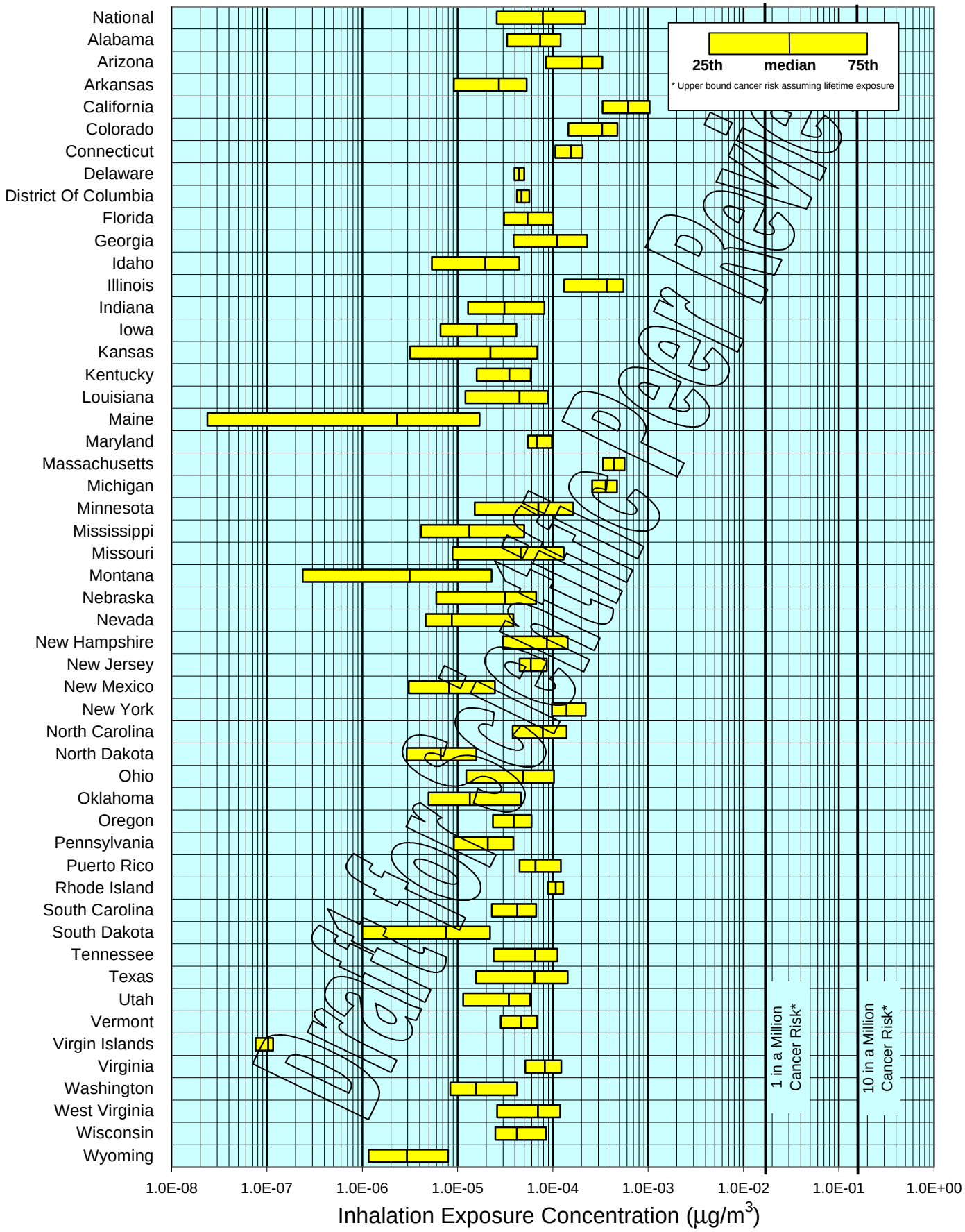
1996 Modeled Exposure Concentrations
1,1,2,2-TCA - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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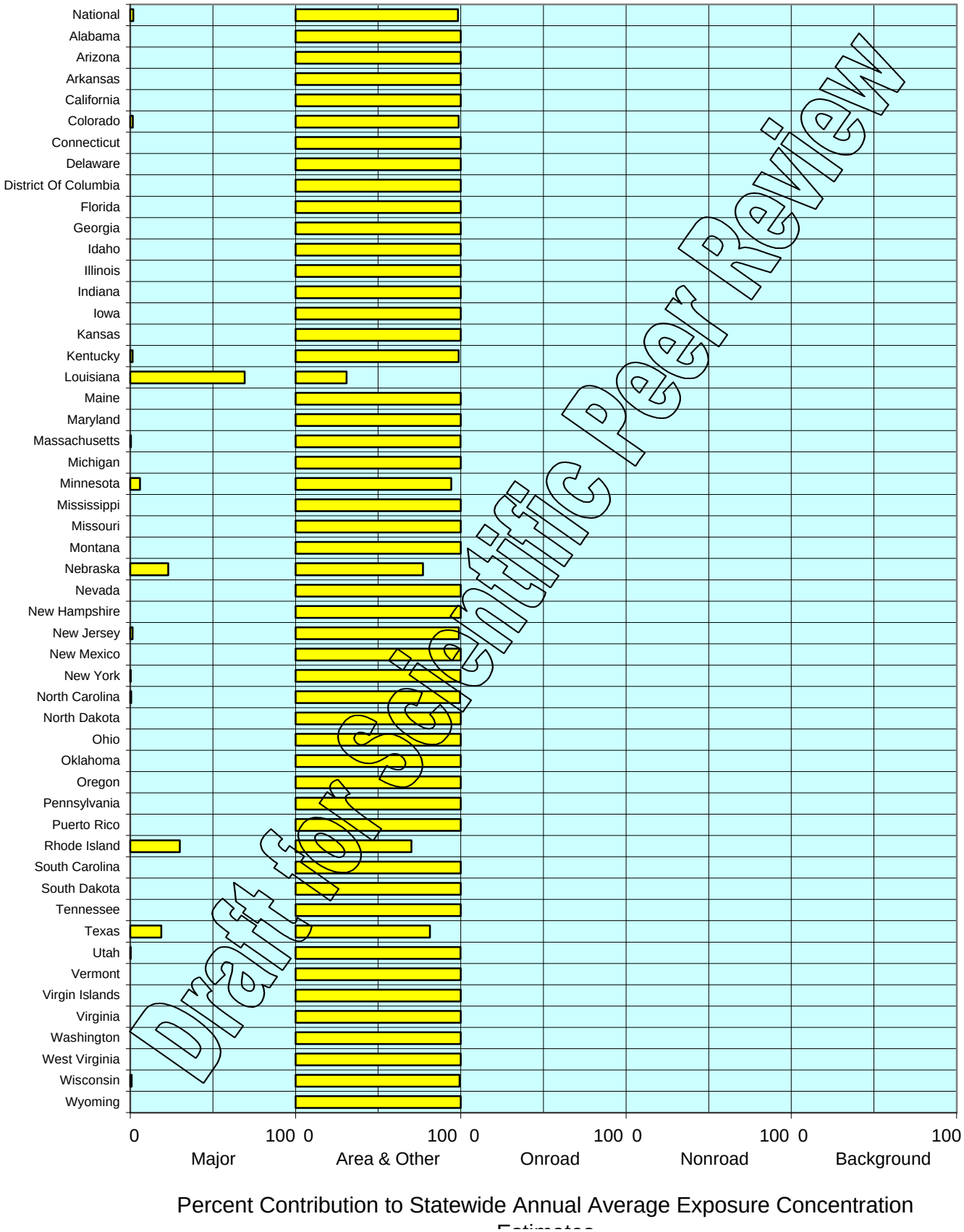
1996 Modeled Exposure Concentrations
1,1,2,2-TCA - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



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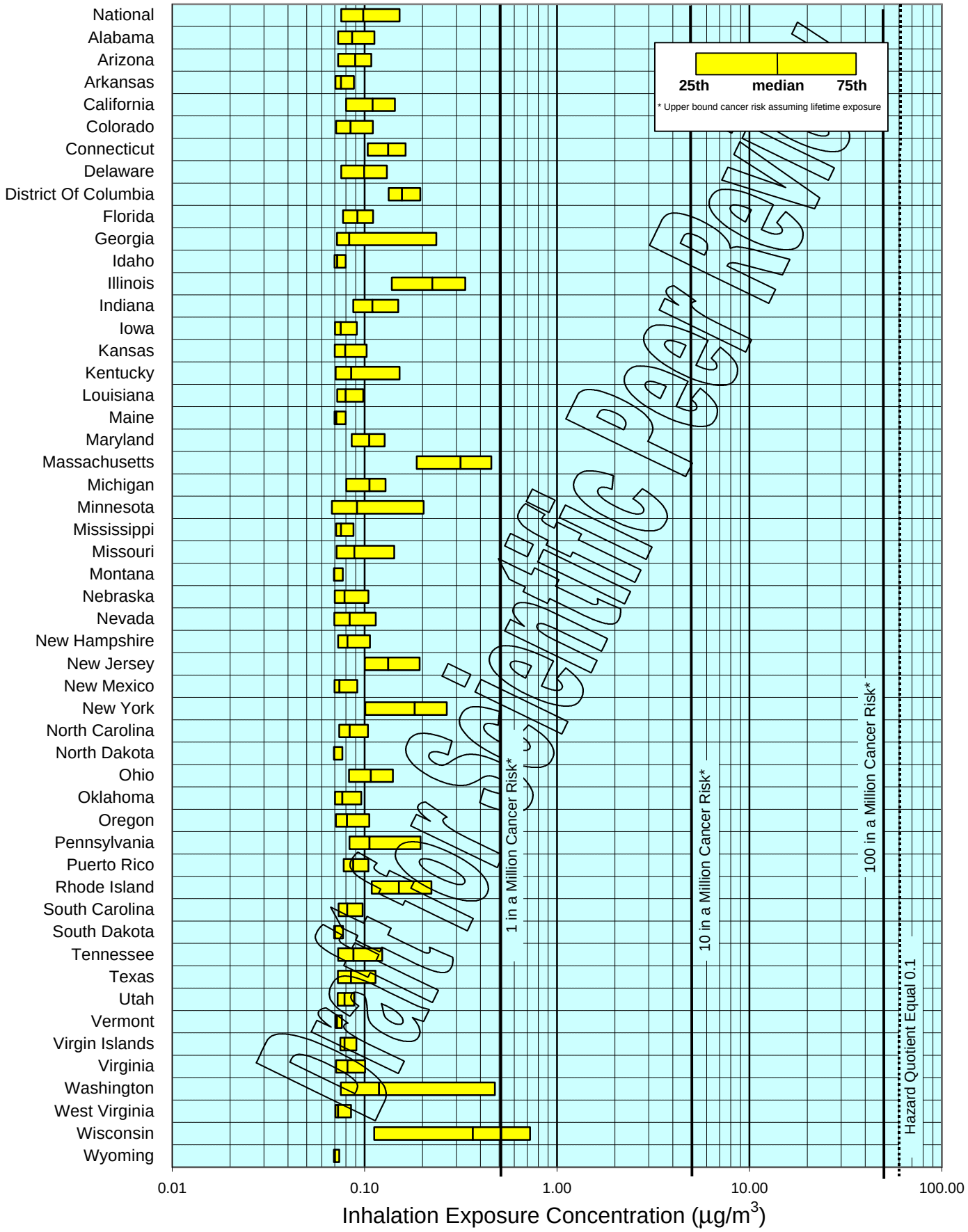
1996 Modeled Exposure Concentrations
Trichloroethylene - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



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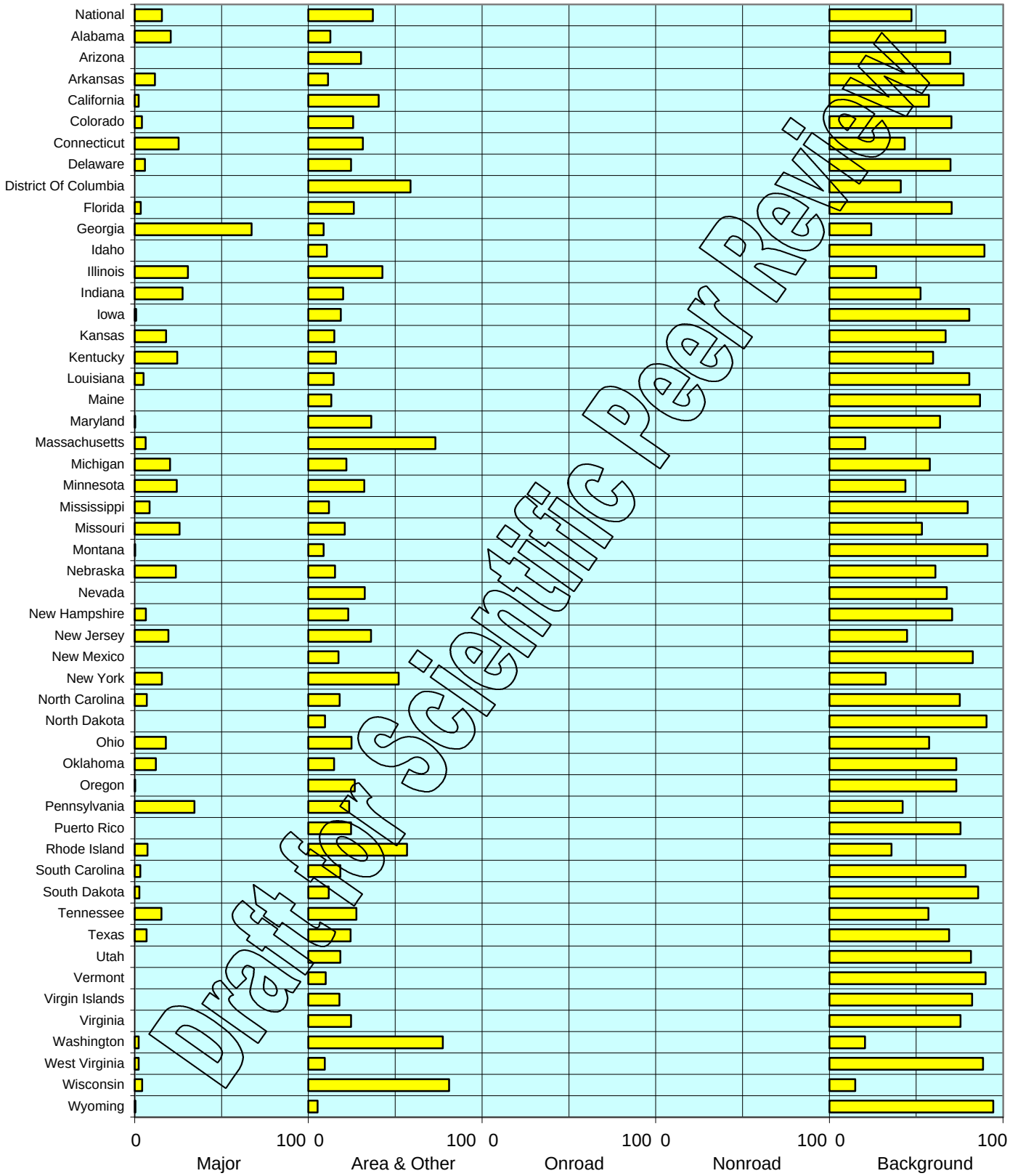
1996 Modeled Exposure Concentrations
Trichloroethylene - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



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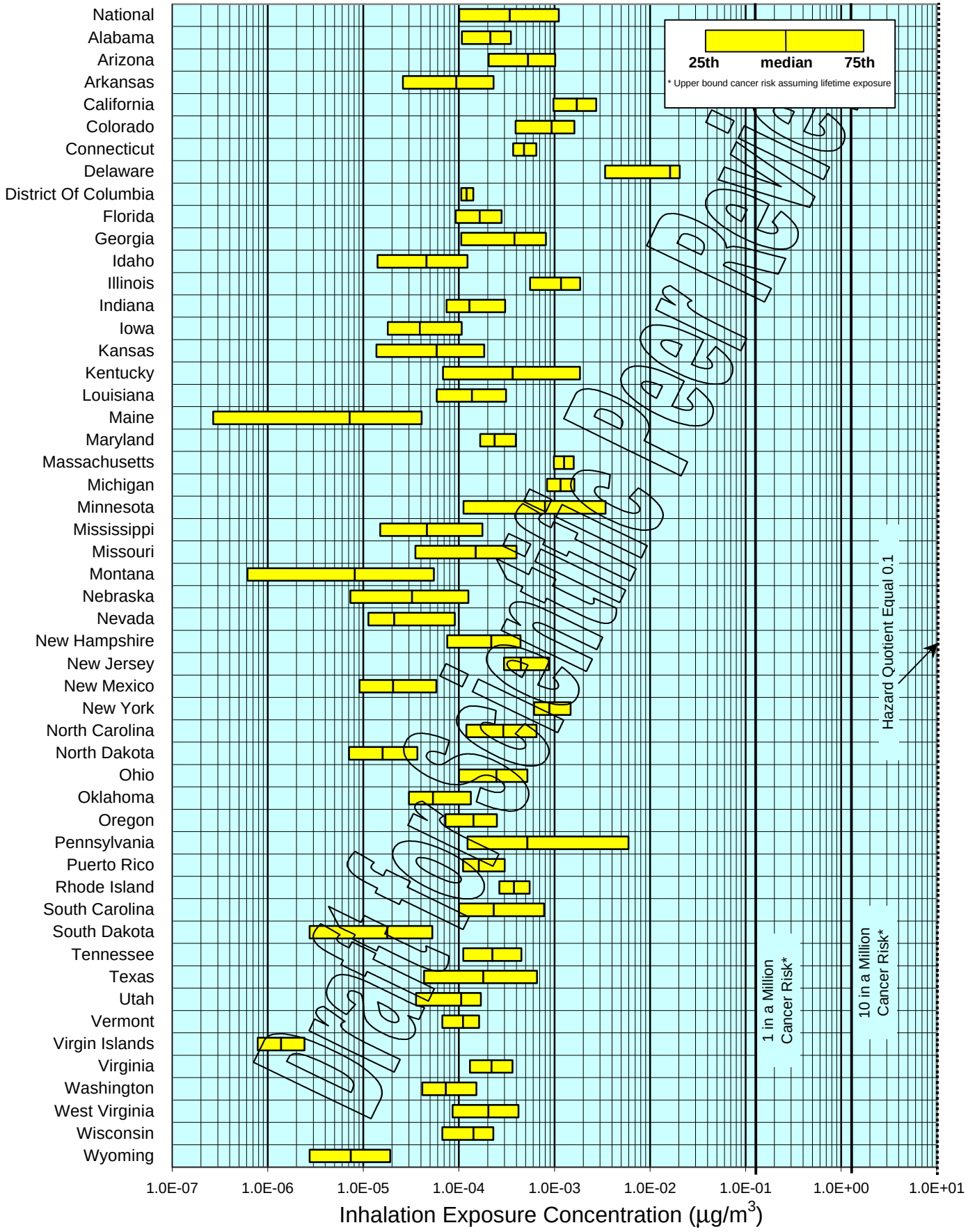
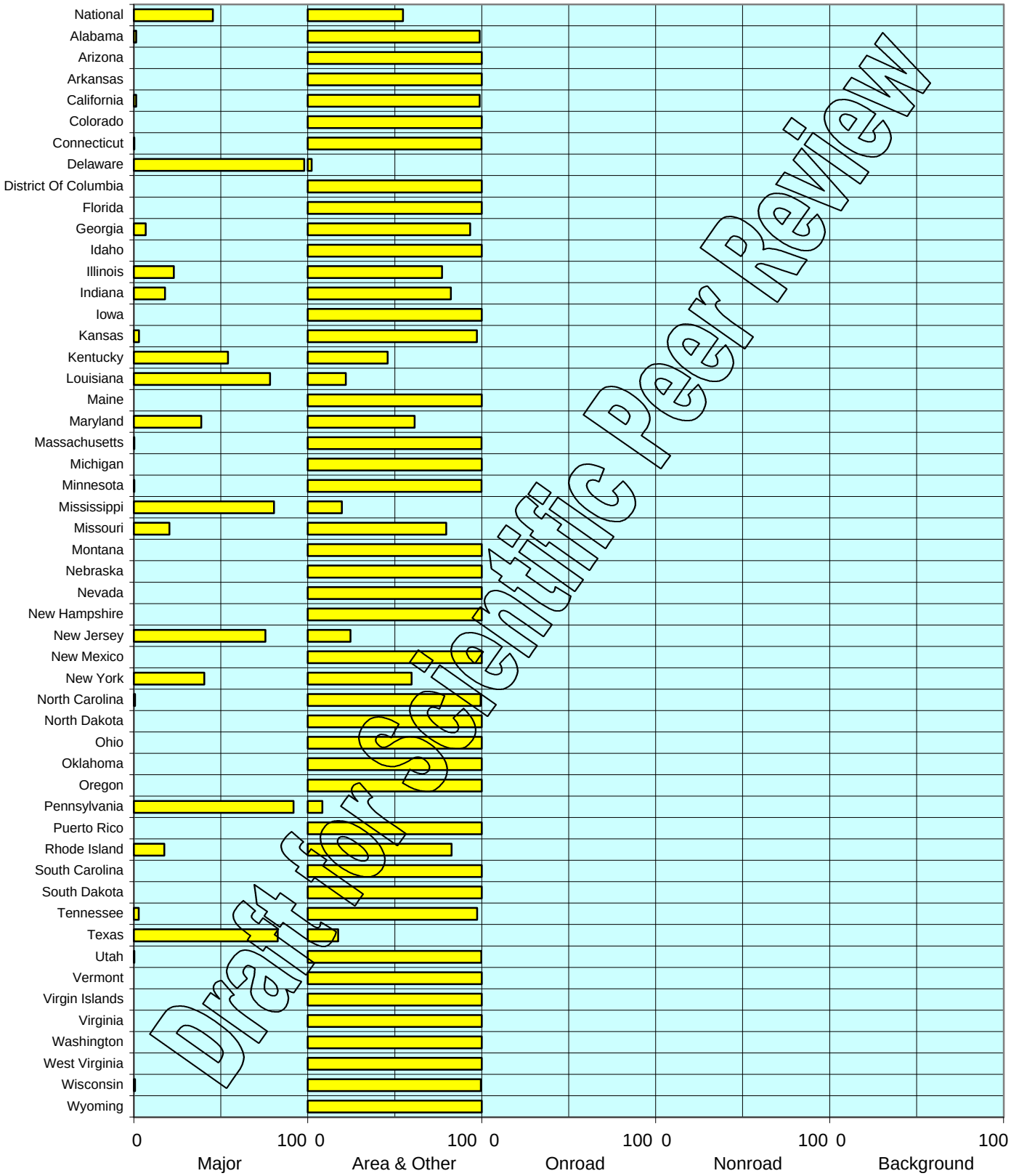
1996 Modeled Exposure Concentrations
Vinyl Chloride - Statewide Concentration Distribution Estimates
(For Limitations On The Use of These Data See Page 2)



US EPA ARCHIVE DOCUMENT

1996 Modeled Exposure Concentrations
Vinyl Chloride - Statewide Source Sector Contribution Estimates

(For Limitations On The Use of These Data See Page 2)



Percent Contribution to Statewide Annual Average Exposure Concentration Estimates

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State Summary Exposure Concentration Estimate Charts

(Charts presented in alphabetical order by state)

(The "Page 2" referred to on each chart has been provided at end of the appendix.)

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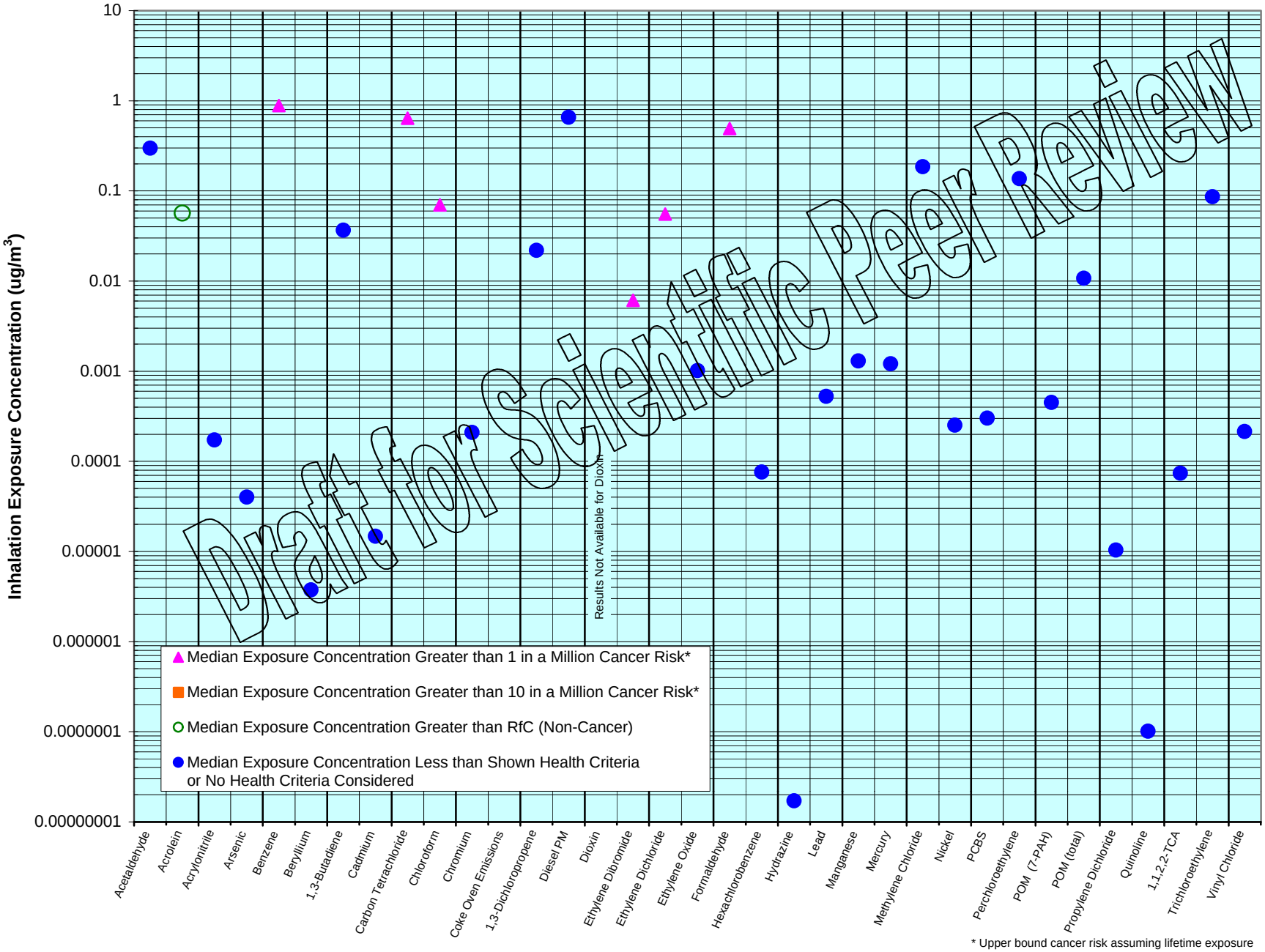
1996 Modeled Median Exposure Concentrations for Alabama
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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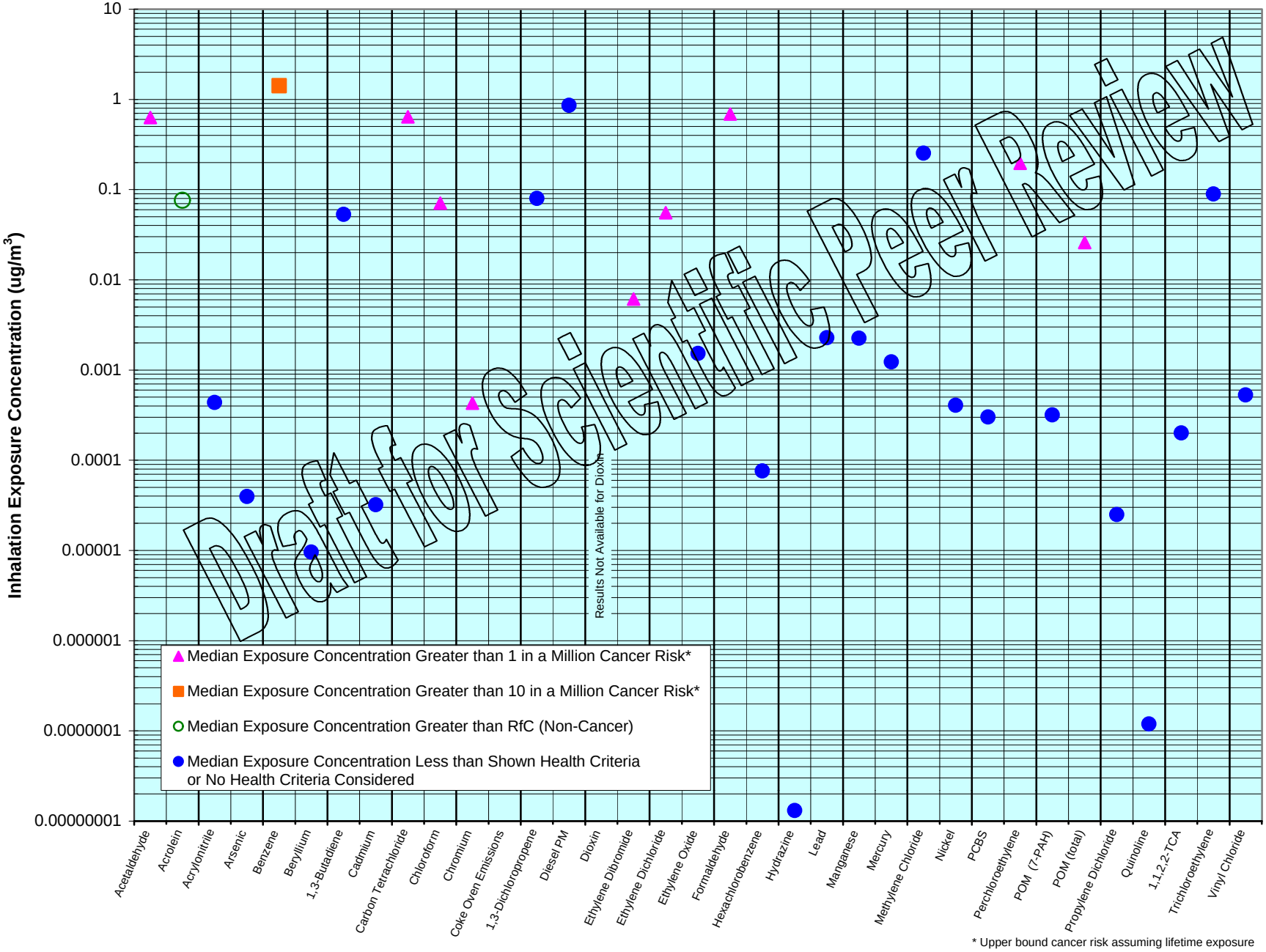
1996 Modeled Median Exposure Concentrations for Arizona
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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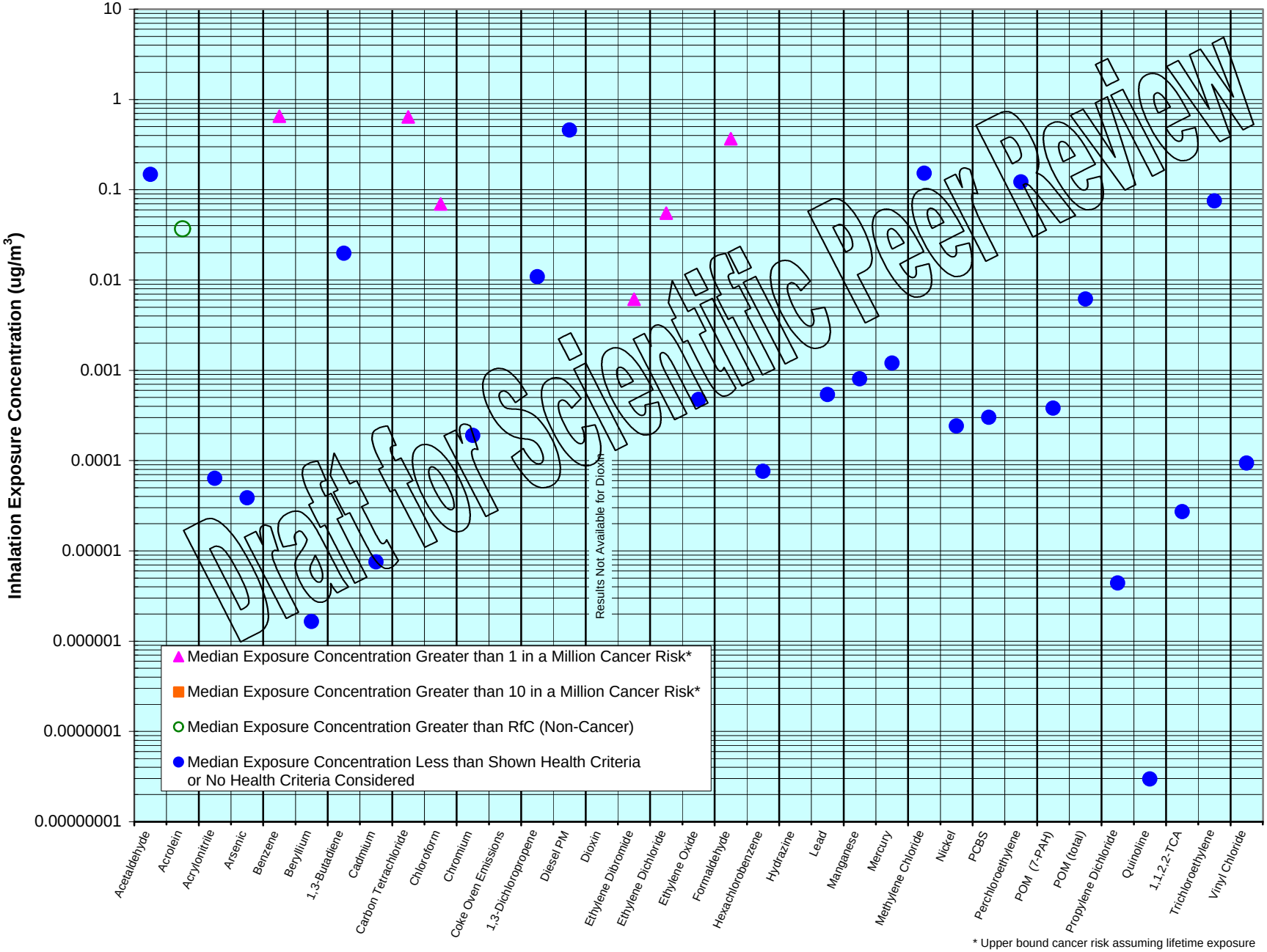
US EPA ARCHIVE DOCUMENT

1996 Modeled Median Exposure Concentrations for Arkansas
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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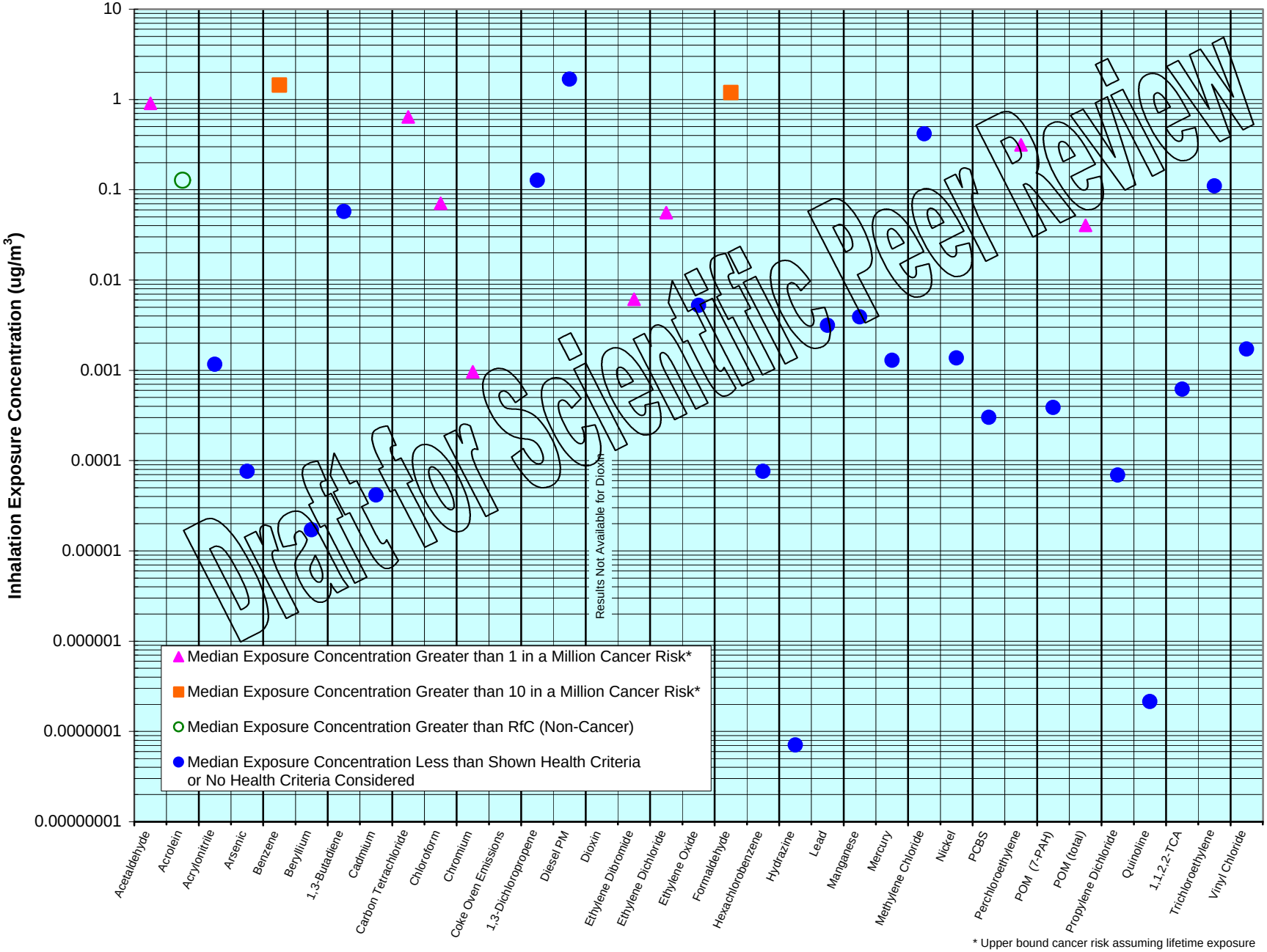
1996 Modeled Median Exposure Concentrations for California
(For Limitations On The Use of These Data See Page 2)



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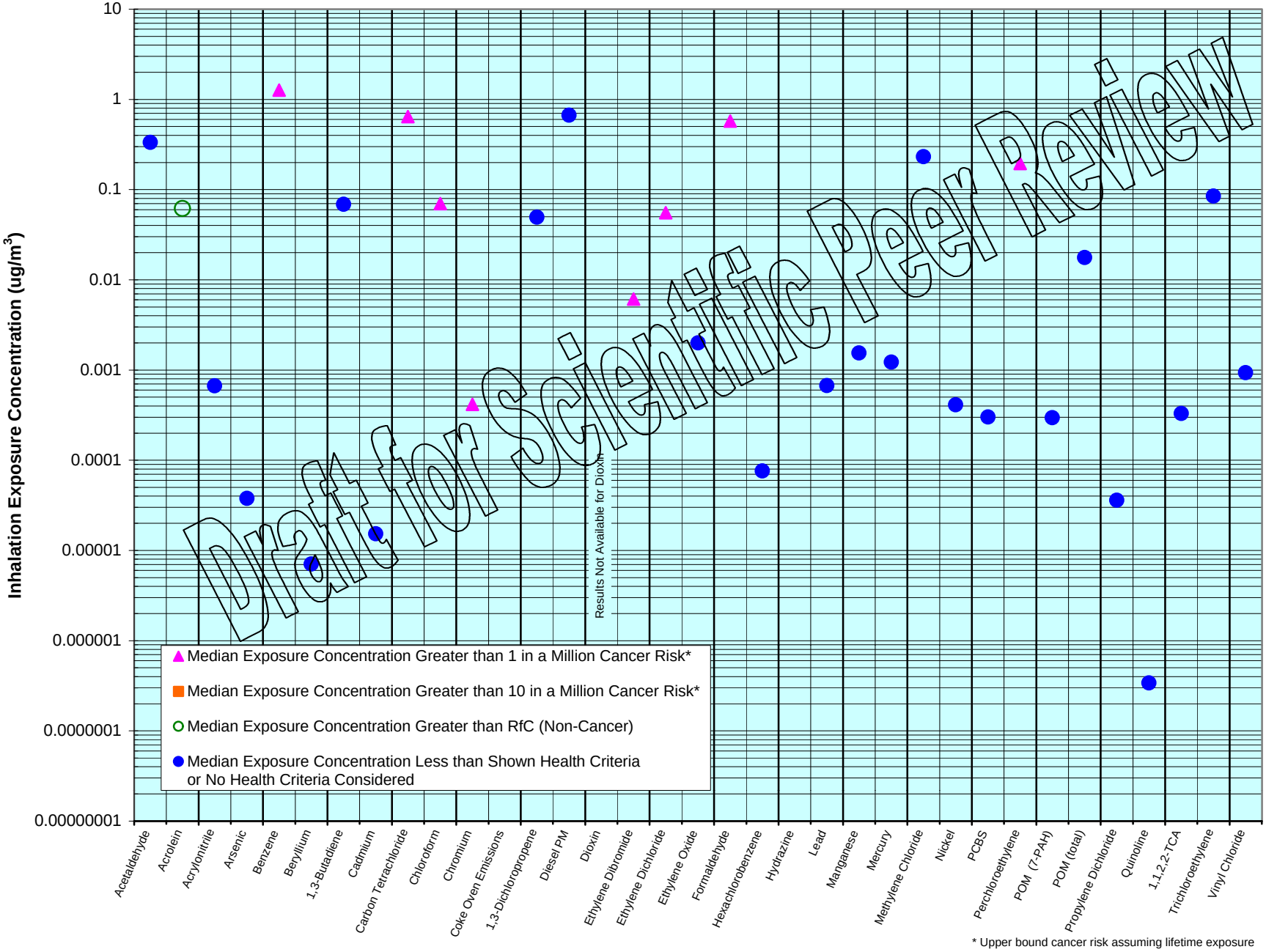
1996 Modeled Median Exposure Concentrations for Colorado
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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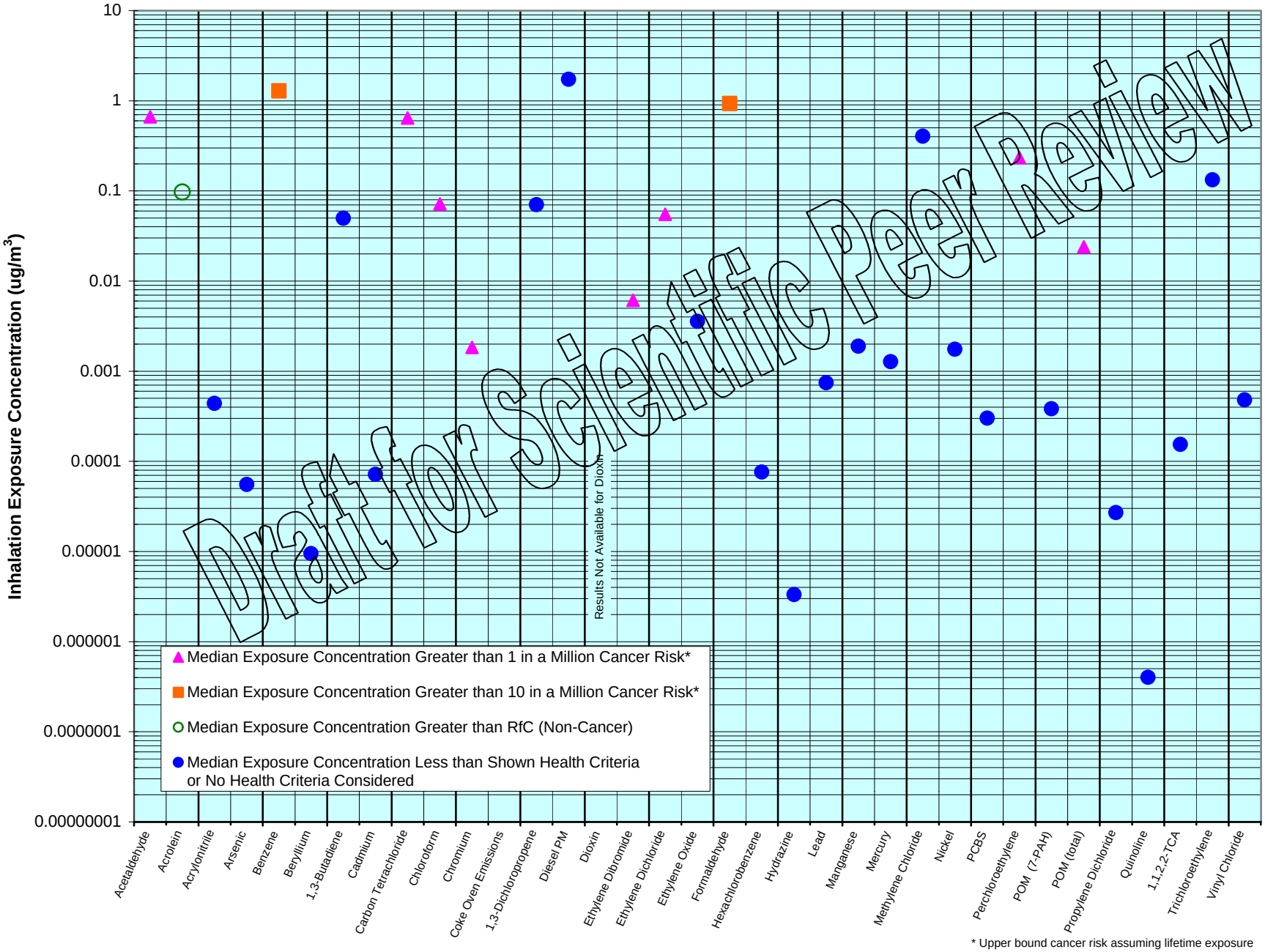
1996 Modeled Median Exposure Concentrations for Connecticut
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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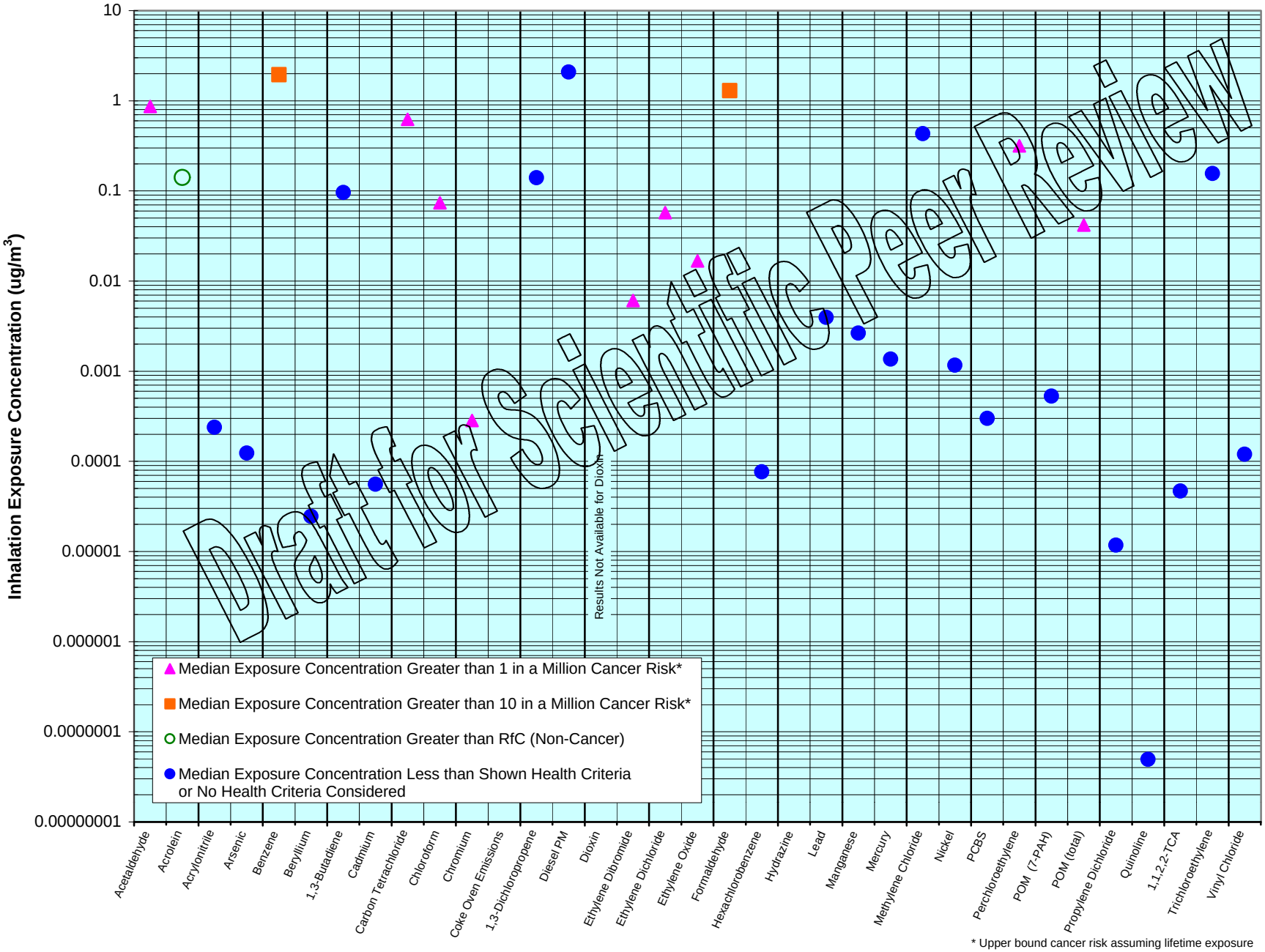
1996 Modeled Median Exposure Concentrations for District Of Columbia
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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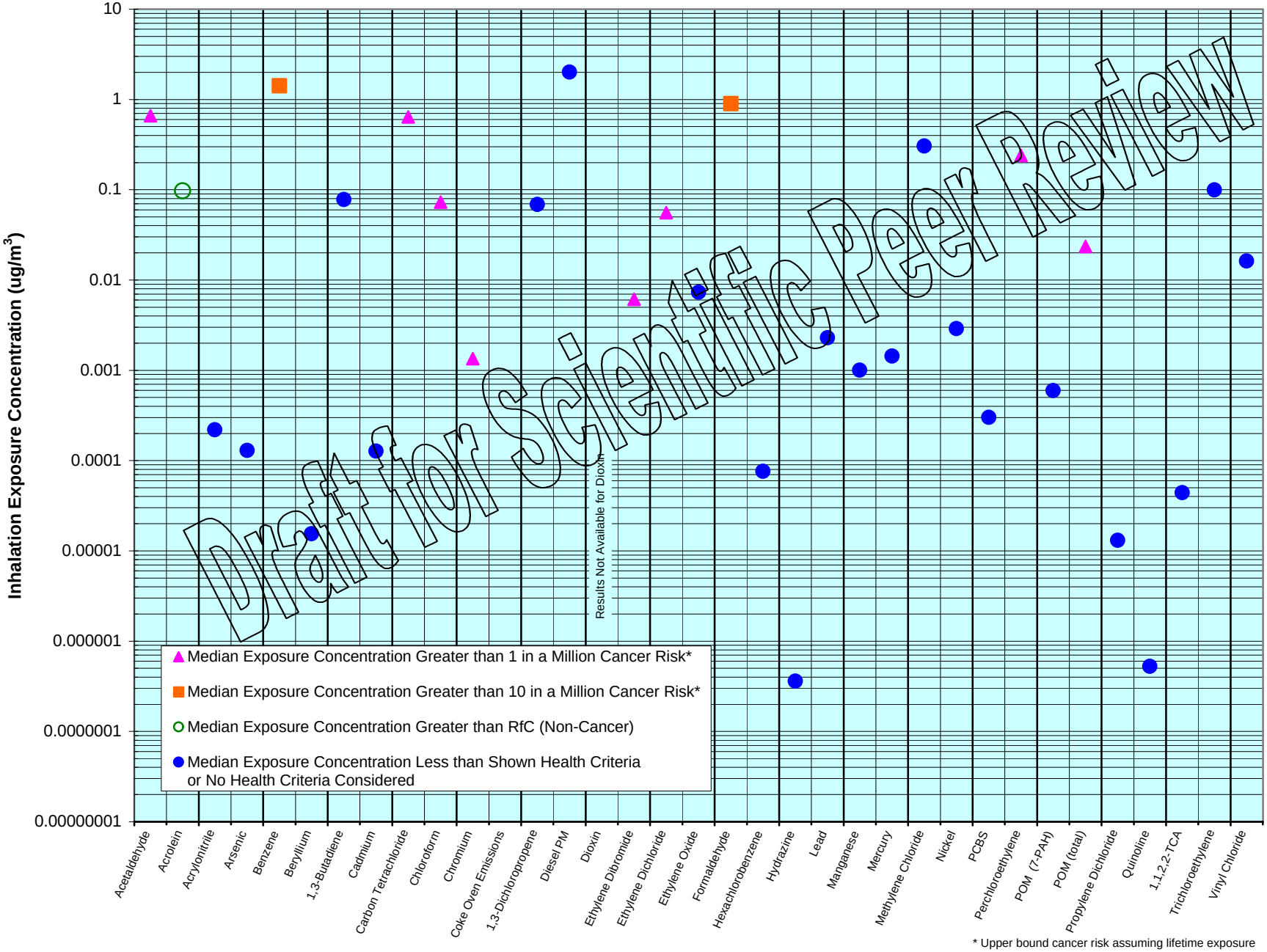
1996 Modeled Median Exposure Concentrations for Delaware
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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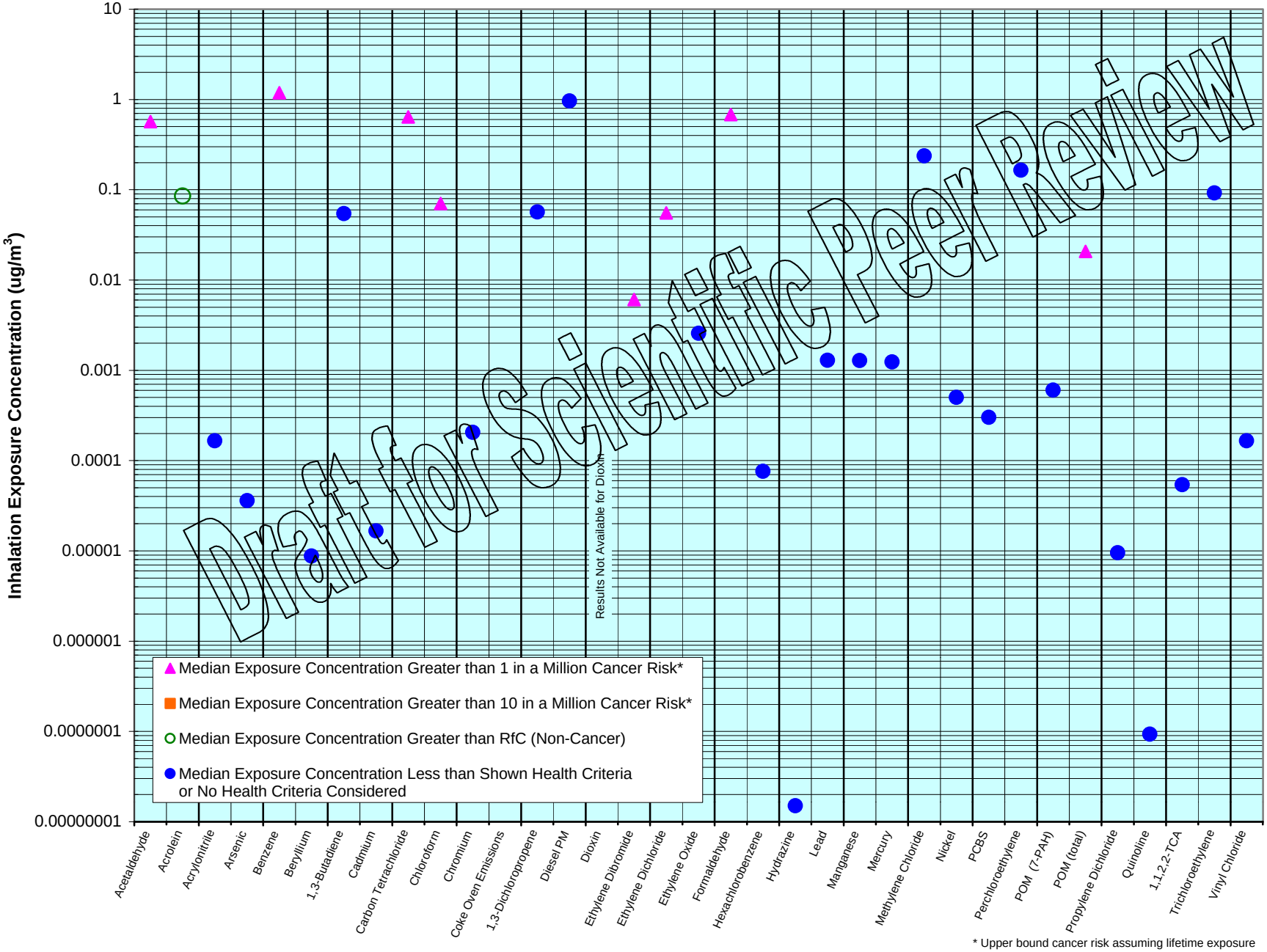
US EPA ARCHIVE DOCUMENT

1996 Modeled Median Exposure Concentrations for Florida
(For Limitations On The Use of These Data See Page 2)



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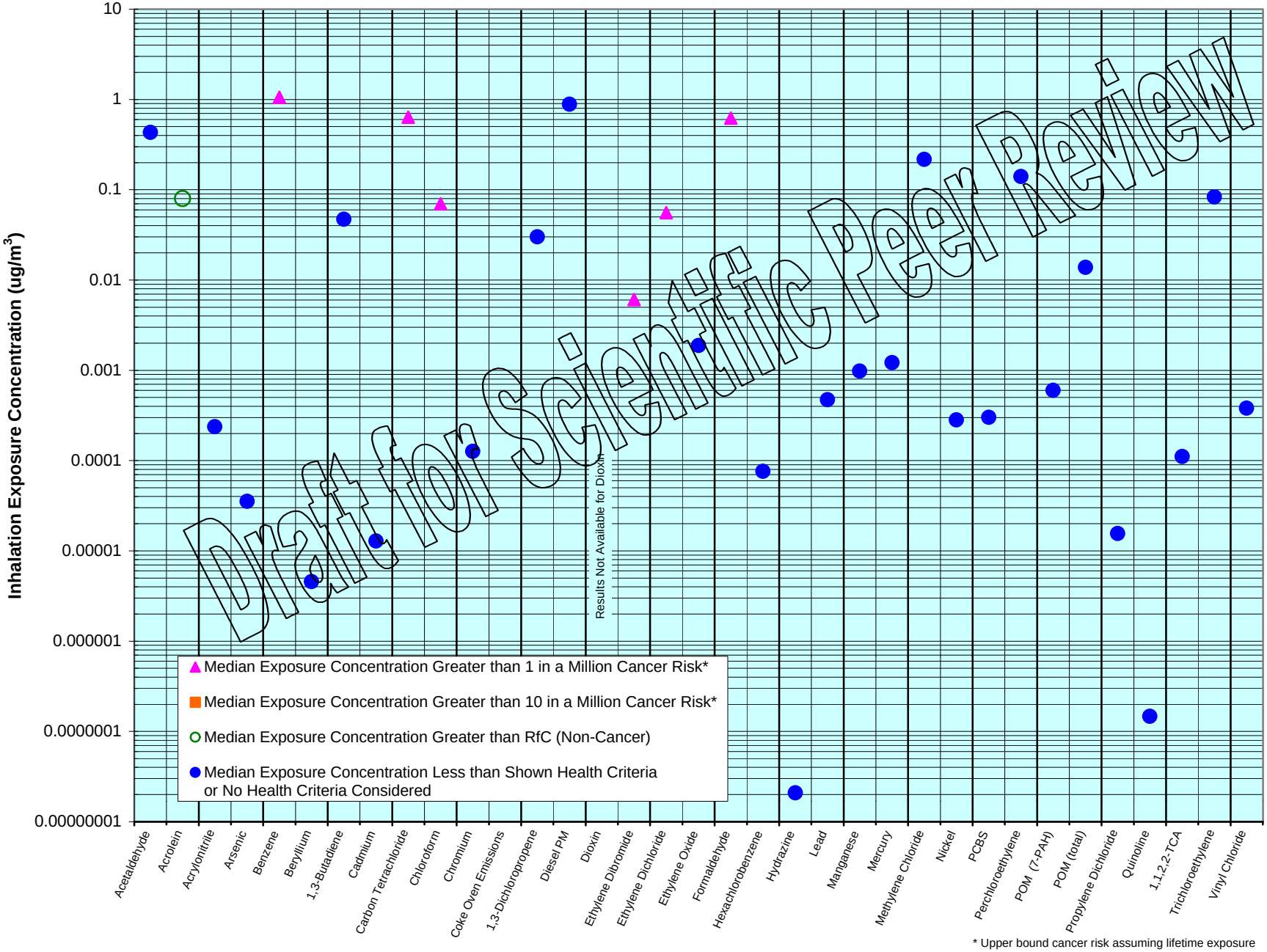
1996 Modeled Median Exposure Concentrations for Georgia
(For Limitations On The Use of These Data See Page 2)



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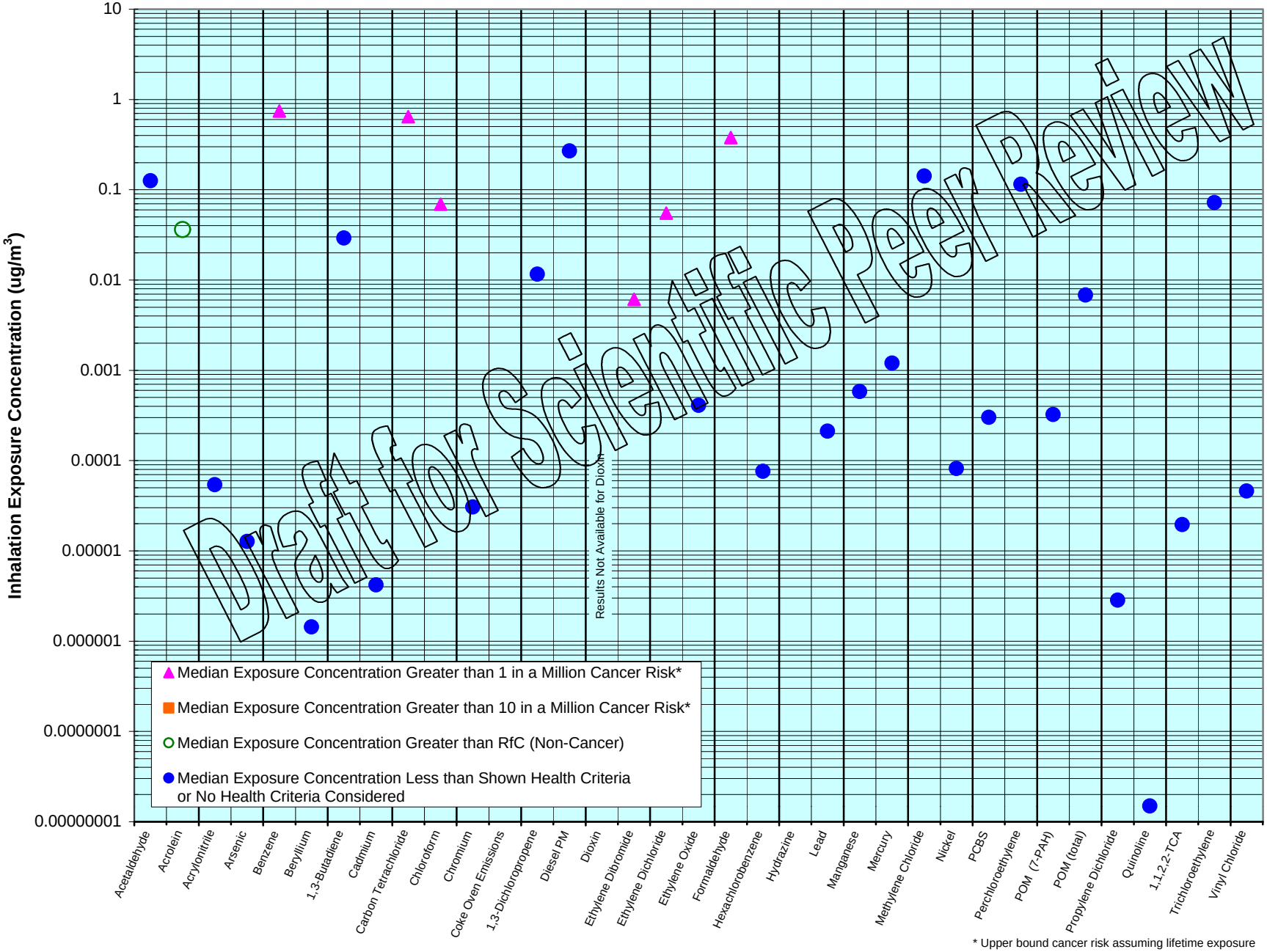
* Upper bound cancer risk assuming lifetime exposure

US EPA ARCHIVE DOCUMENT

1996 Modeled Median Exposure Concentrations for Idaho
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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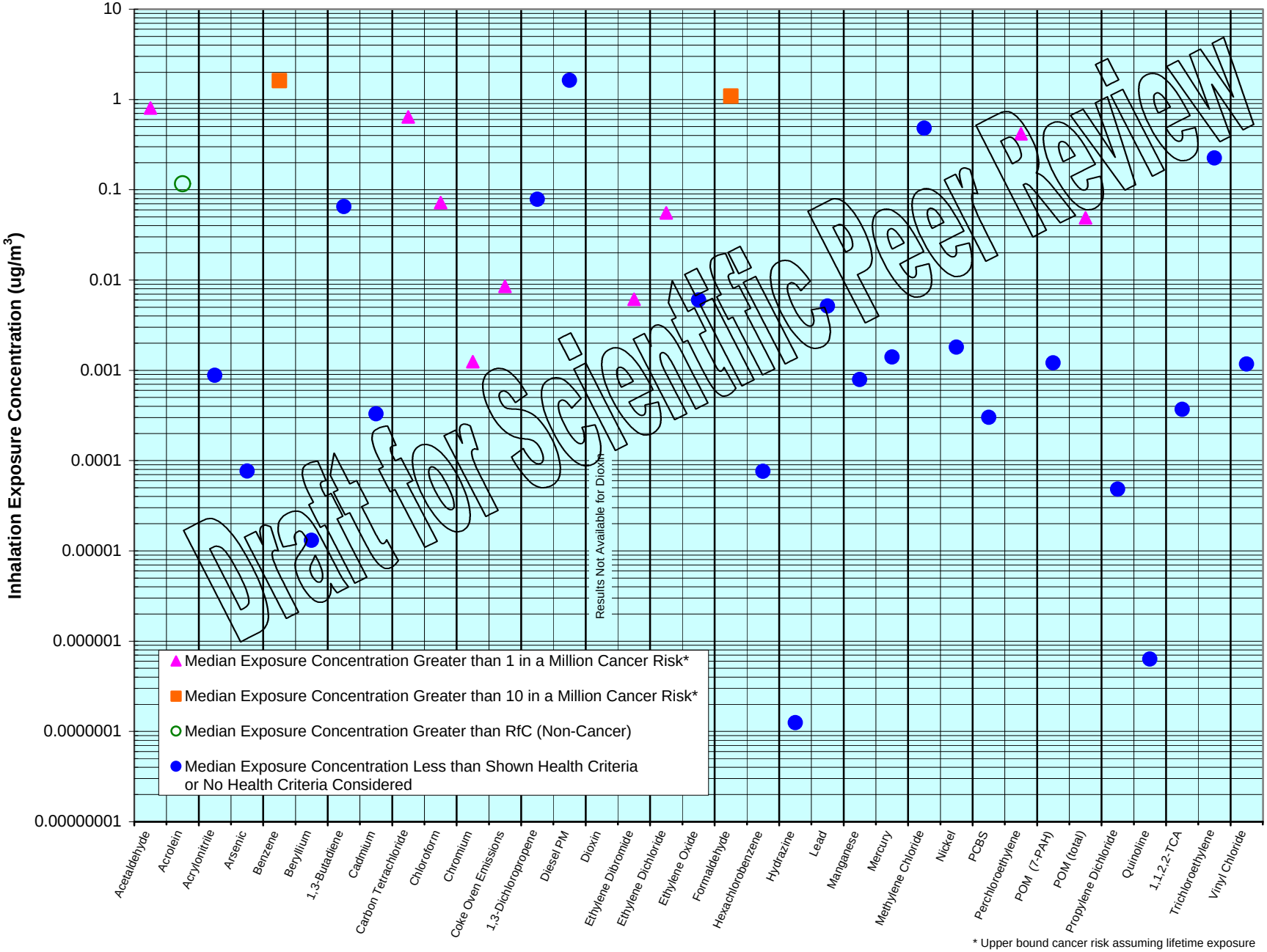
US EPA ARCHIVE DOCUMENT

1996 Modeled Median Exposure Concentrations for Illinois
(For Limitations On The Use of These Data See Page 2)



* Upper bound cancer risk assuming lifetime exposure

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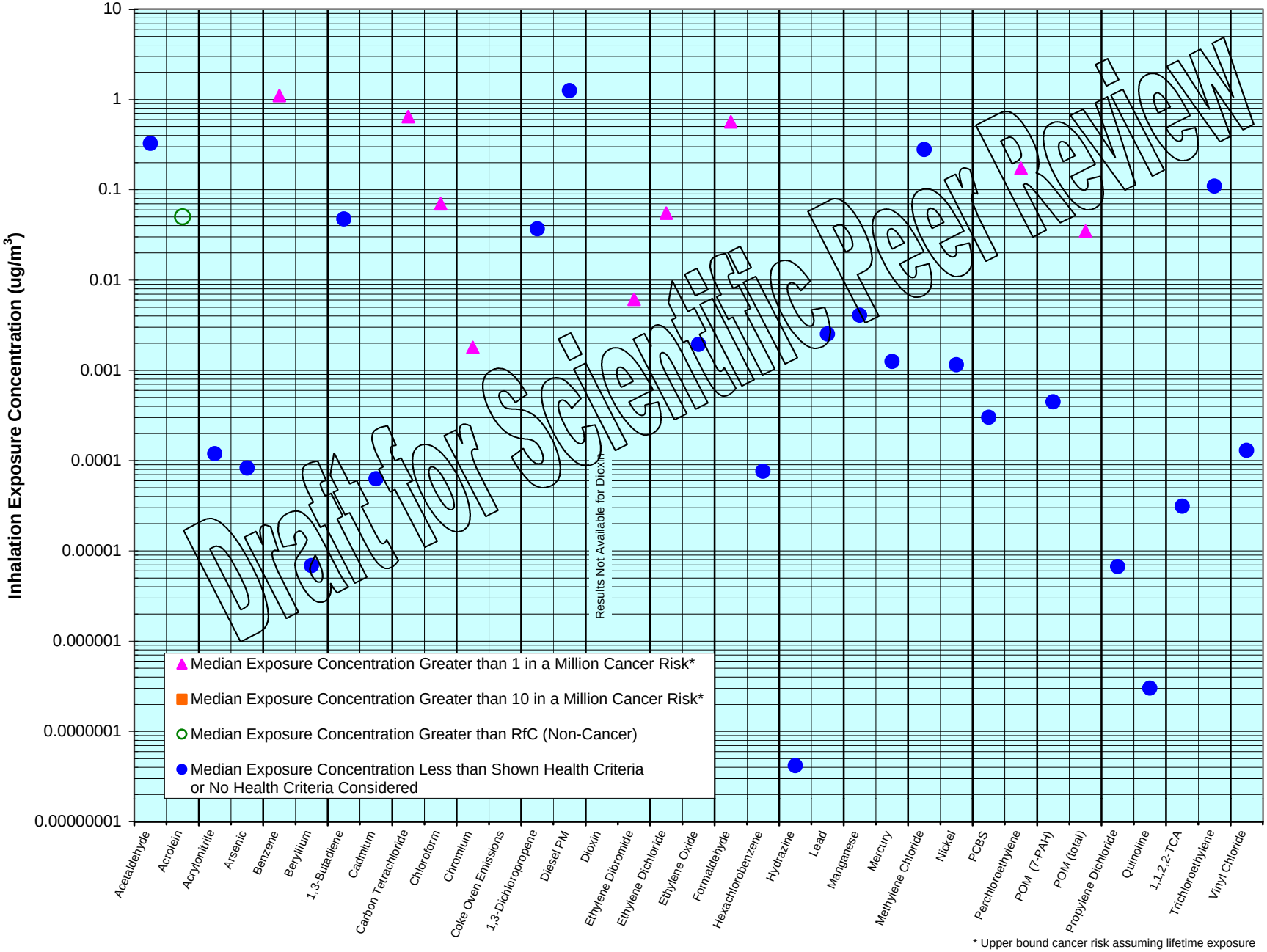
US EPA ARCHIVE DOCUMENT

1996 Modeled Median Exposure Concentrations for Indiana
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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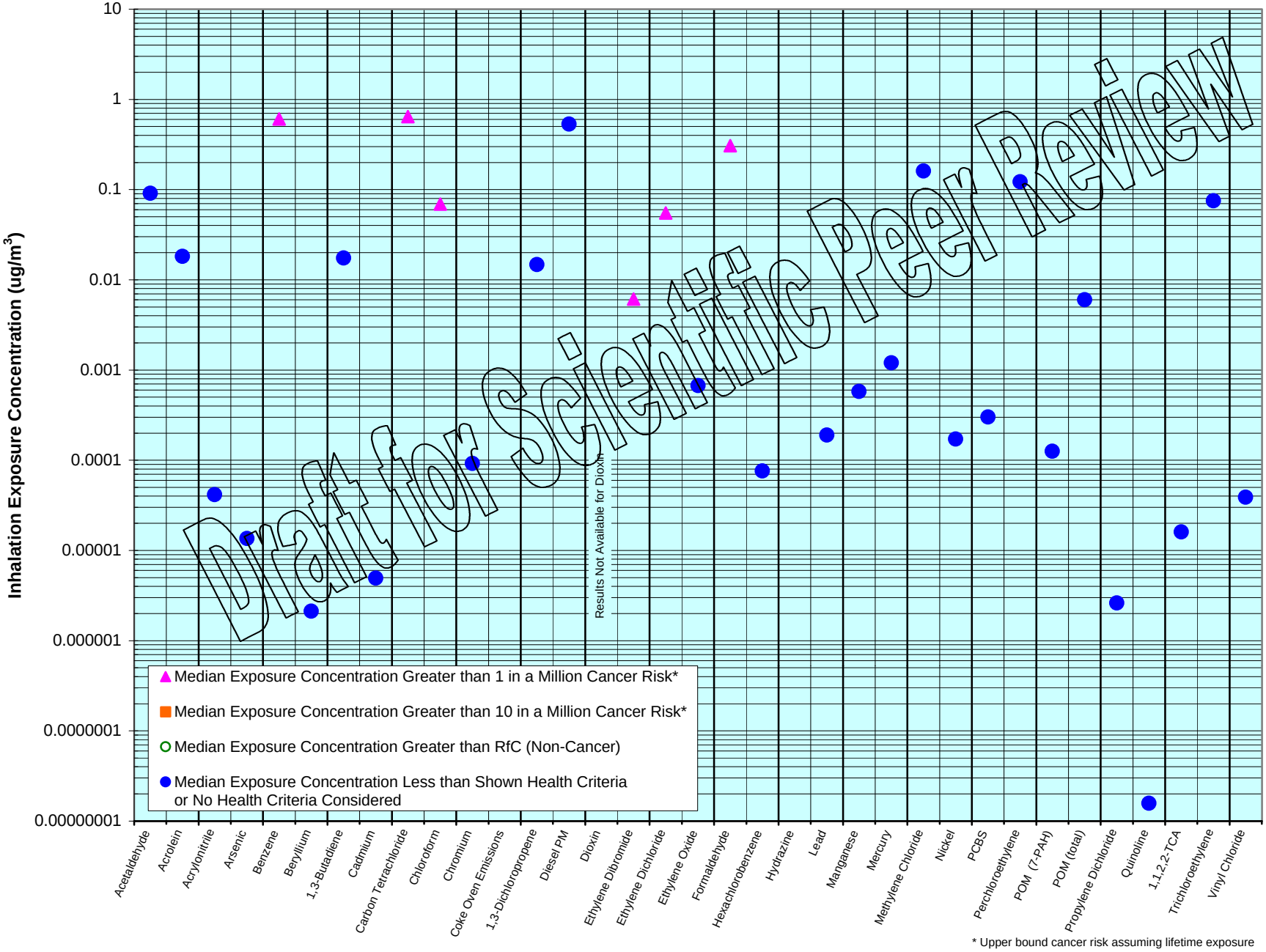
1996 Modeled Median Exposure Concentrations for Iowa
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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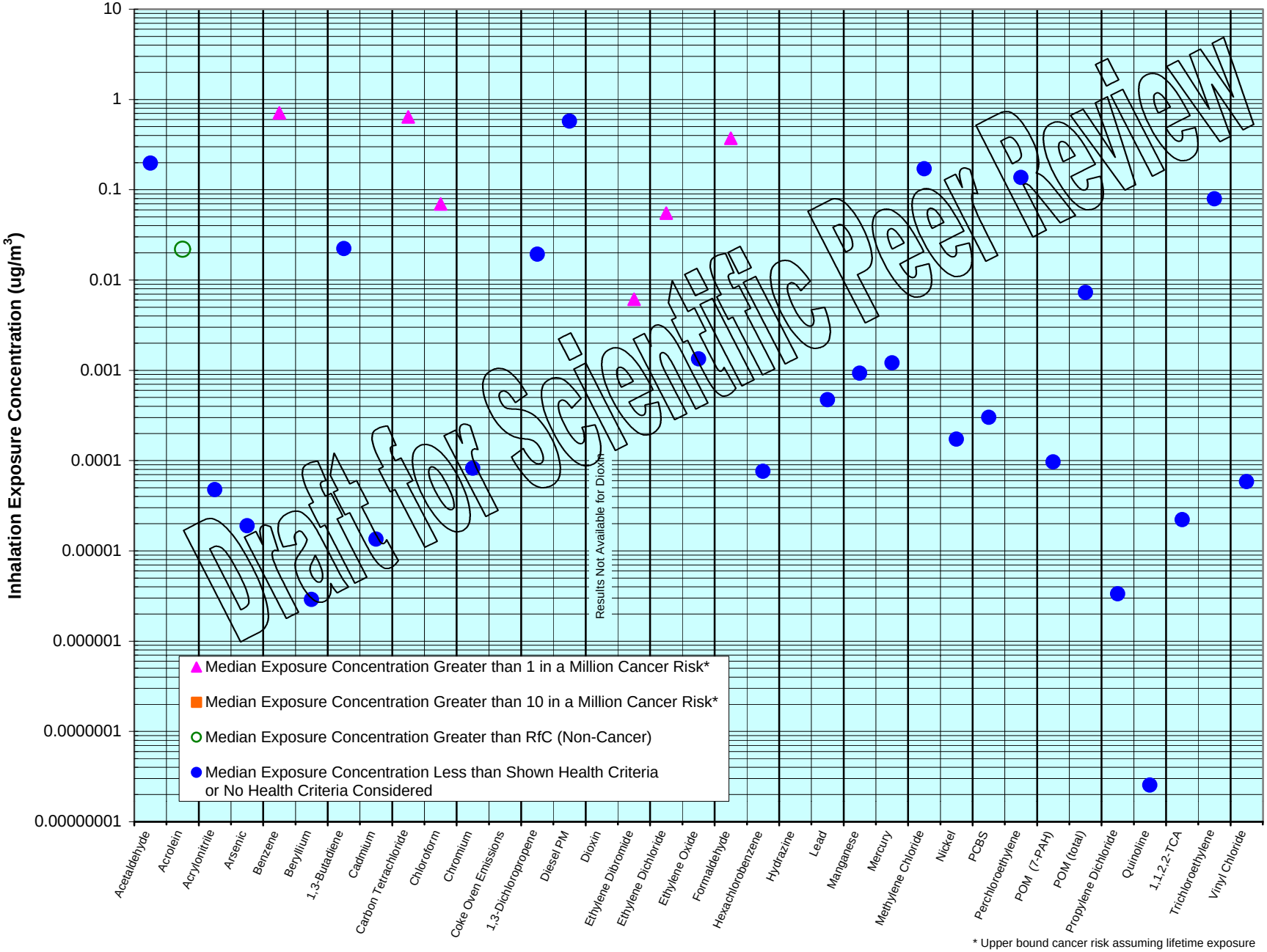
1996 Modeled Median Exposure Concentrations for Kansas
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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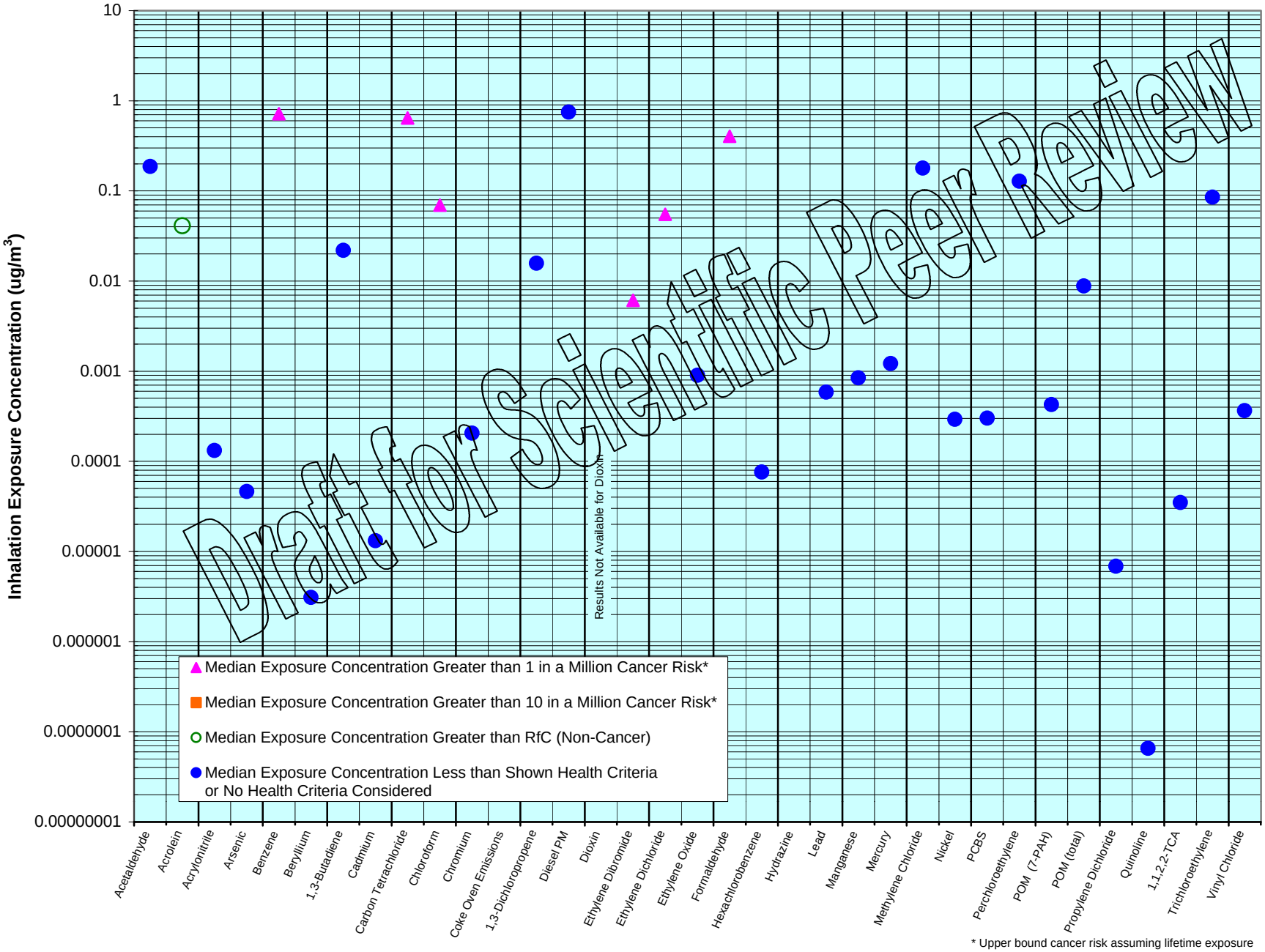
US EPA ARCHIVE DOCUMENT

1996 Modeled Median Exposure Concentrations for Kentucky
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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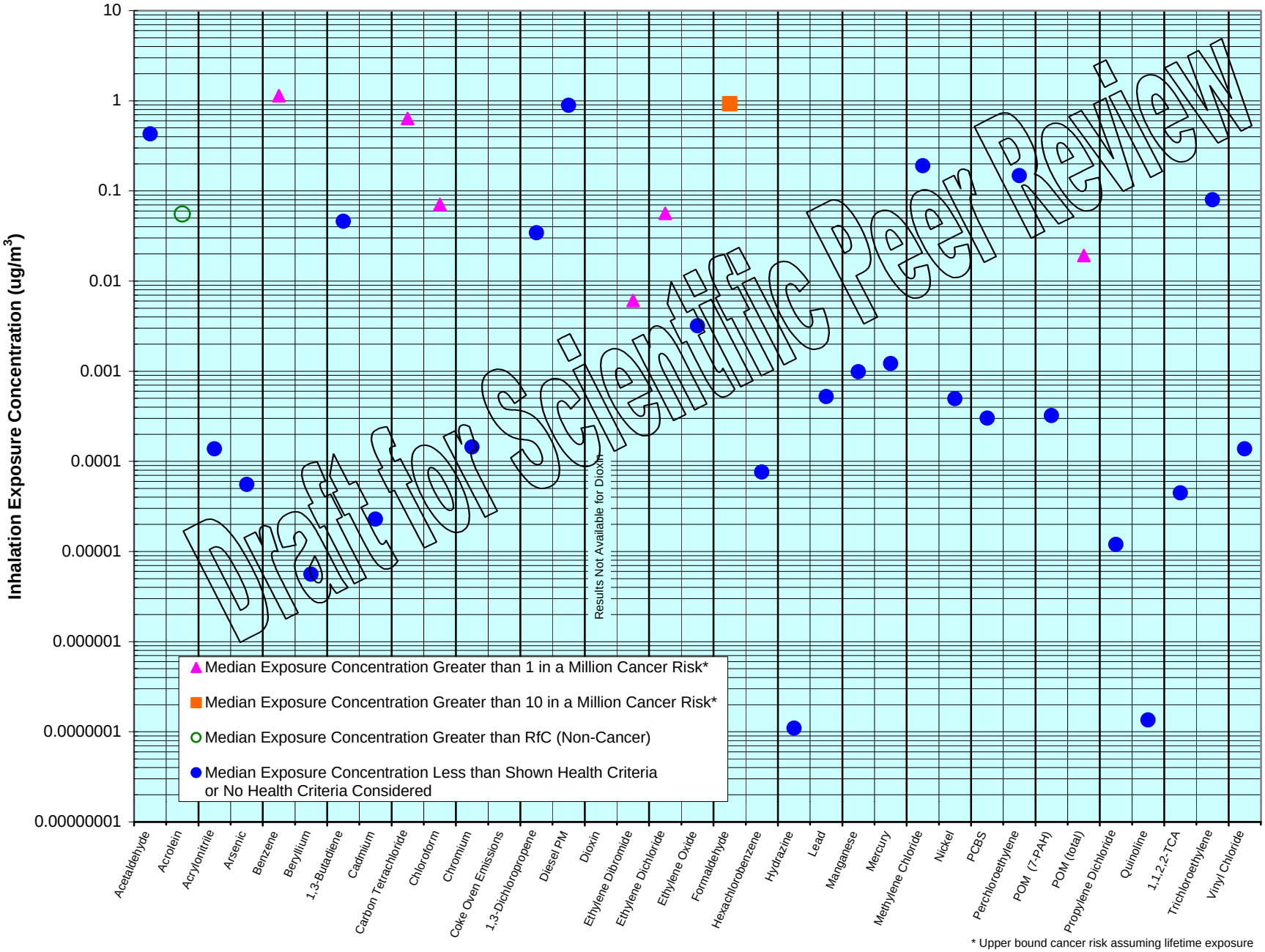
US EPA ARCHIVE DOCUMENT

1996 Modeled Median Exposure Concentrations for Louisiana
(For Limitations On The Use of These Data See Page 2)



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* Upper bound cancer risk assuming lifetime exposure

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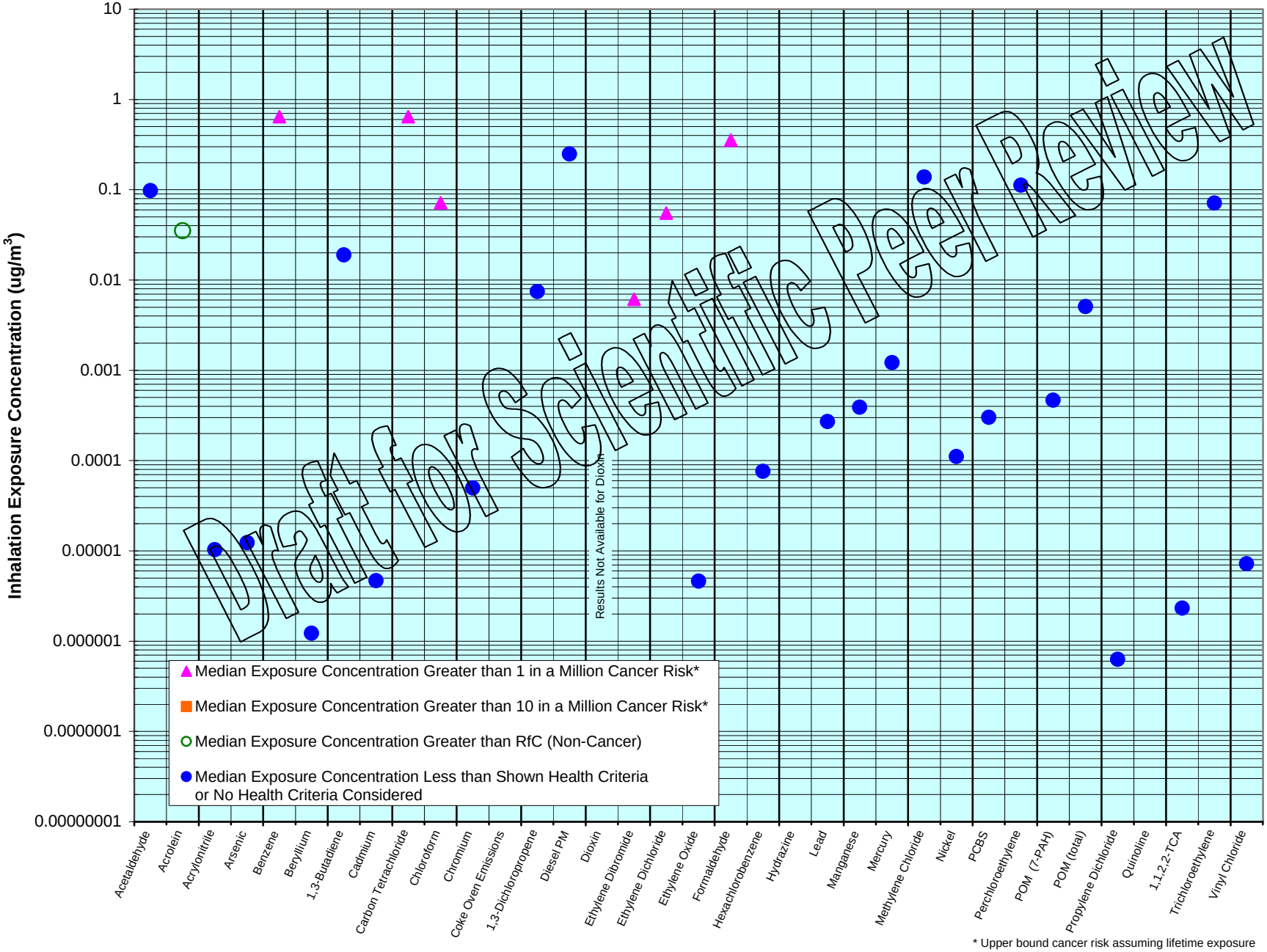
1996 Modeled Median Exposure Concentrations for Maine
(For Limitations On The Use of These Data See Page 2)



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1996 Modeled Median Exposure Concentrations for Maryland
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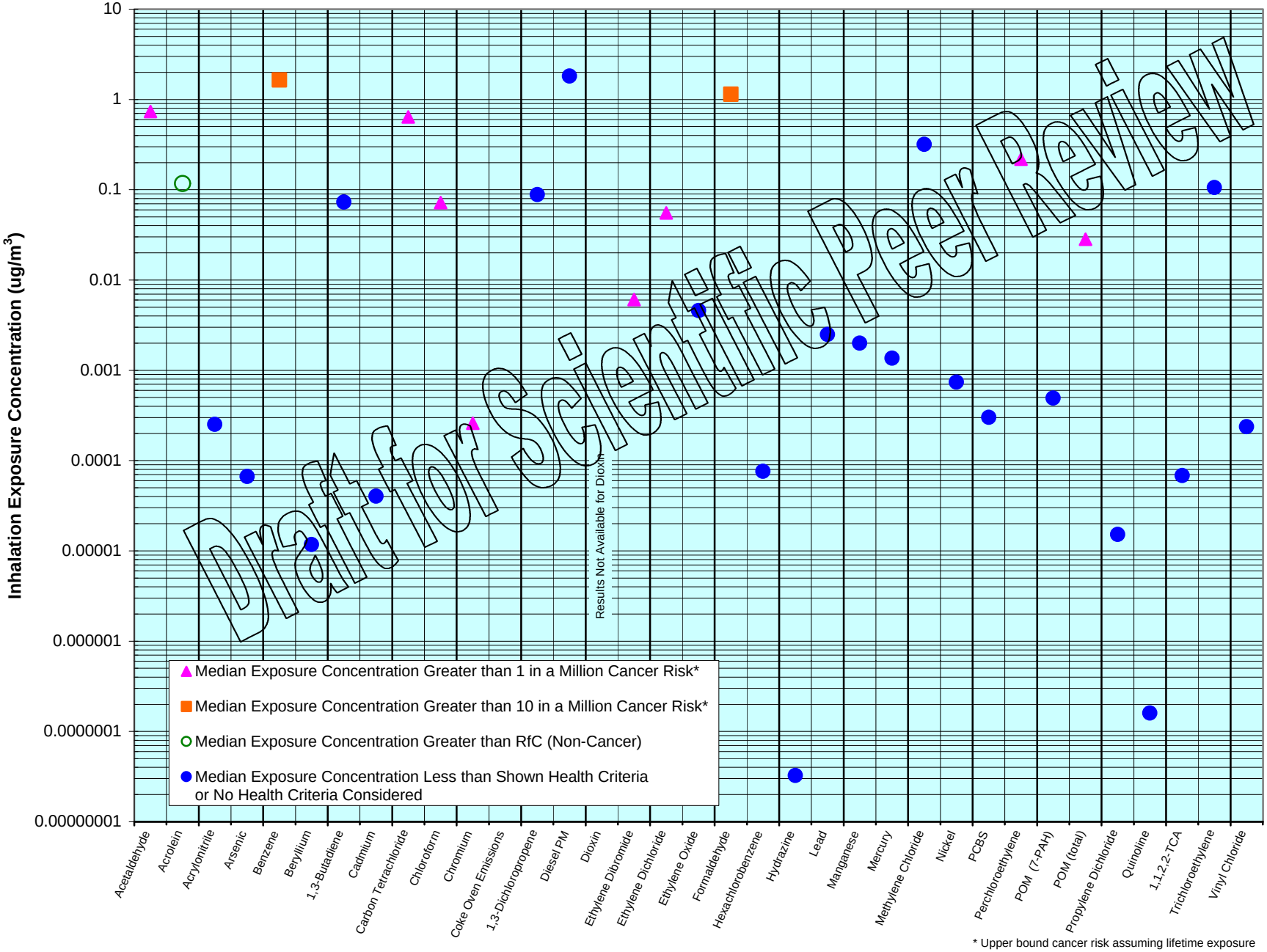

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1996 Modeled Median Exposure Concentrations for Massachusetts
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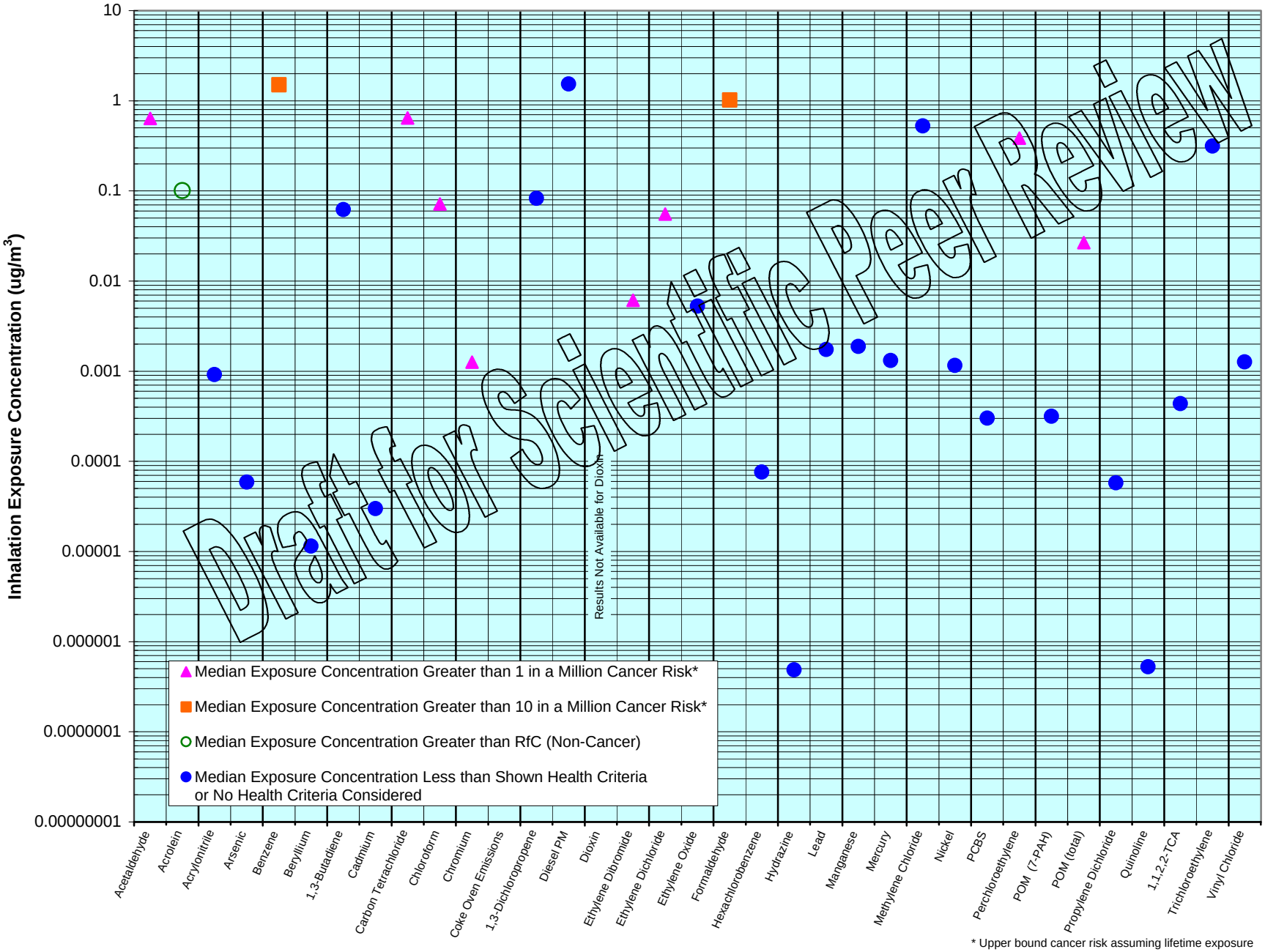

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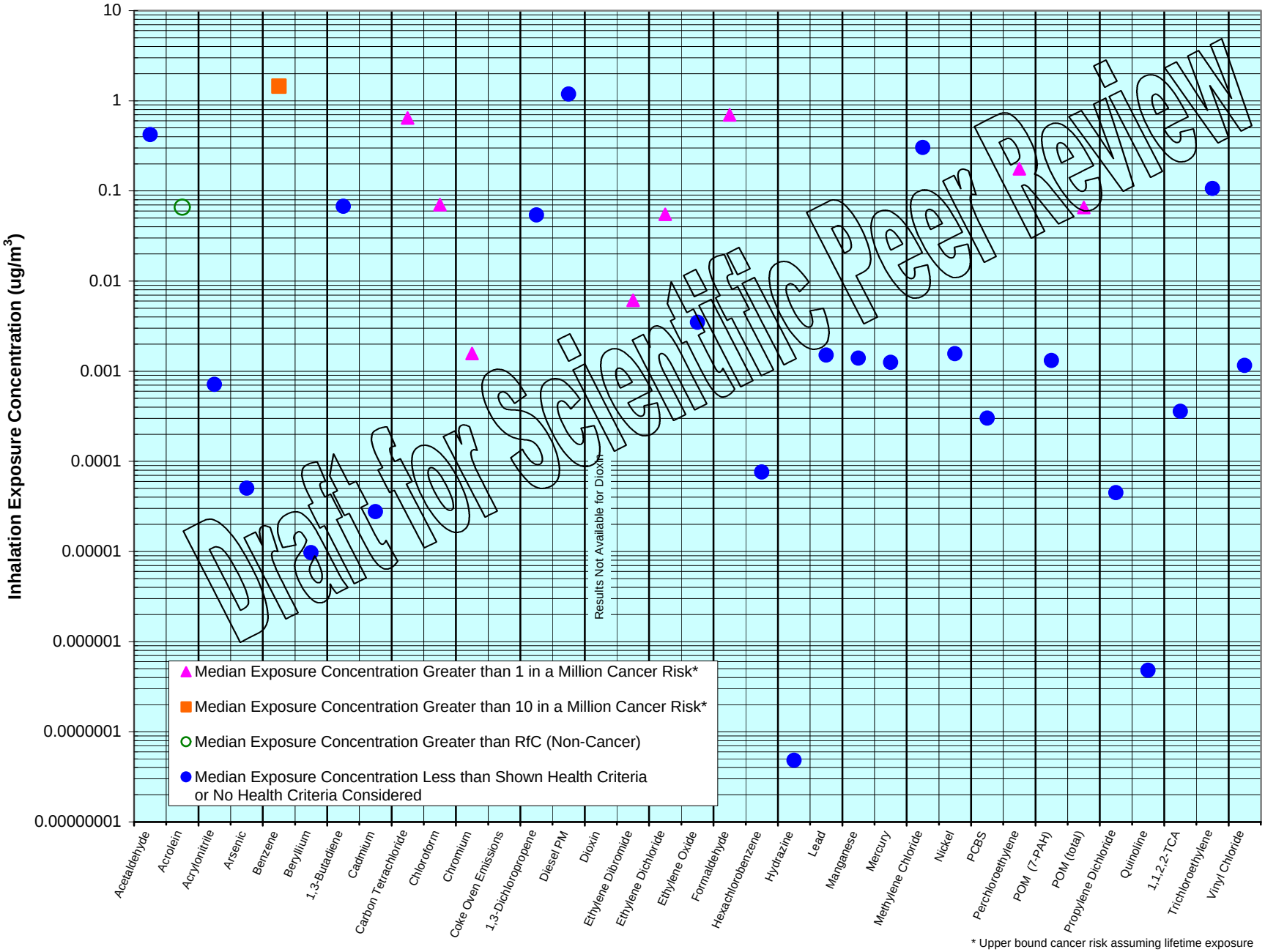

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1996 Modeled Median Exposure Concentrations for Minnesota
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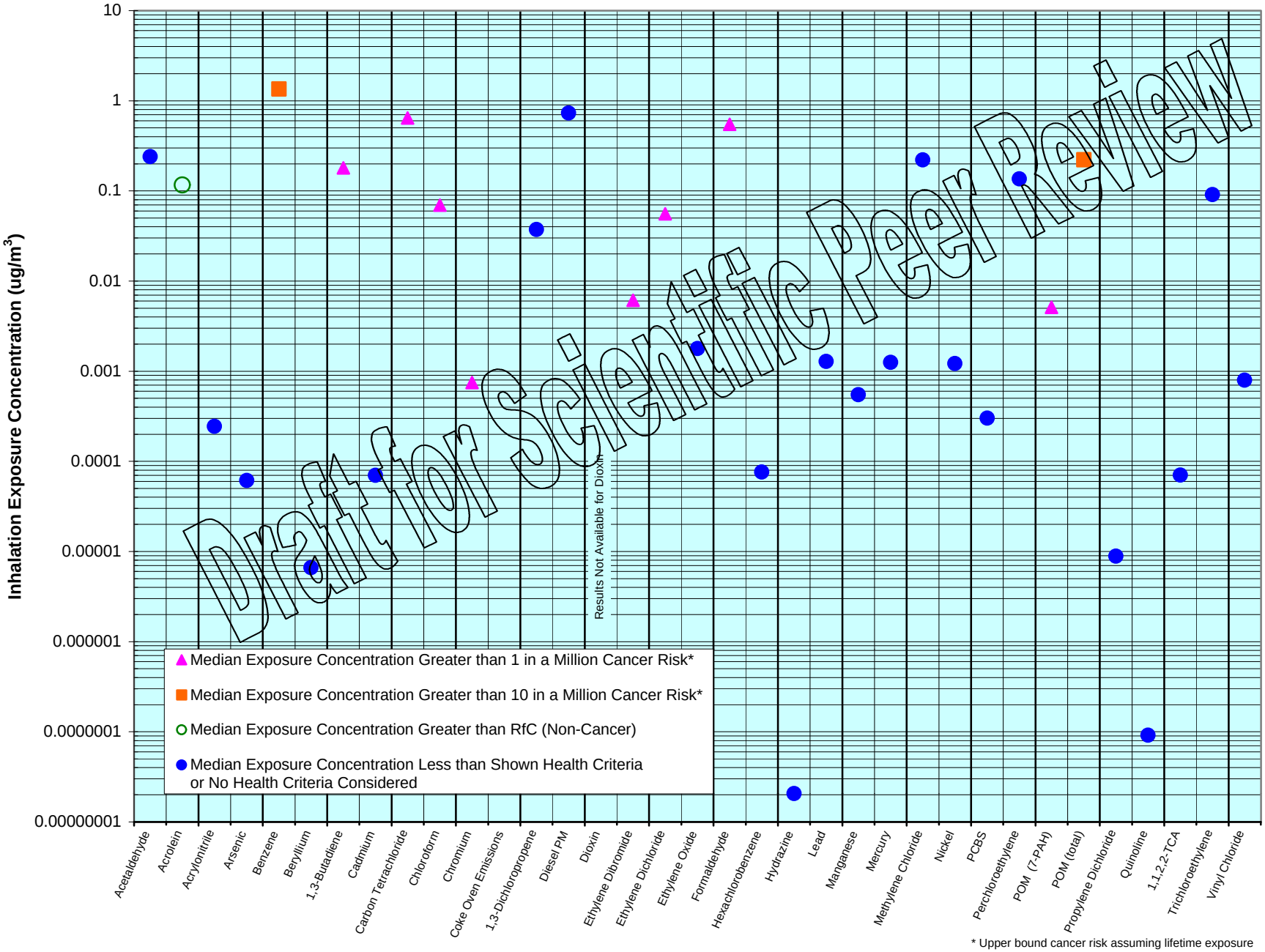

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1996 Modeled Median Exposure Concentrations for Mississippi
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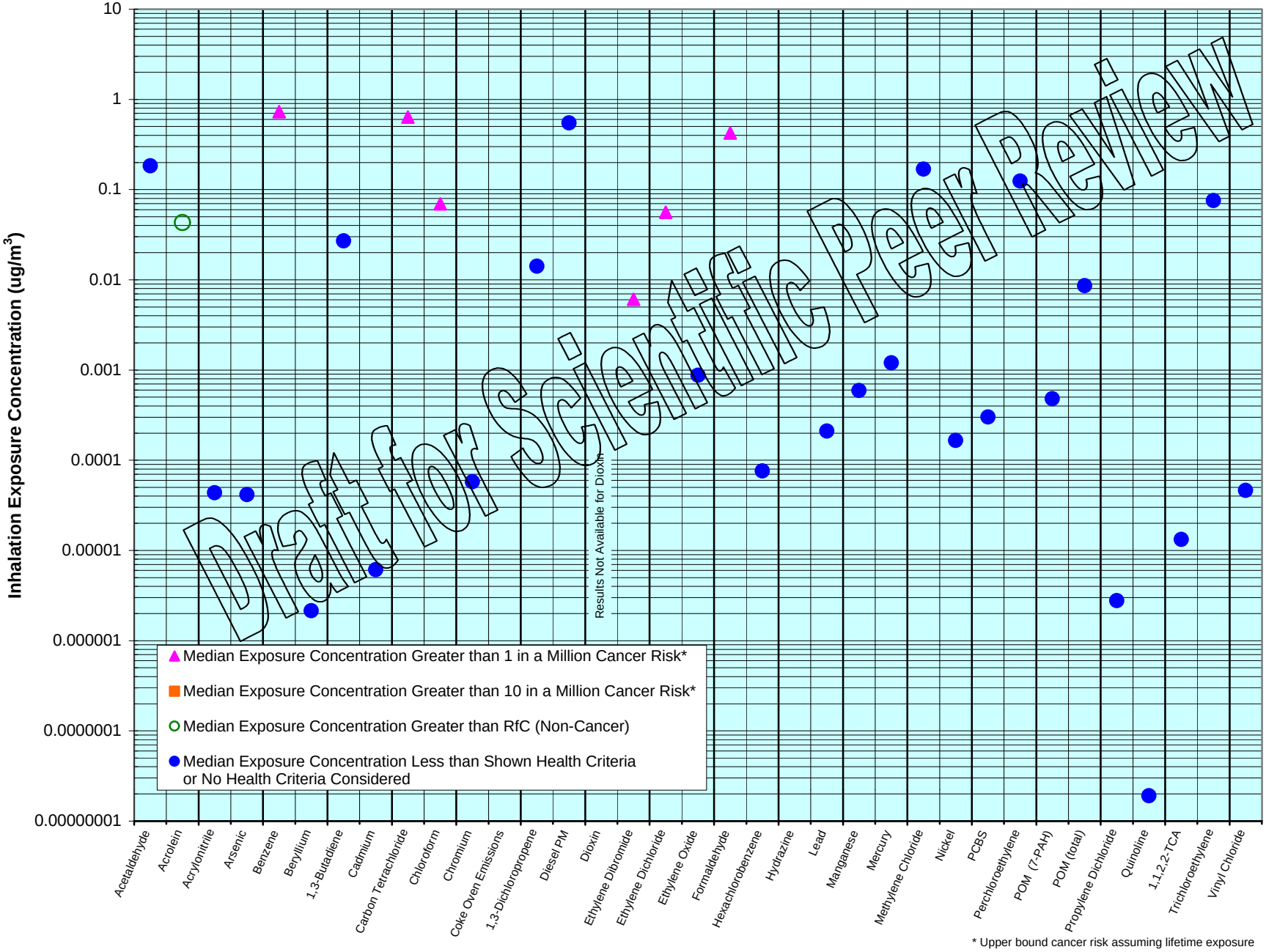

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1996 Modeled Median Exposure Concentrations for Missouri
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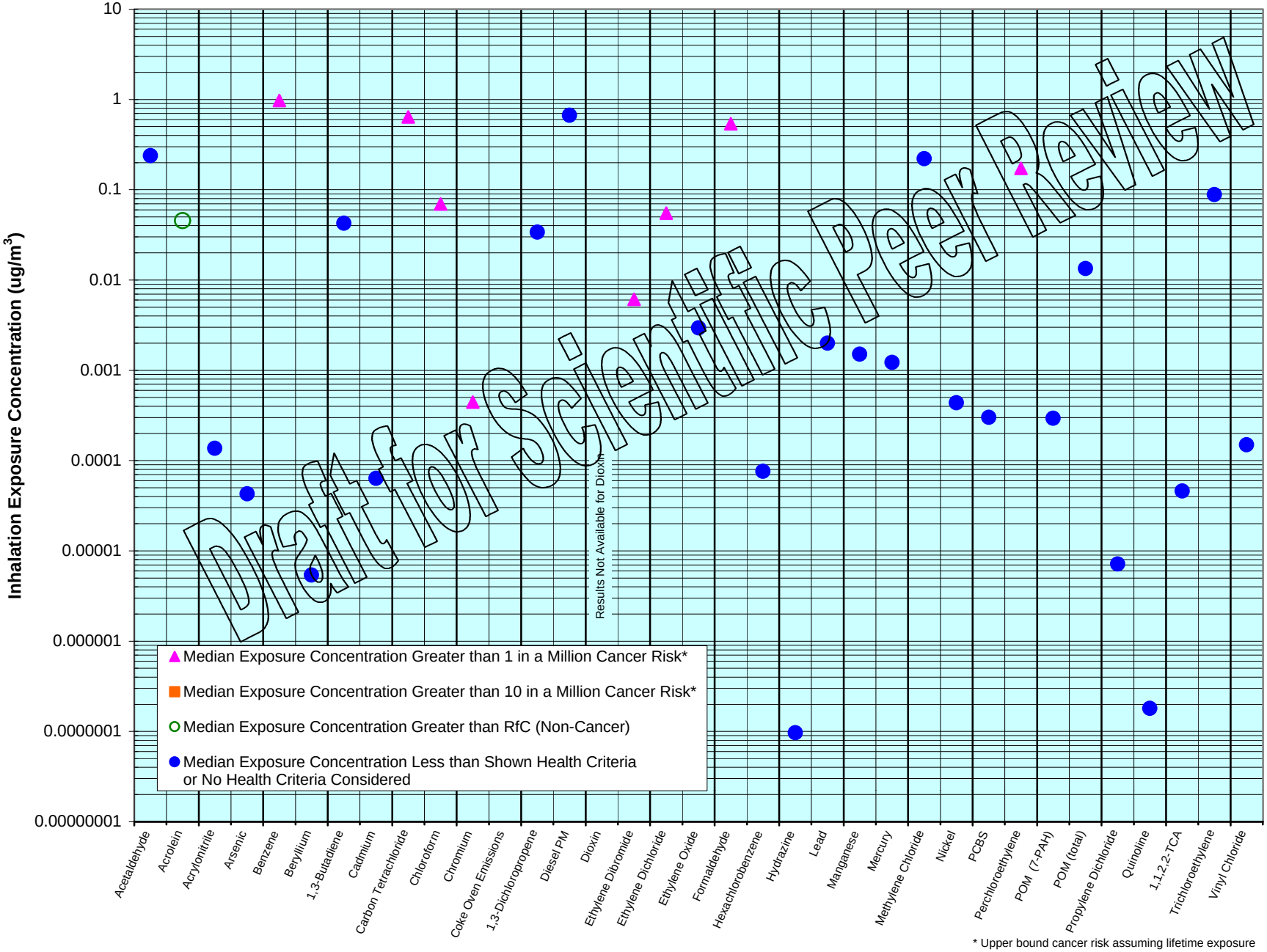

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1996 Modeled Median Exposure Concentrations for Montana
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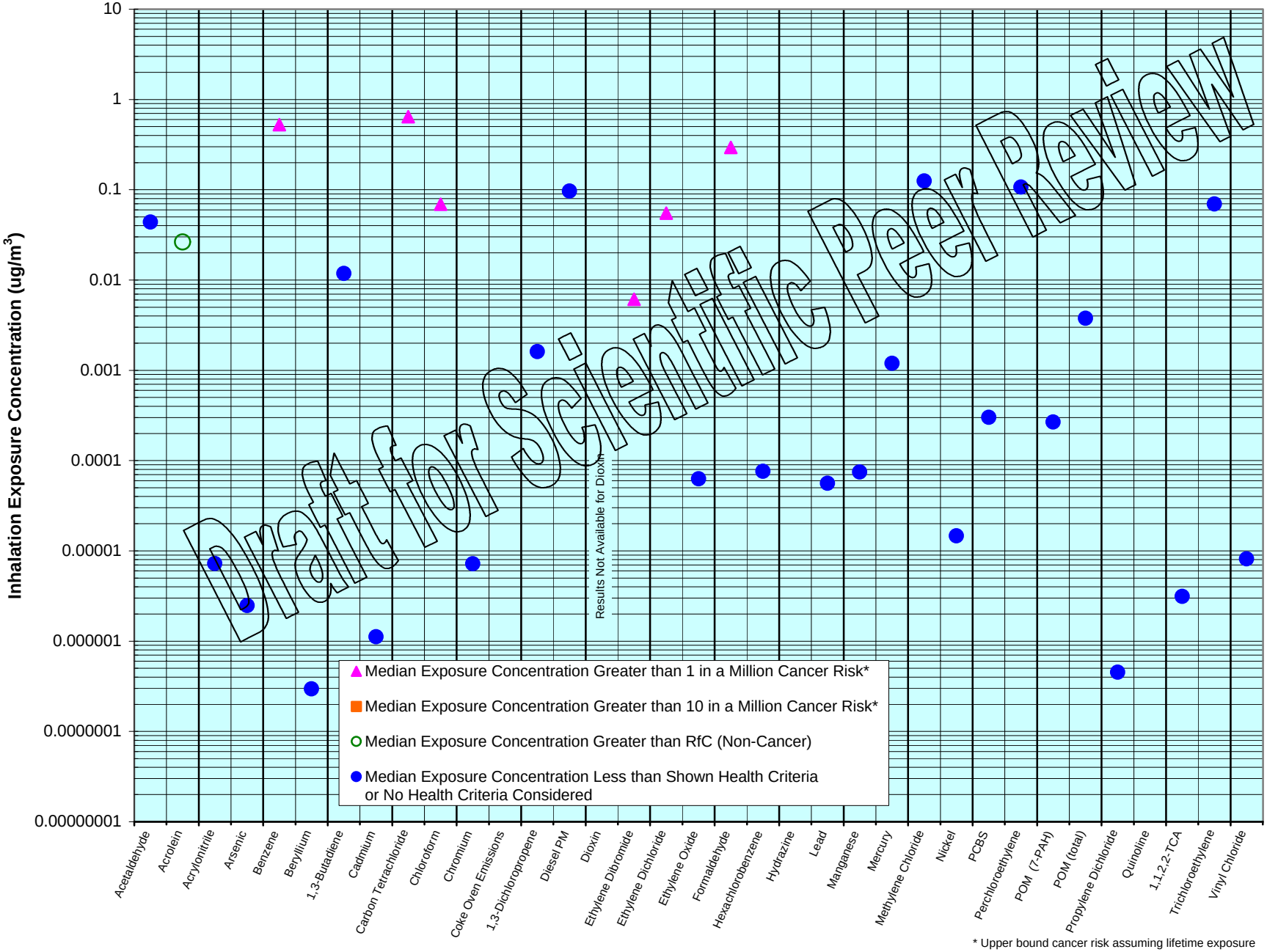

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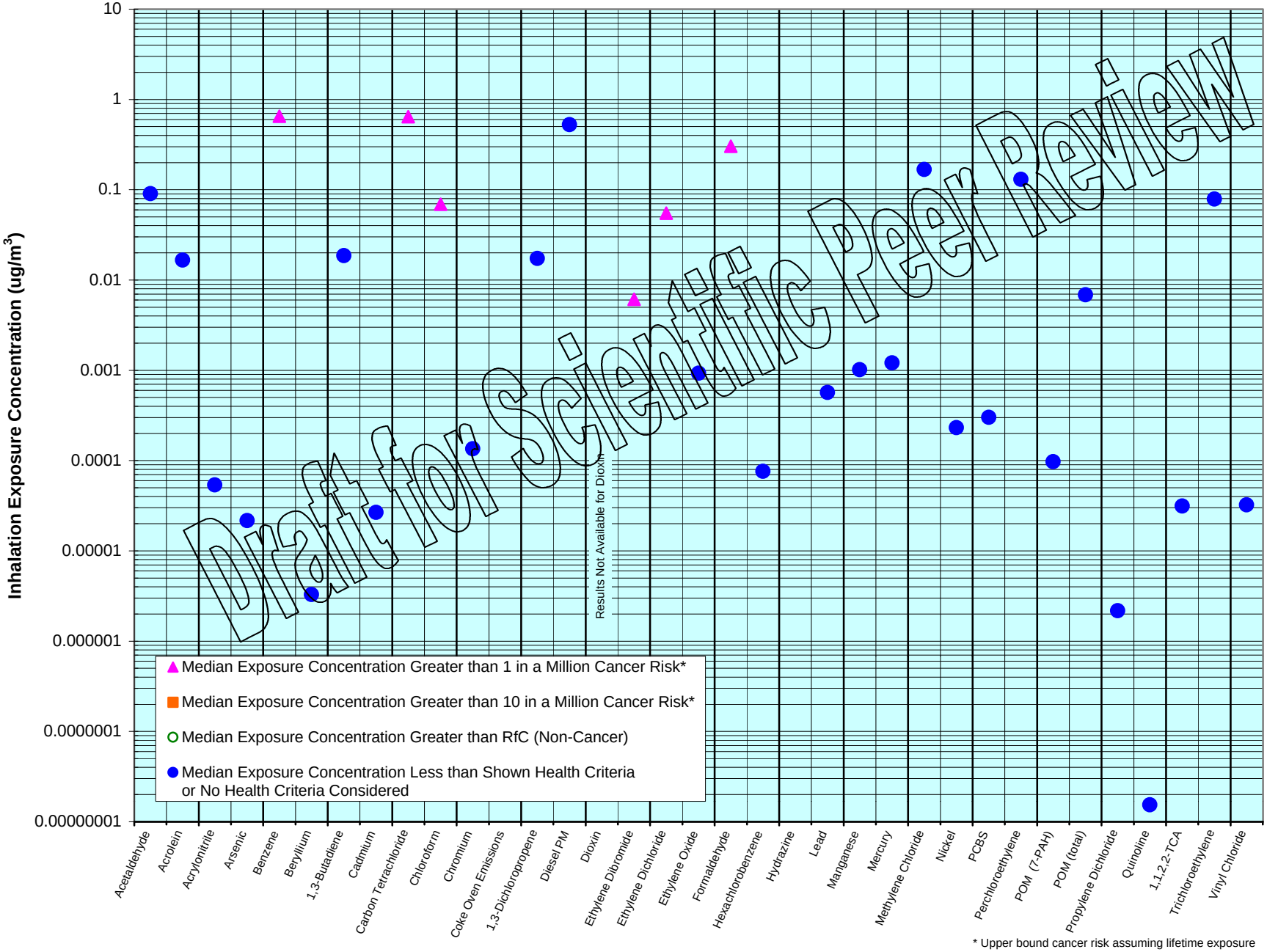
1996 Modeled Median Exposure Concentrations for Nebraska
(For Limitations On The Use of These Data See Page 2)



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1996 Modeled Median Exposure Concentrations for Nevada
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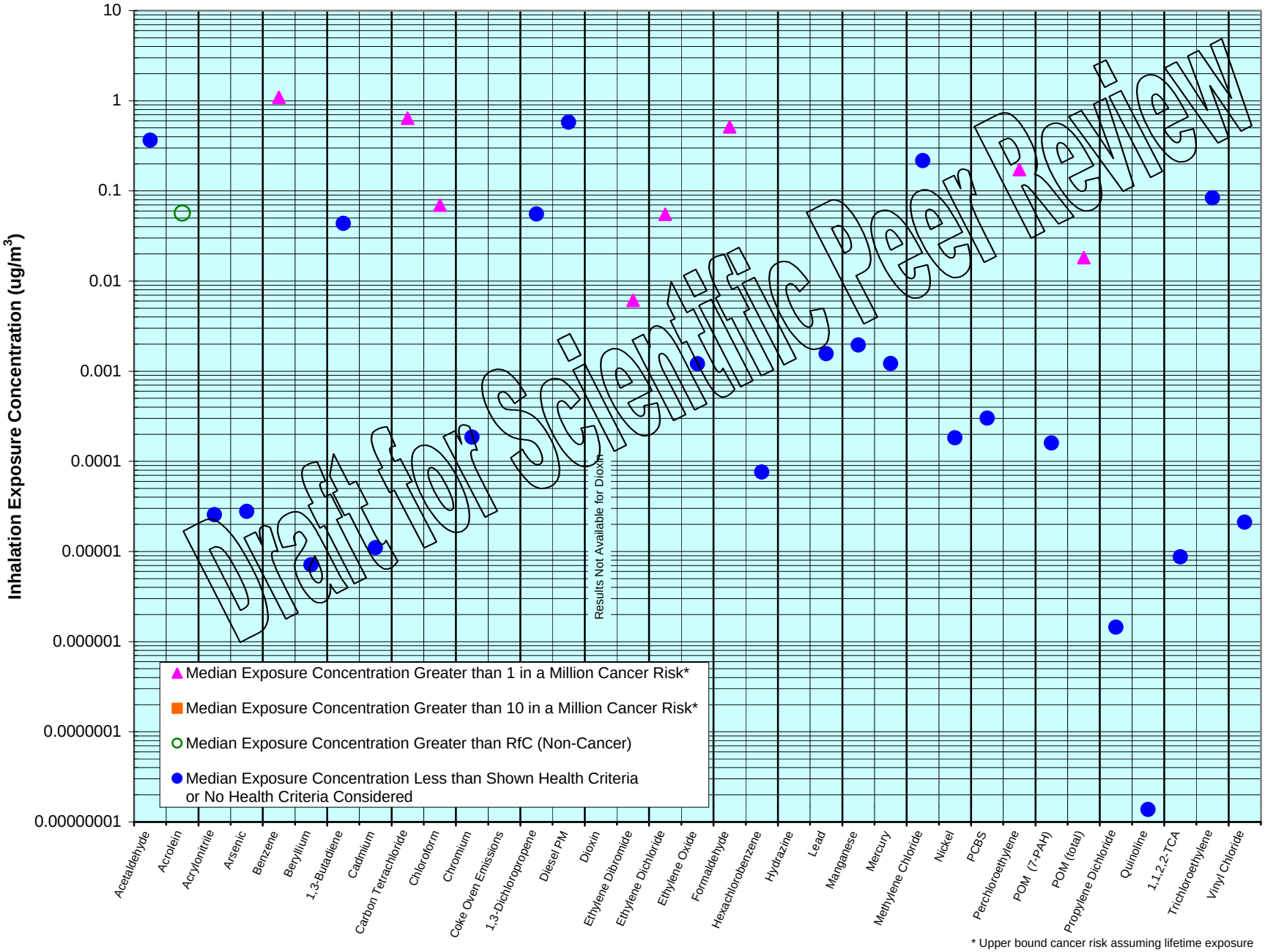

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1996 Modeled Median Exposure Concentrations for New Hampshire
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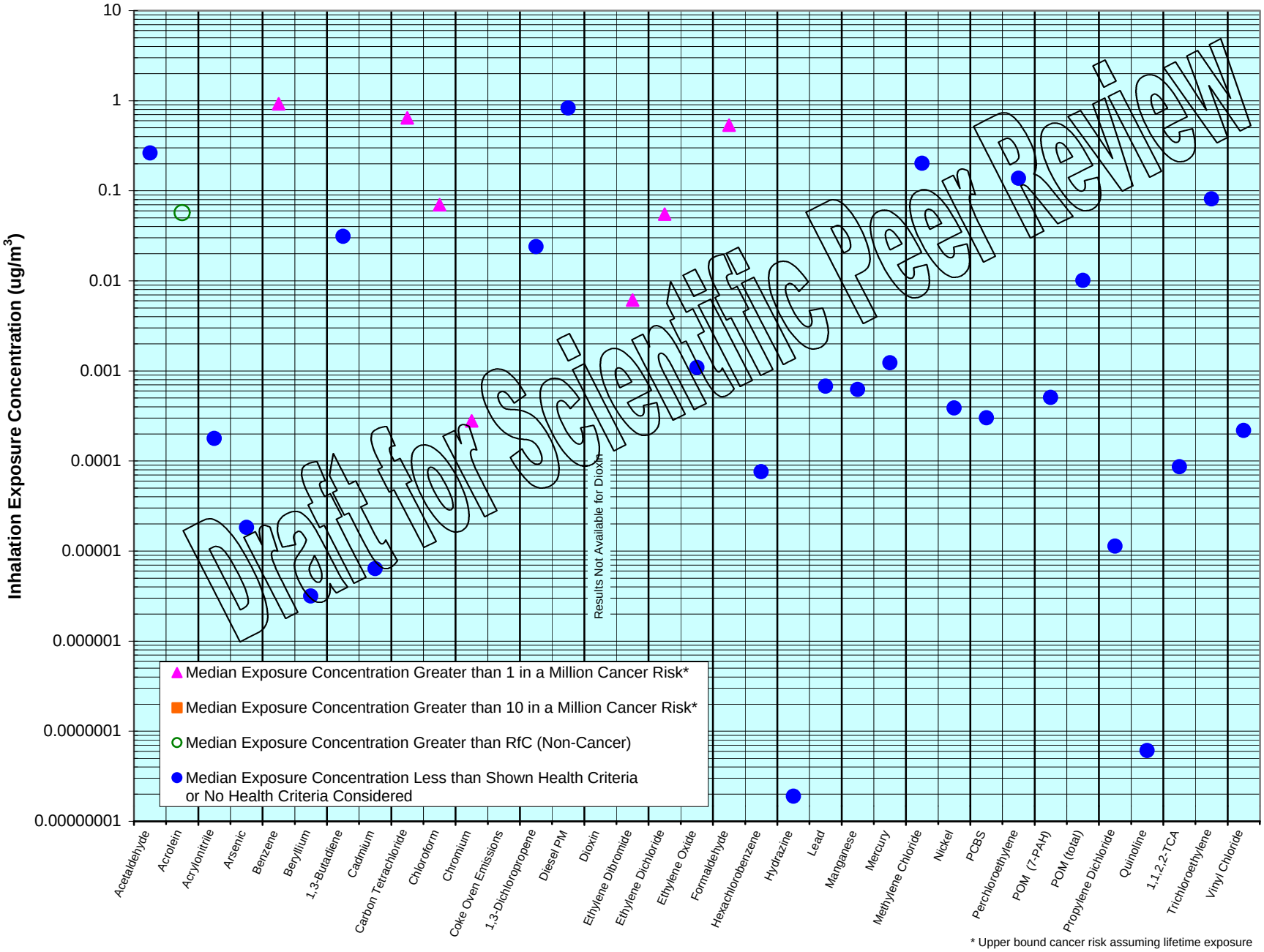

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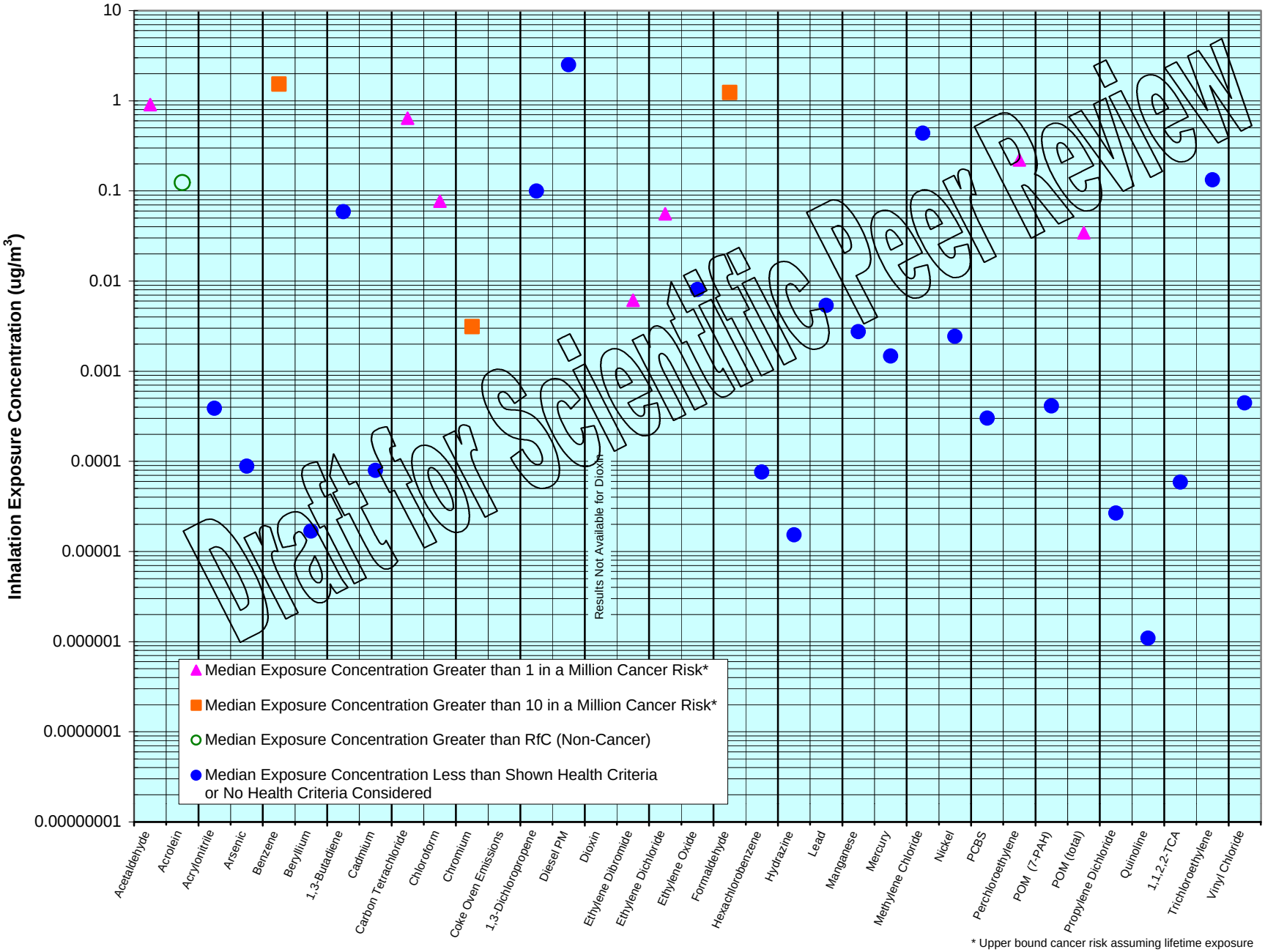
1996 Modeled Median Exposure Concentrations for New Jersey
(For Limitations On The Use of These Data See Page 2)



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1996 Modeled Median Exposure Concentrations for New Mexico
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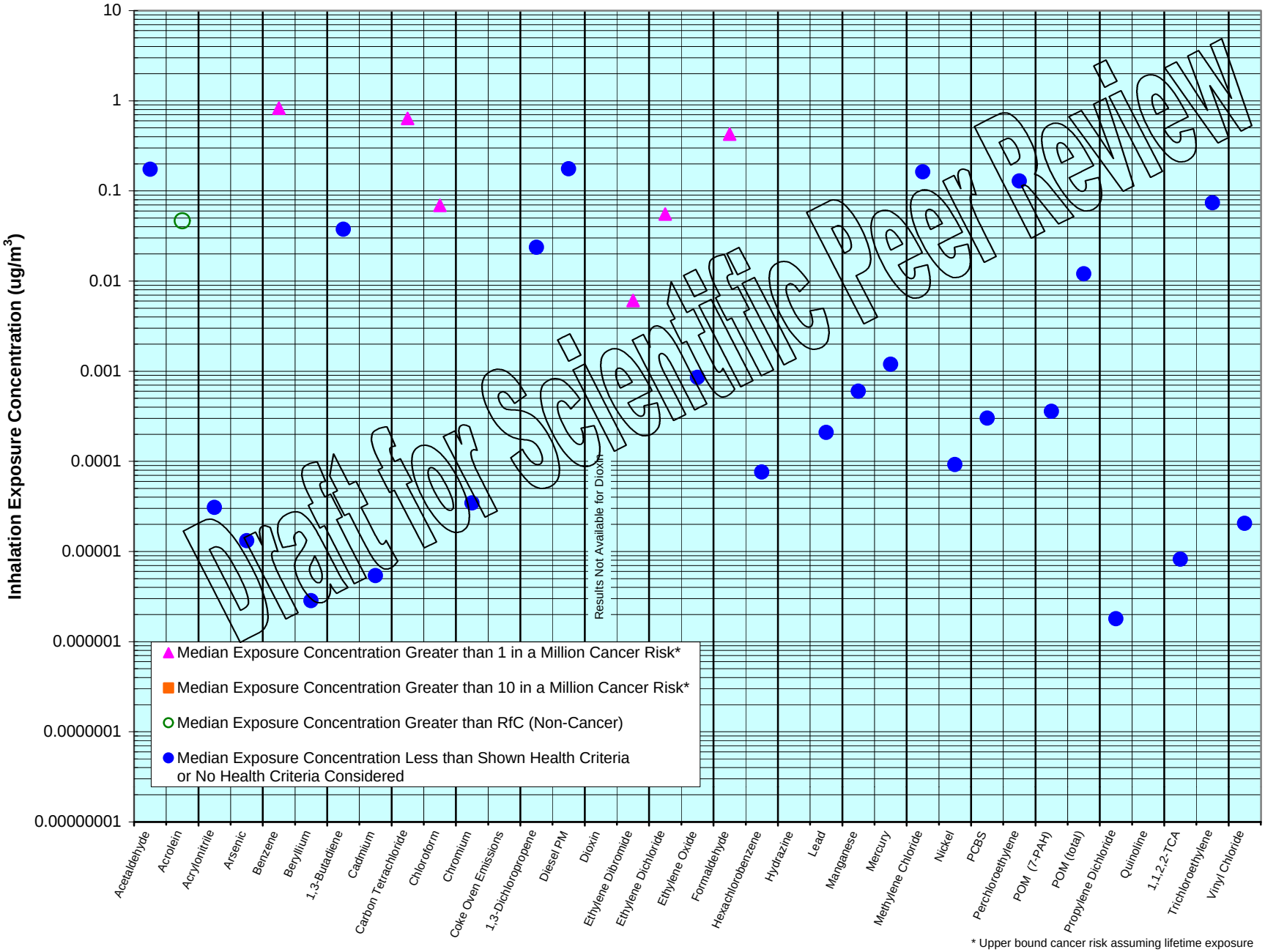

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1996 Modeled Median Exposure Concentrations for New York
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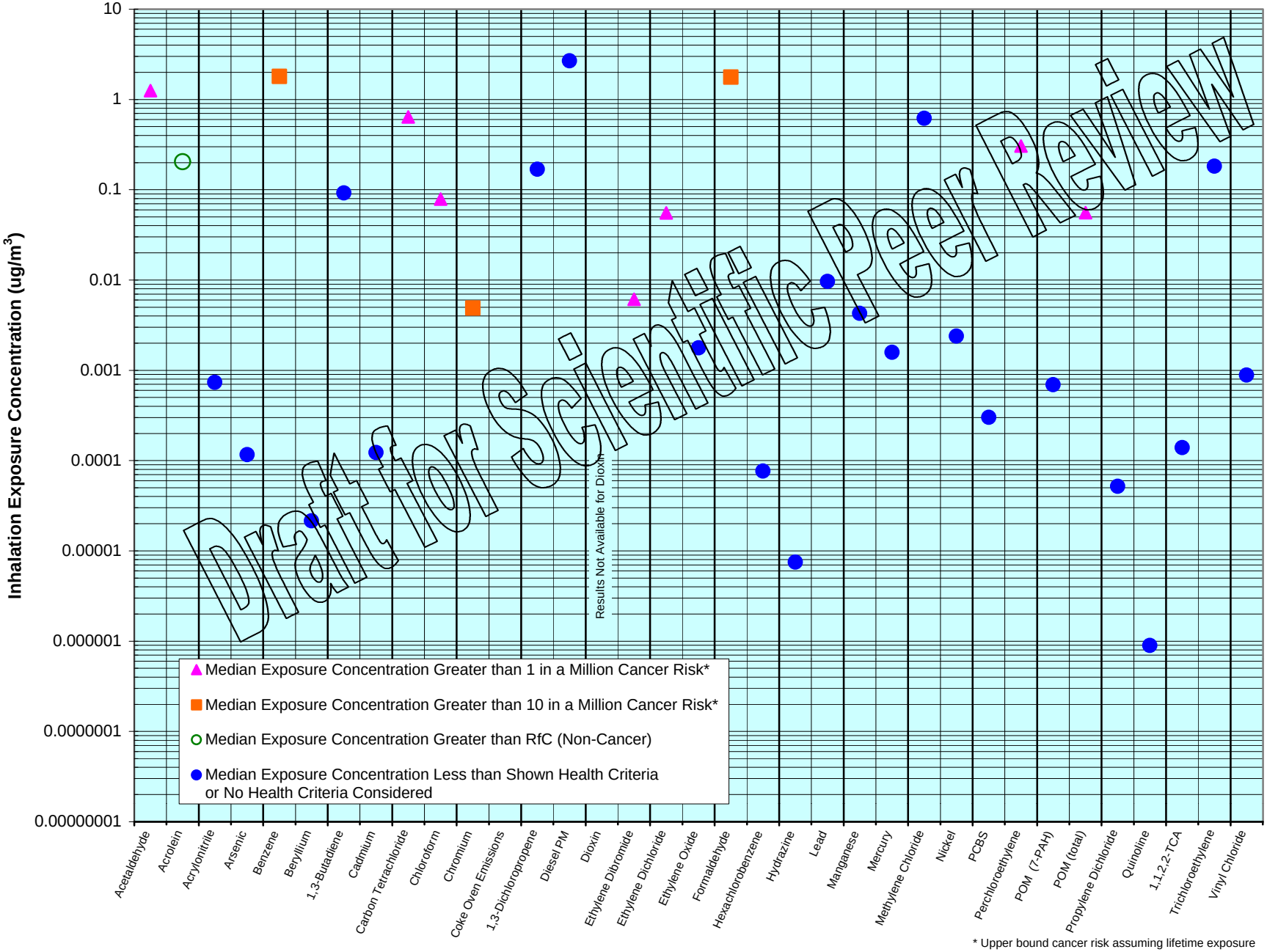

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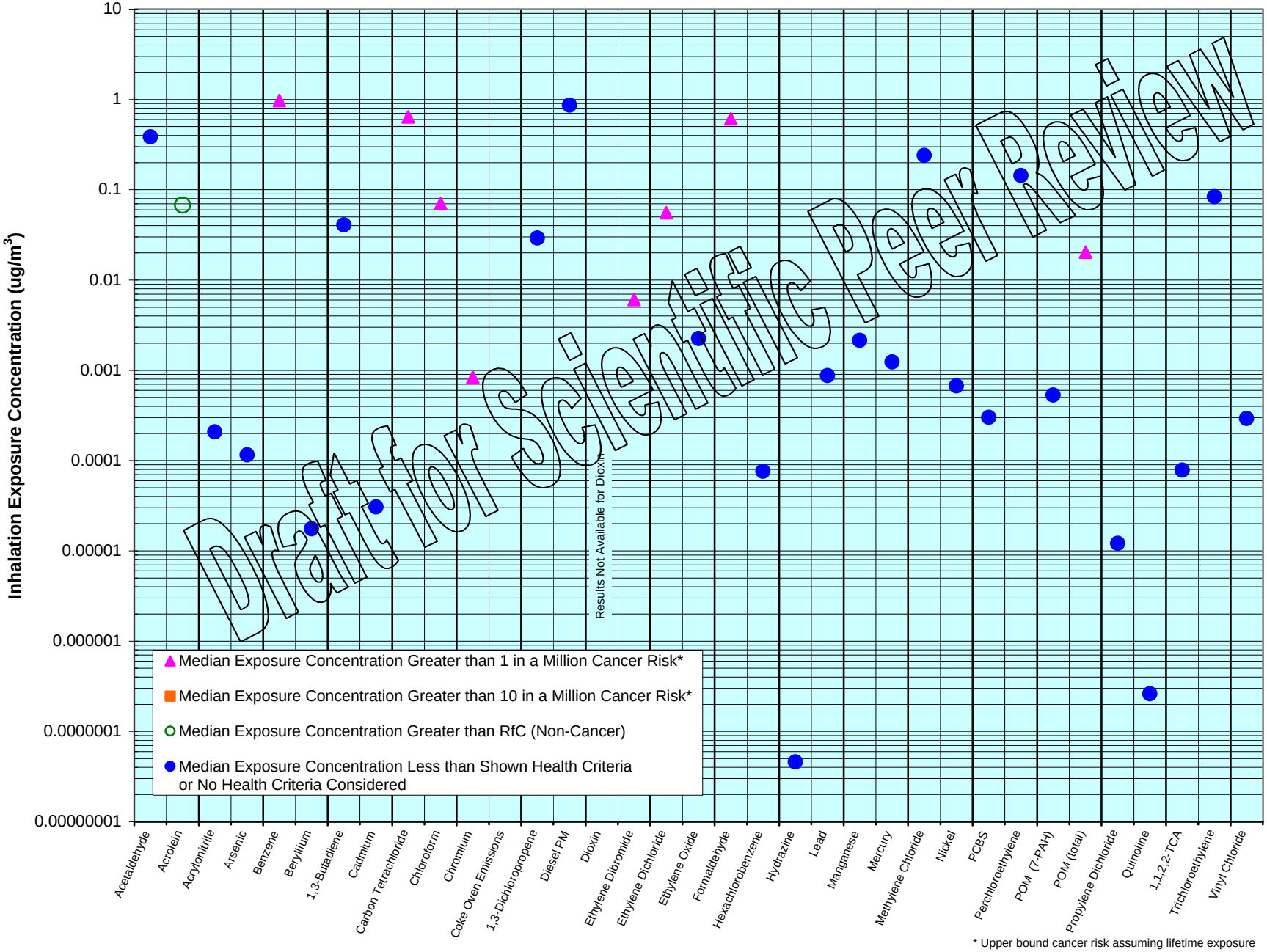
1996 Modeled Median Exposure Concentrations for North Carolina
(For Limitations On The Use of These Data See Page 2)



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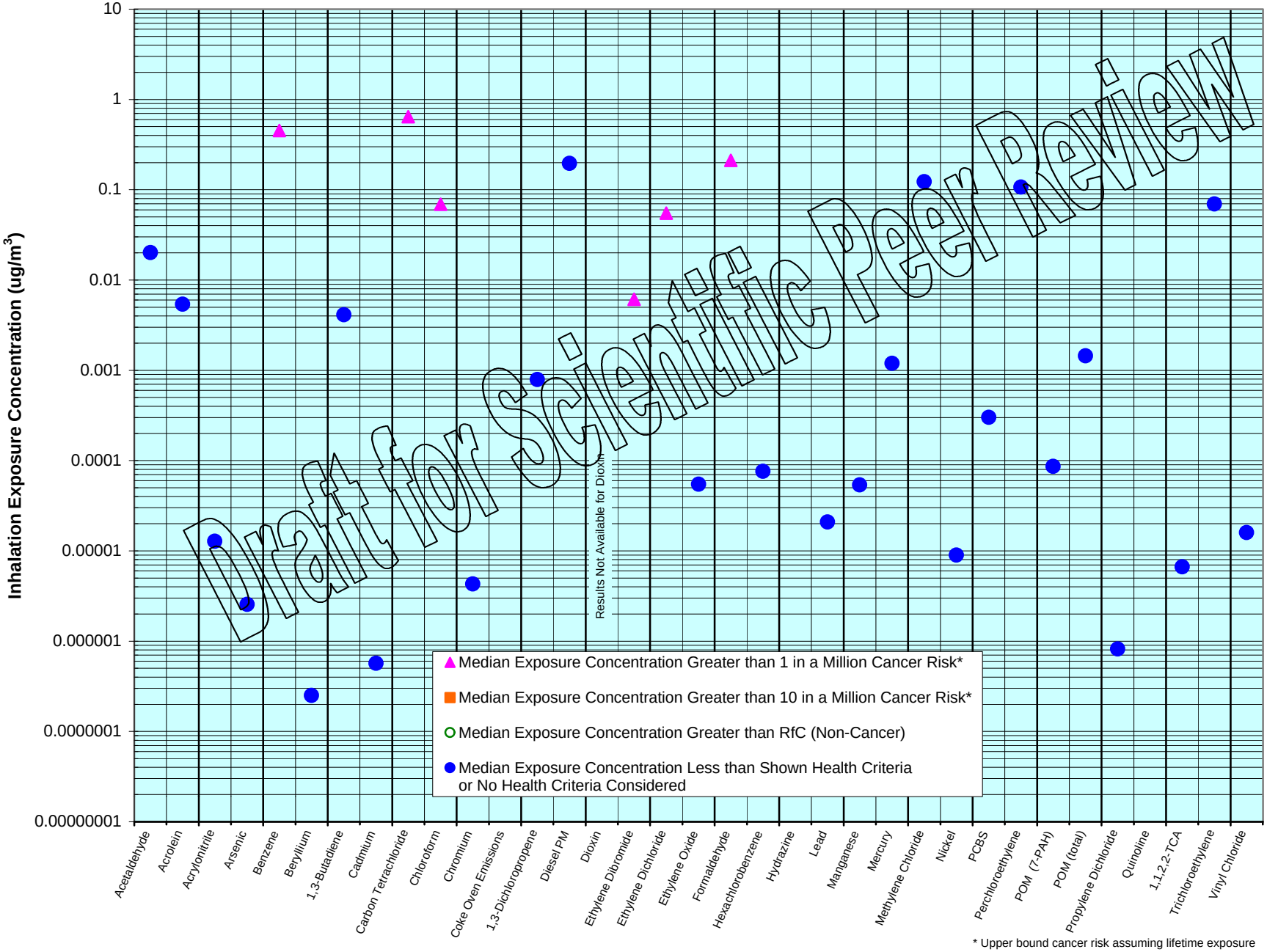

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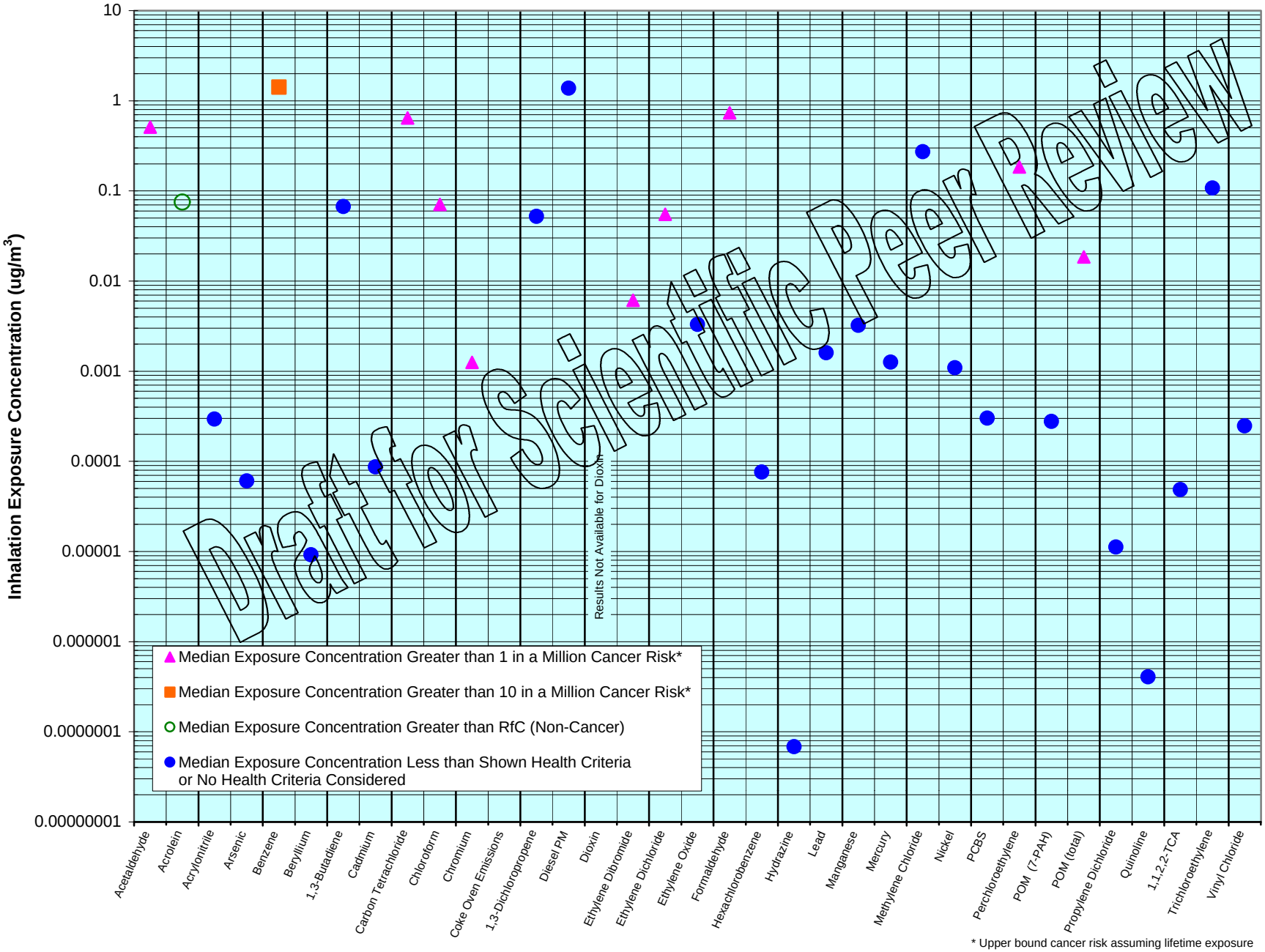
1996 Modeled Median Exposure Concentrations for Ohio
(For Limitations On The Use of These Data See Page 2)



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1996 Modeled Median Exposure Concentrations for Oklahoma
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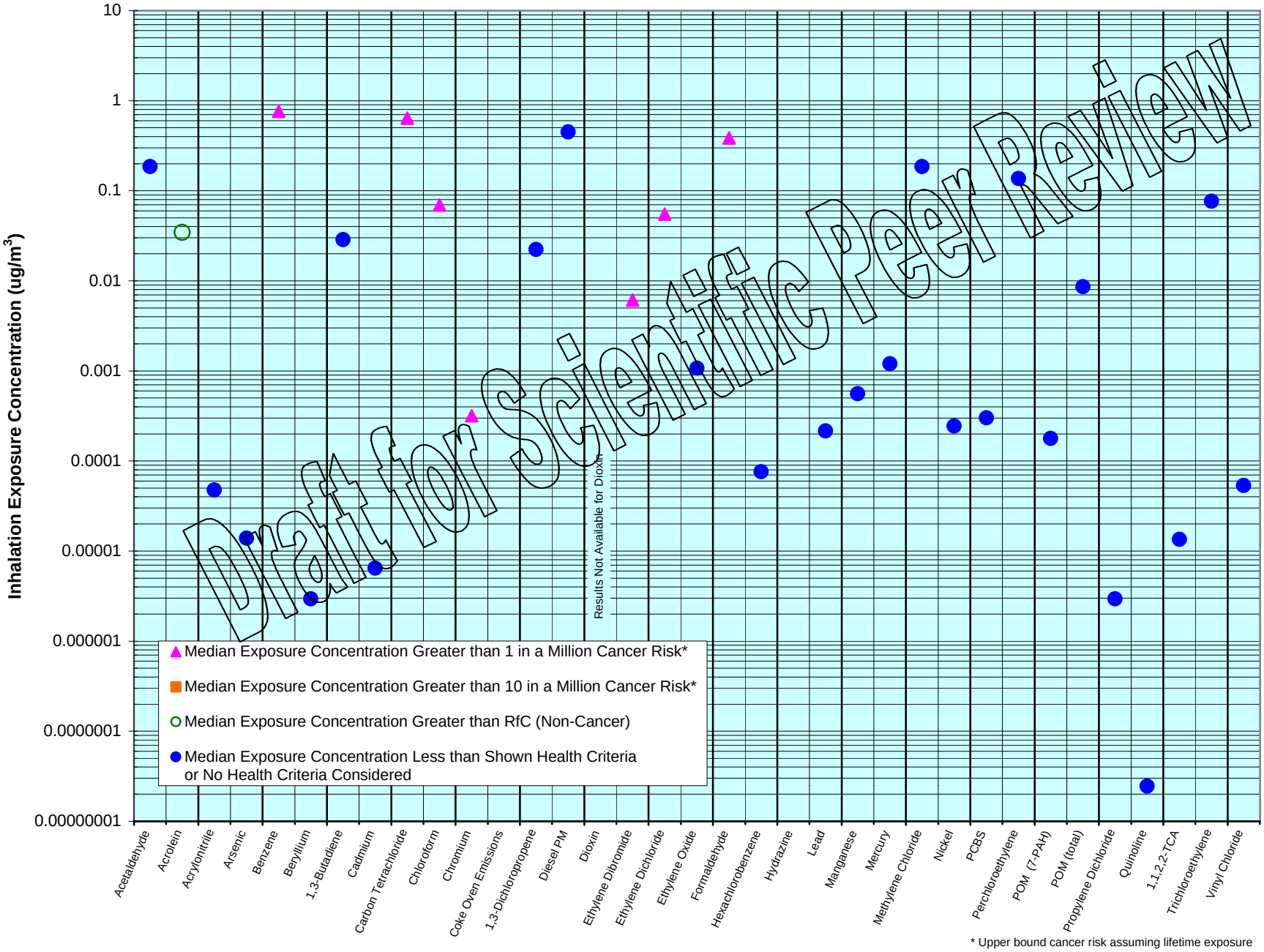

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1996 Modeled Median Exposure Concentrations for Oregon
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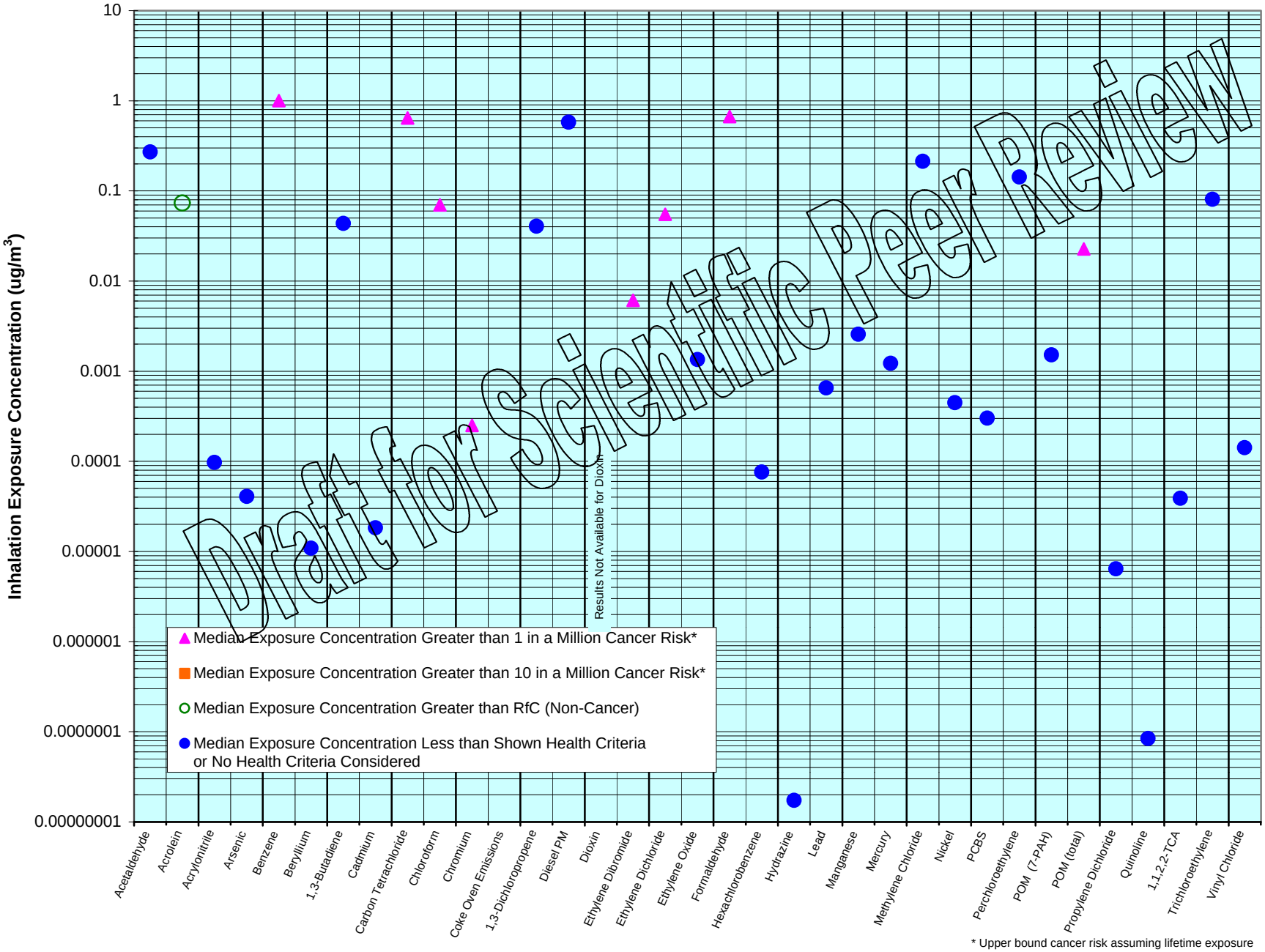

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1996 Modeled Median Exposure Concentrations for Pennsylvania
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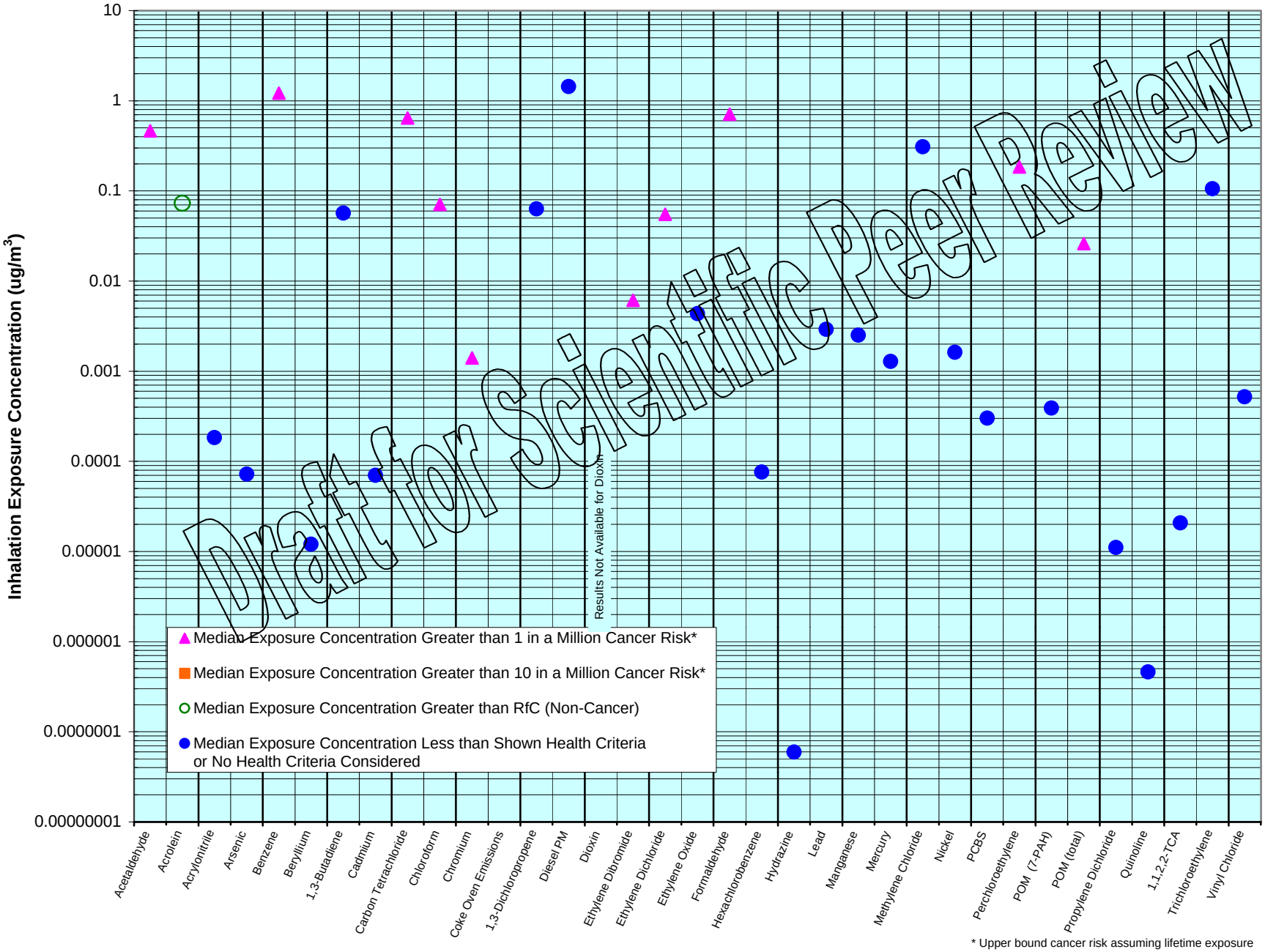

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US EPA ARCHIVE DOCUMENT

1996 Modeled Median Exposure Concentrations for Puerto Rico
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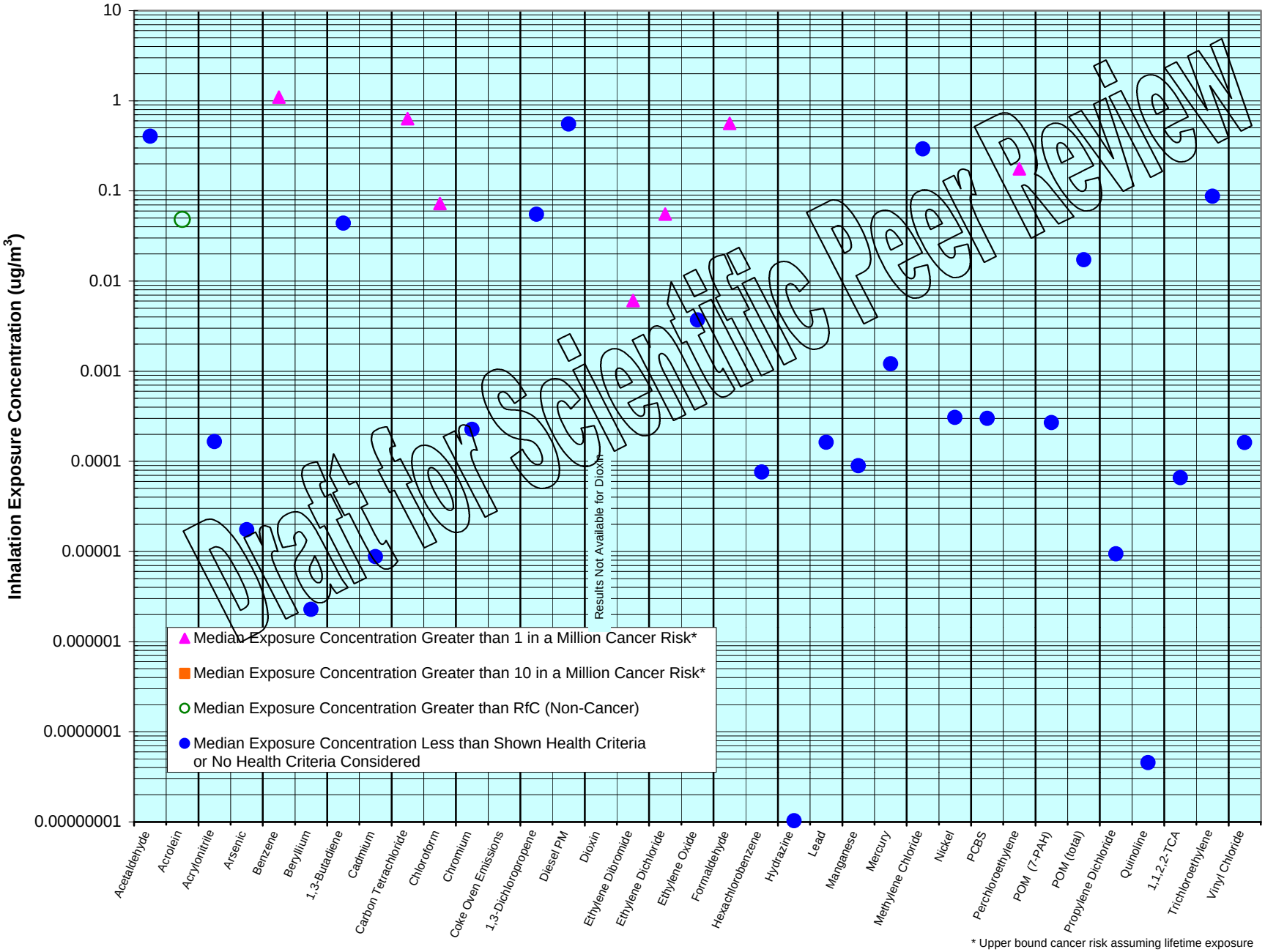

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1996 Modeled Median Exposure Concentrations for Rhode Island
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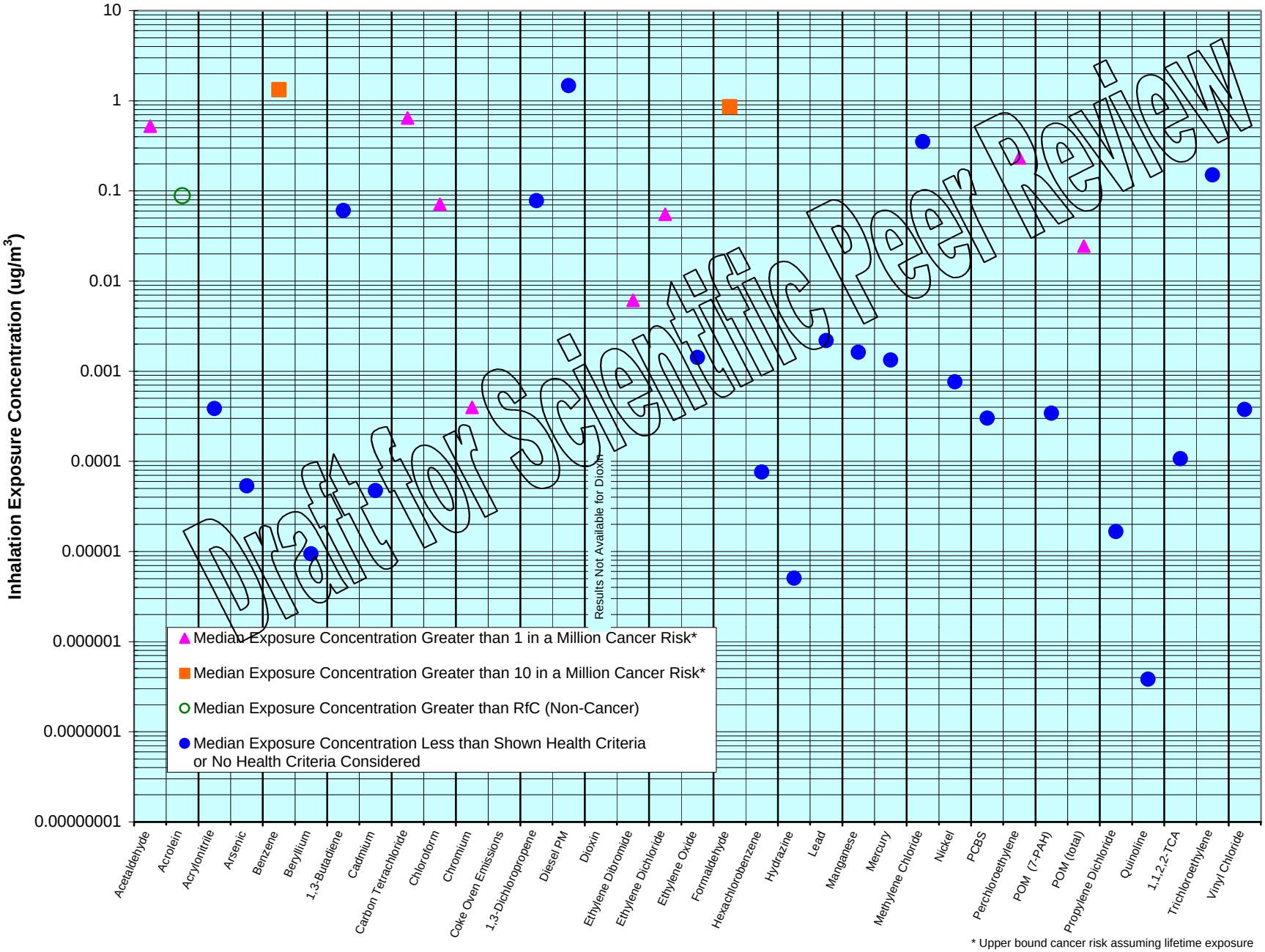

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1996 Modeled Median Exposure Concentrations for South Carolina
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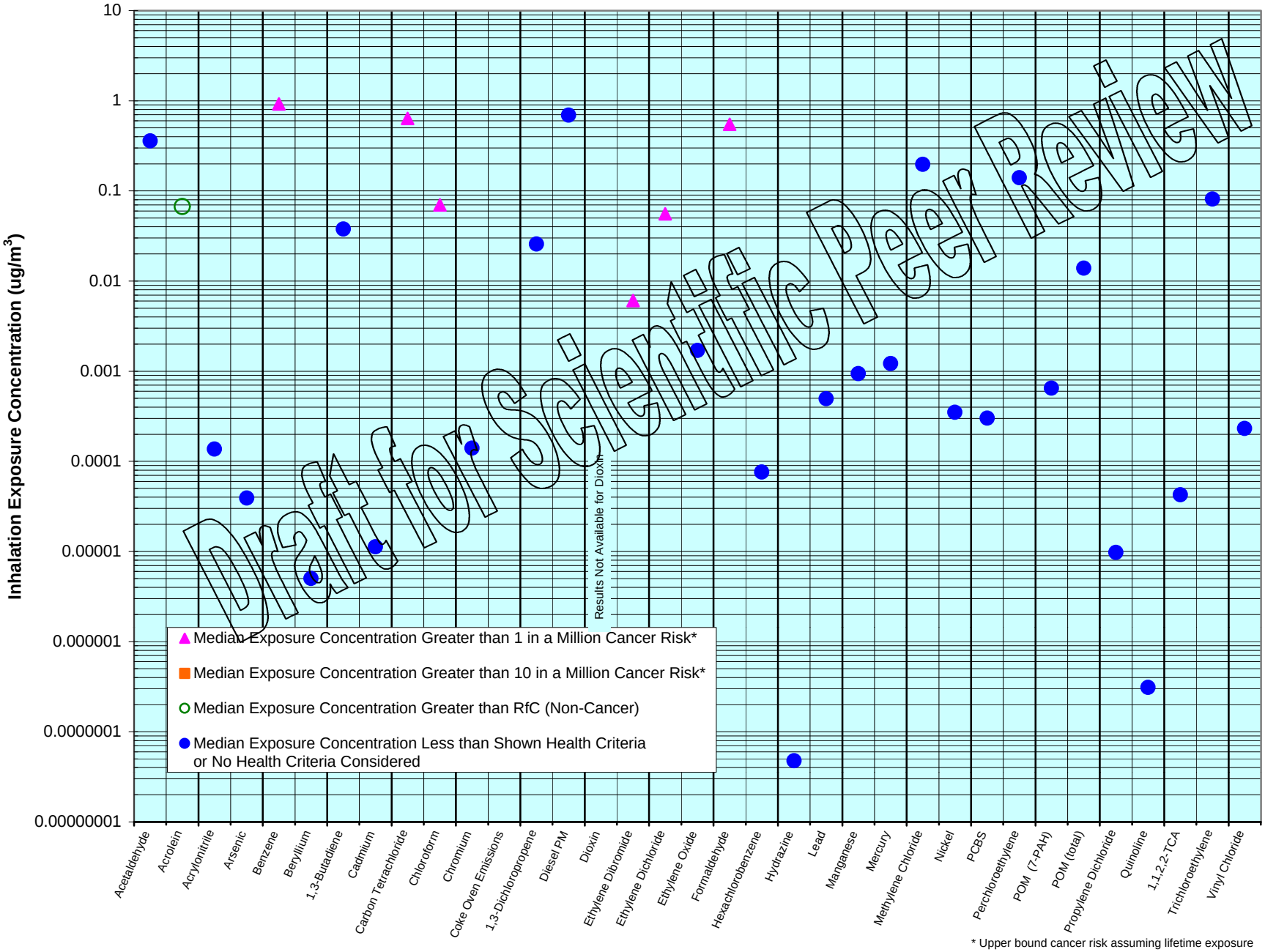

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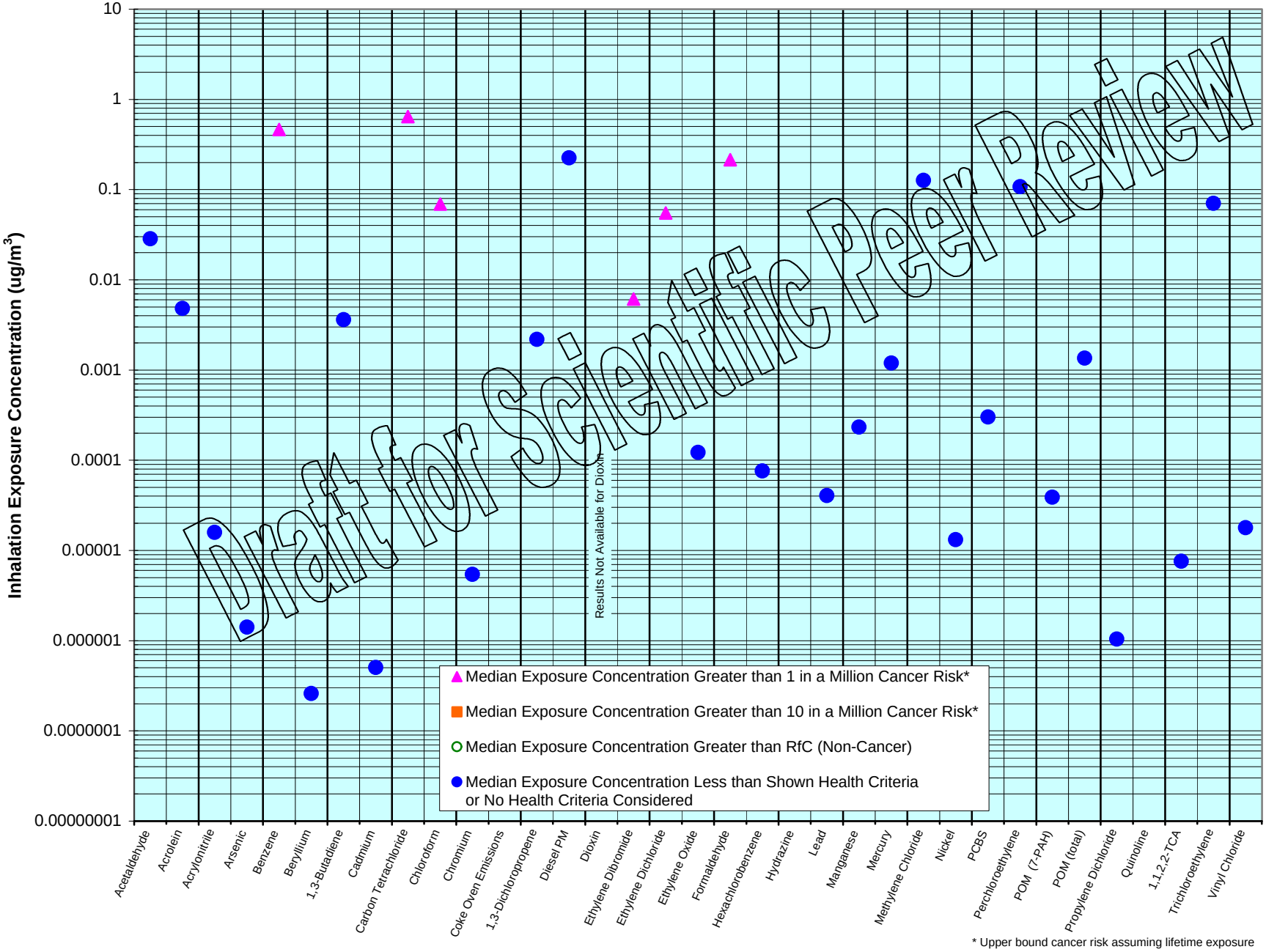

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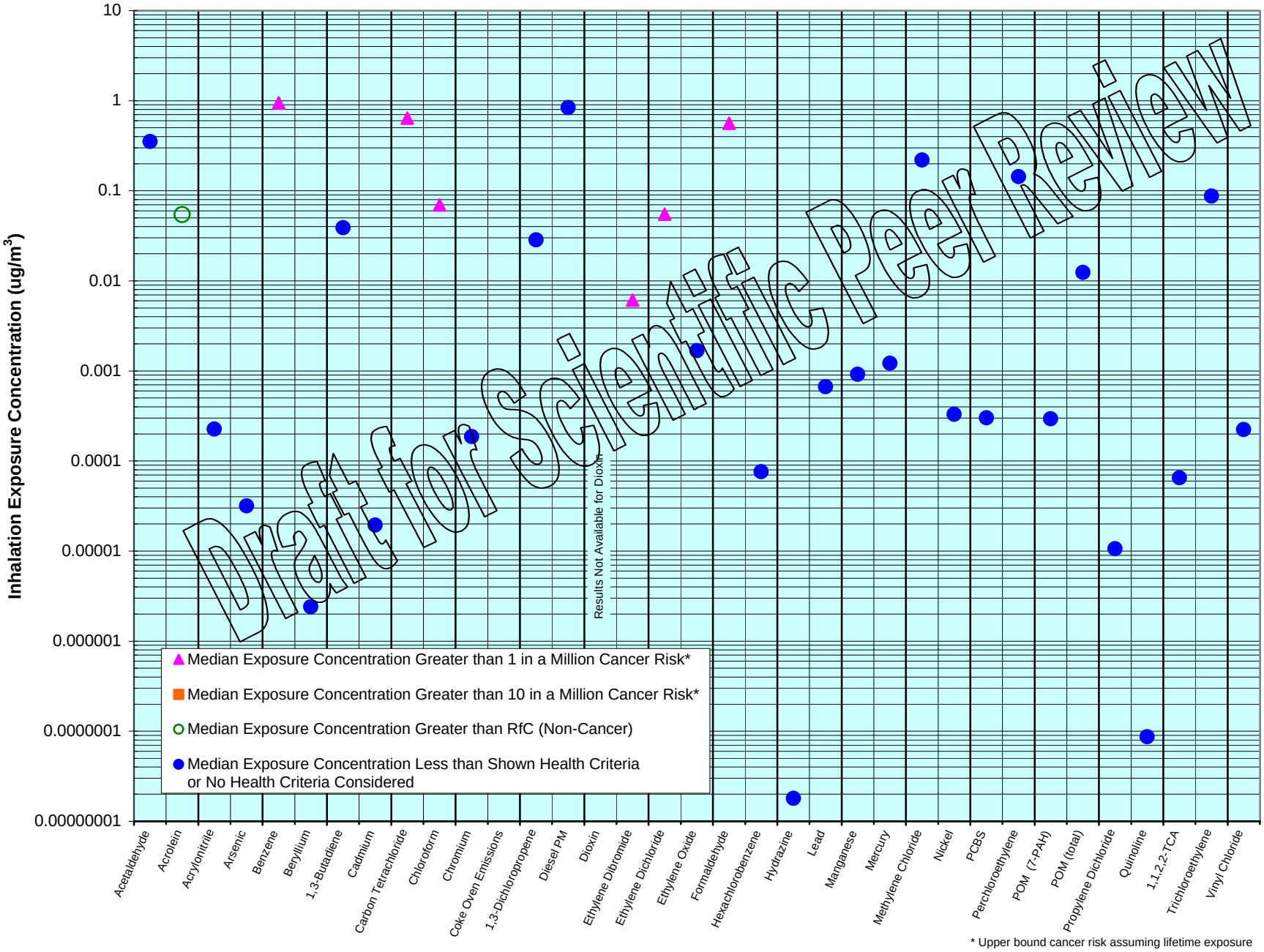

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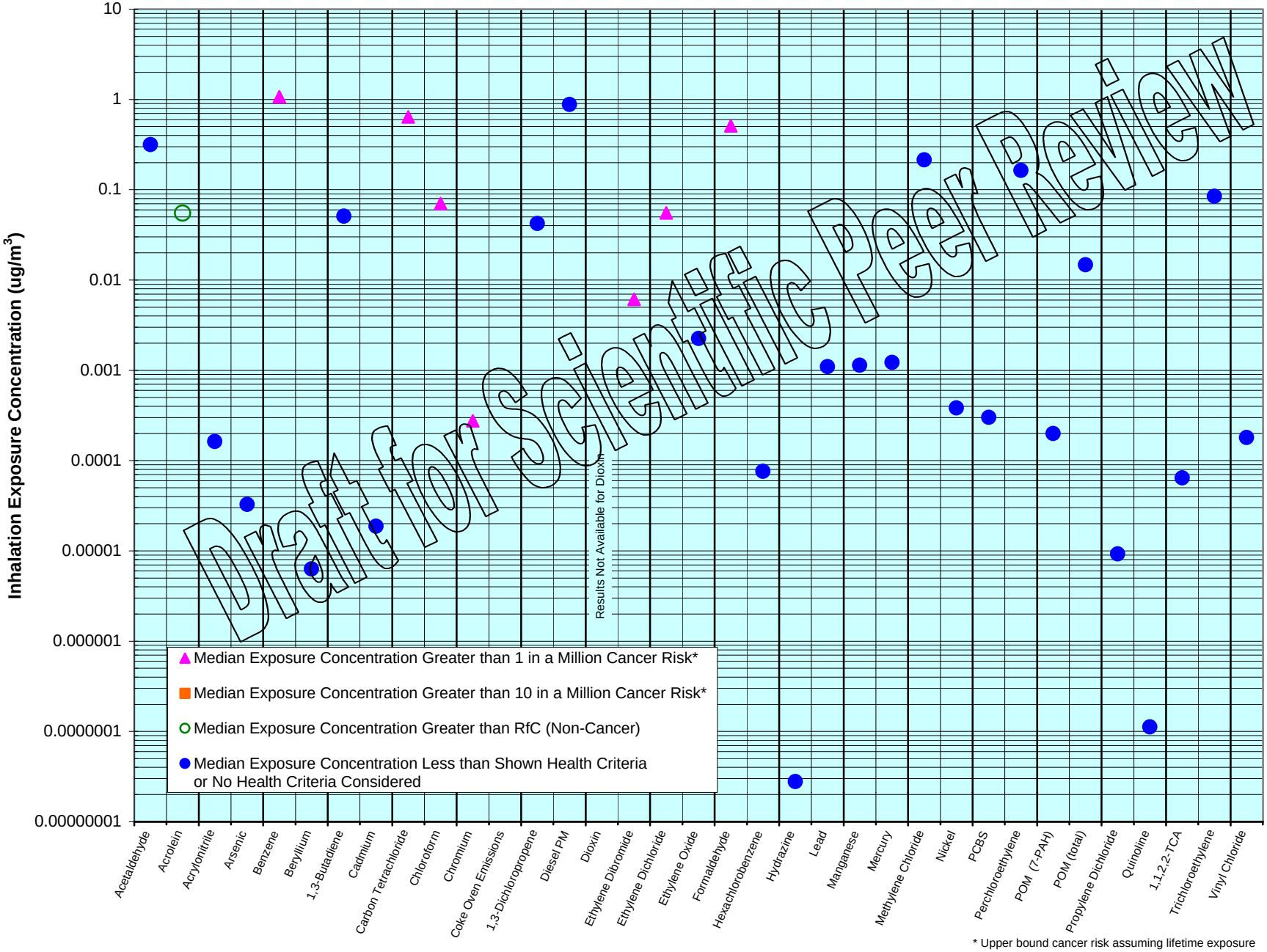

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1996 Modeled Median Exposure Concentrations for Utah
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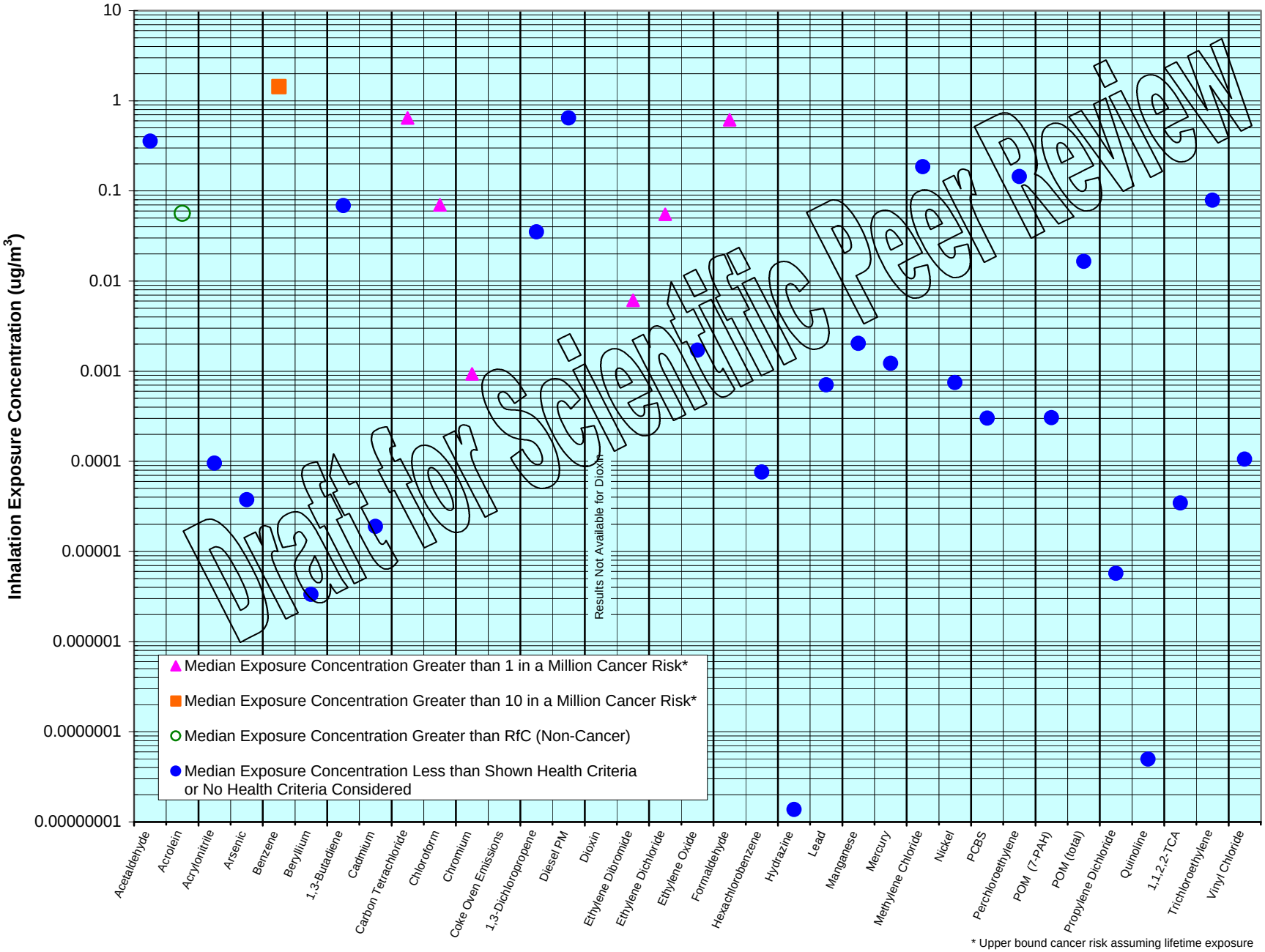

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1996 Modeled Median Exposure Concentrations for Vermont
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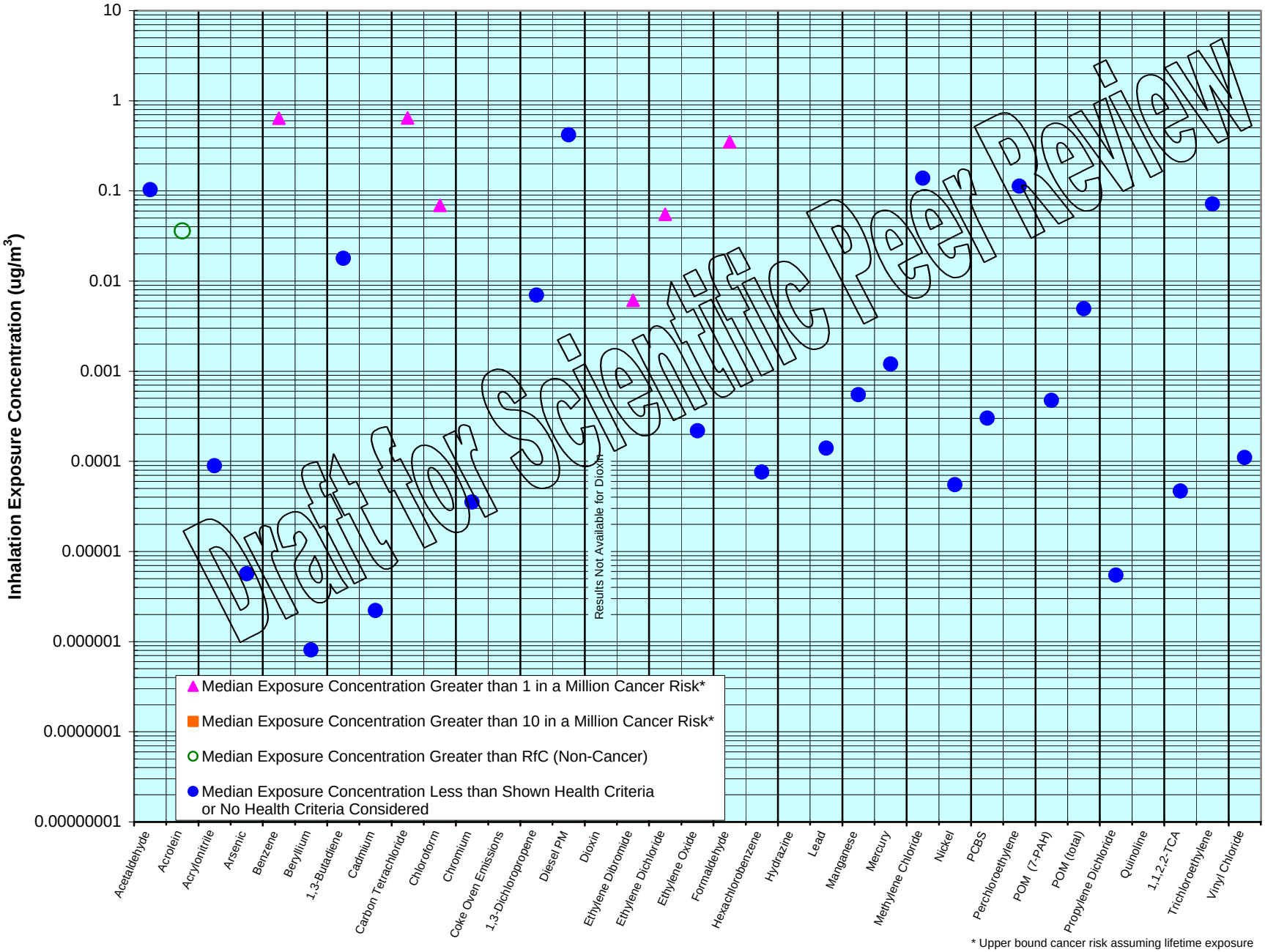

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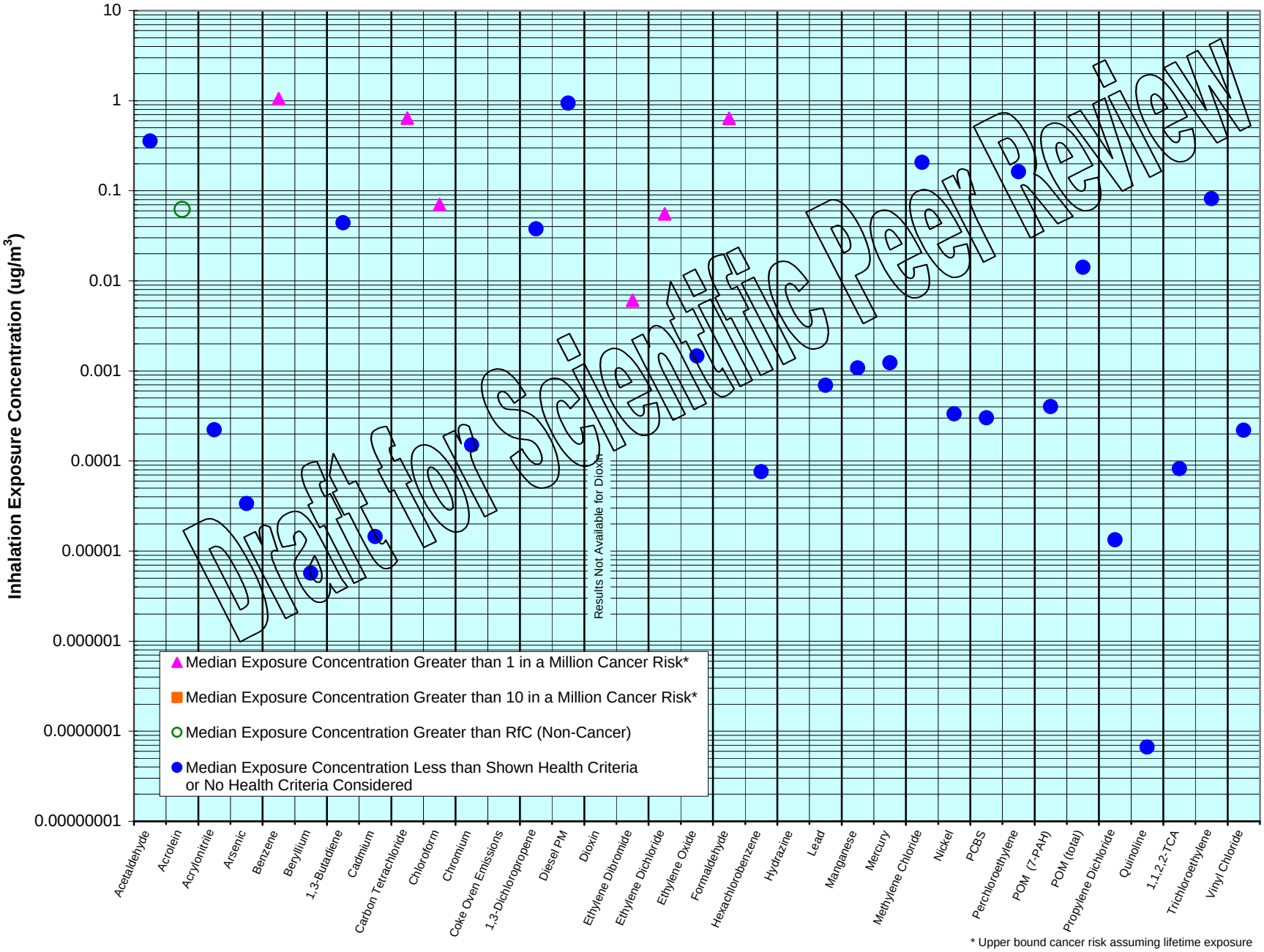

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1996 Modeled Median Exposure Concentrations for Virgin Islands
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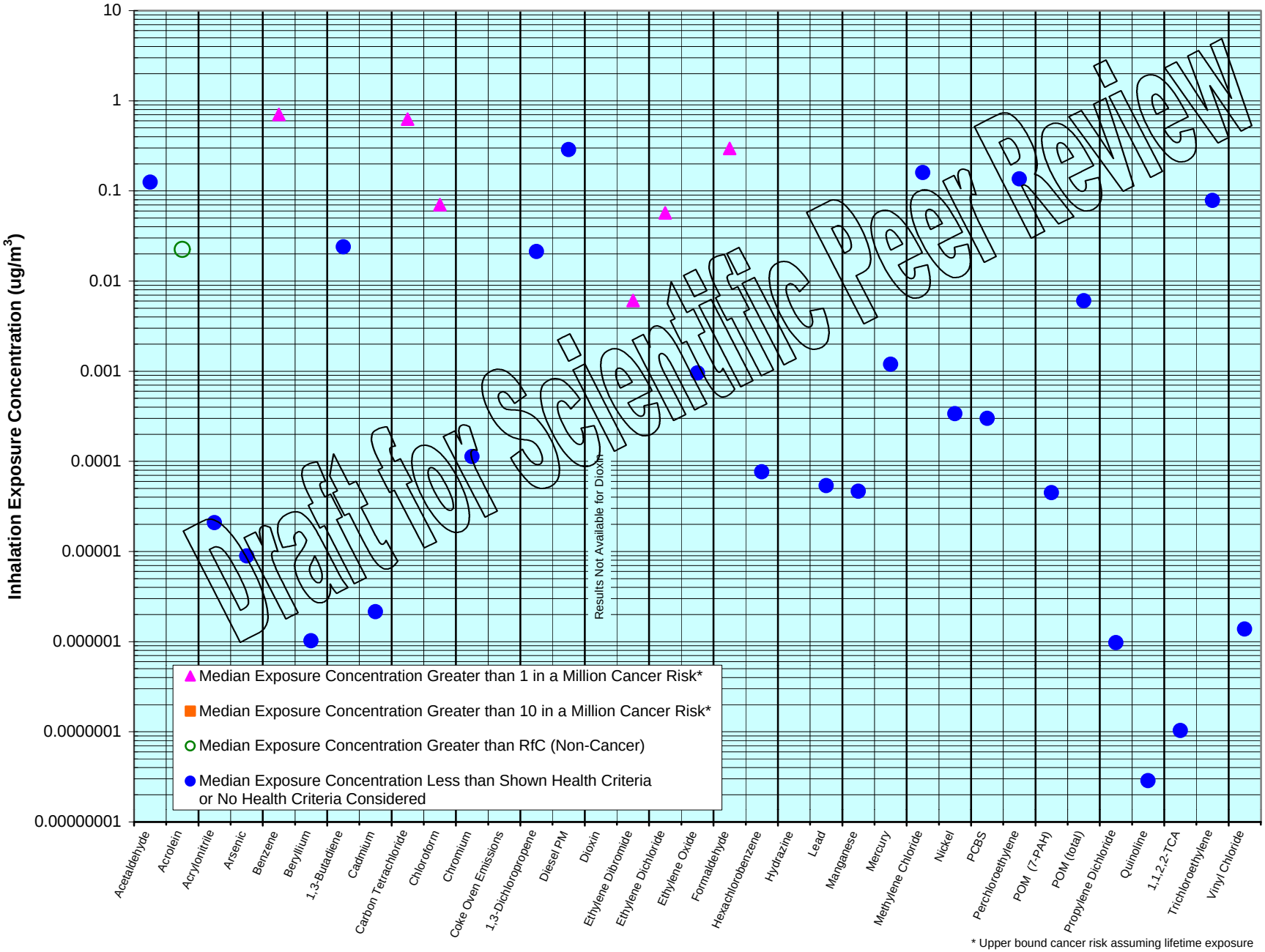

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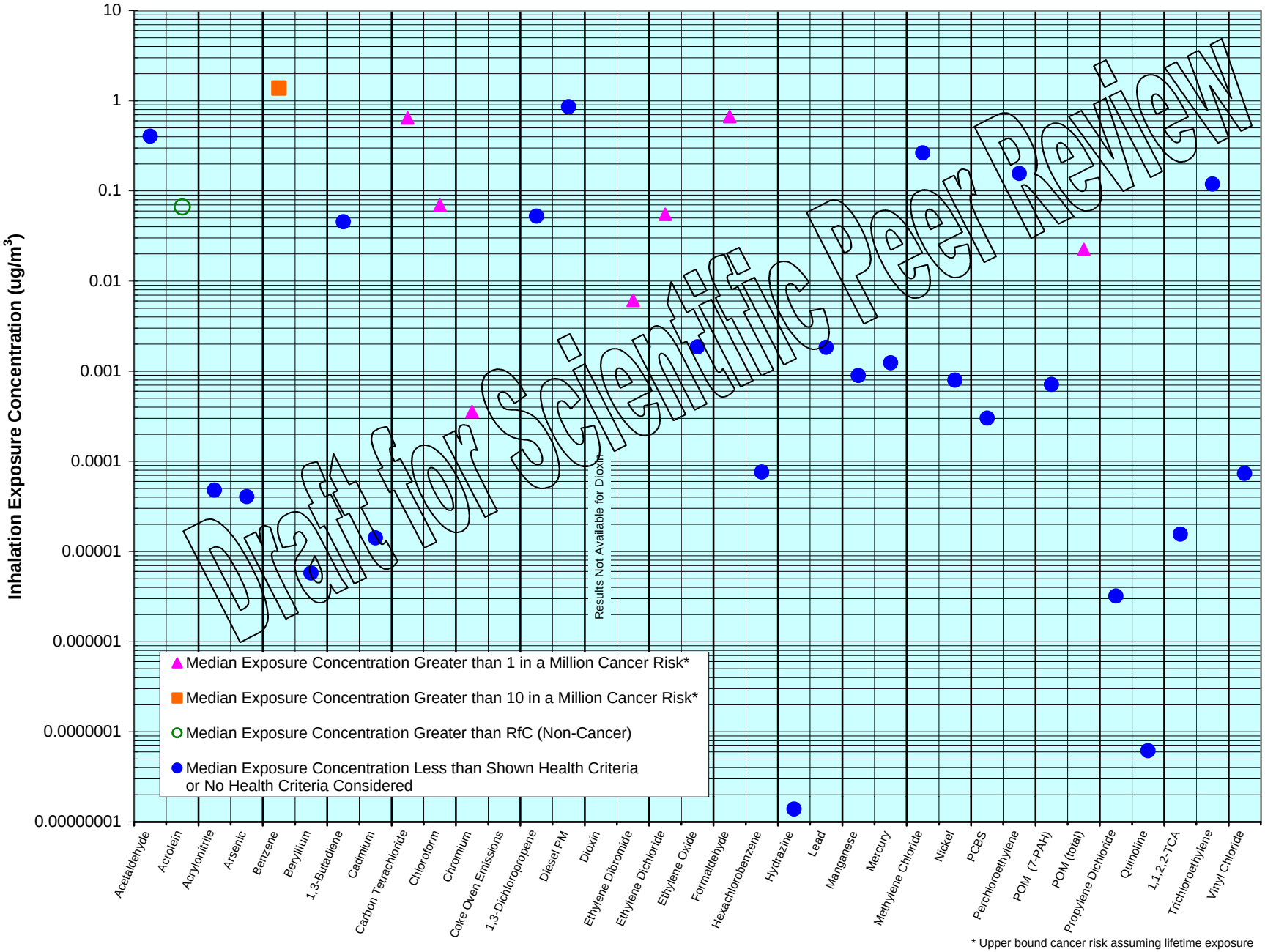
1996 Modeled Median Exposure Concentrations for Washington
(For Limitations On The Use of These Data See Page 2)



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1996 Modeled Median Exposure Concentrations for West Virginia
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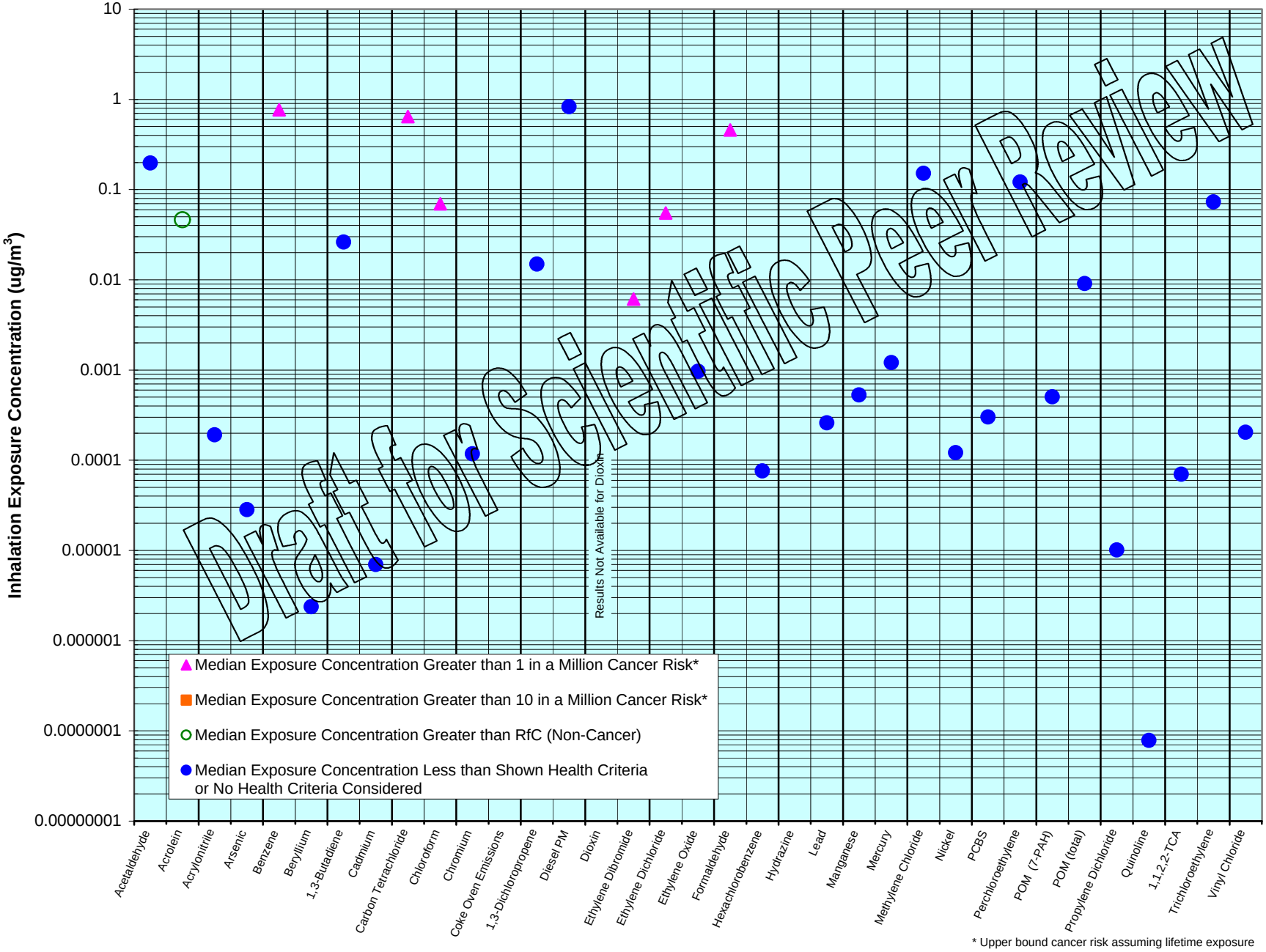

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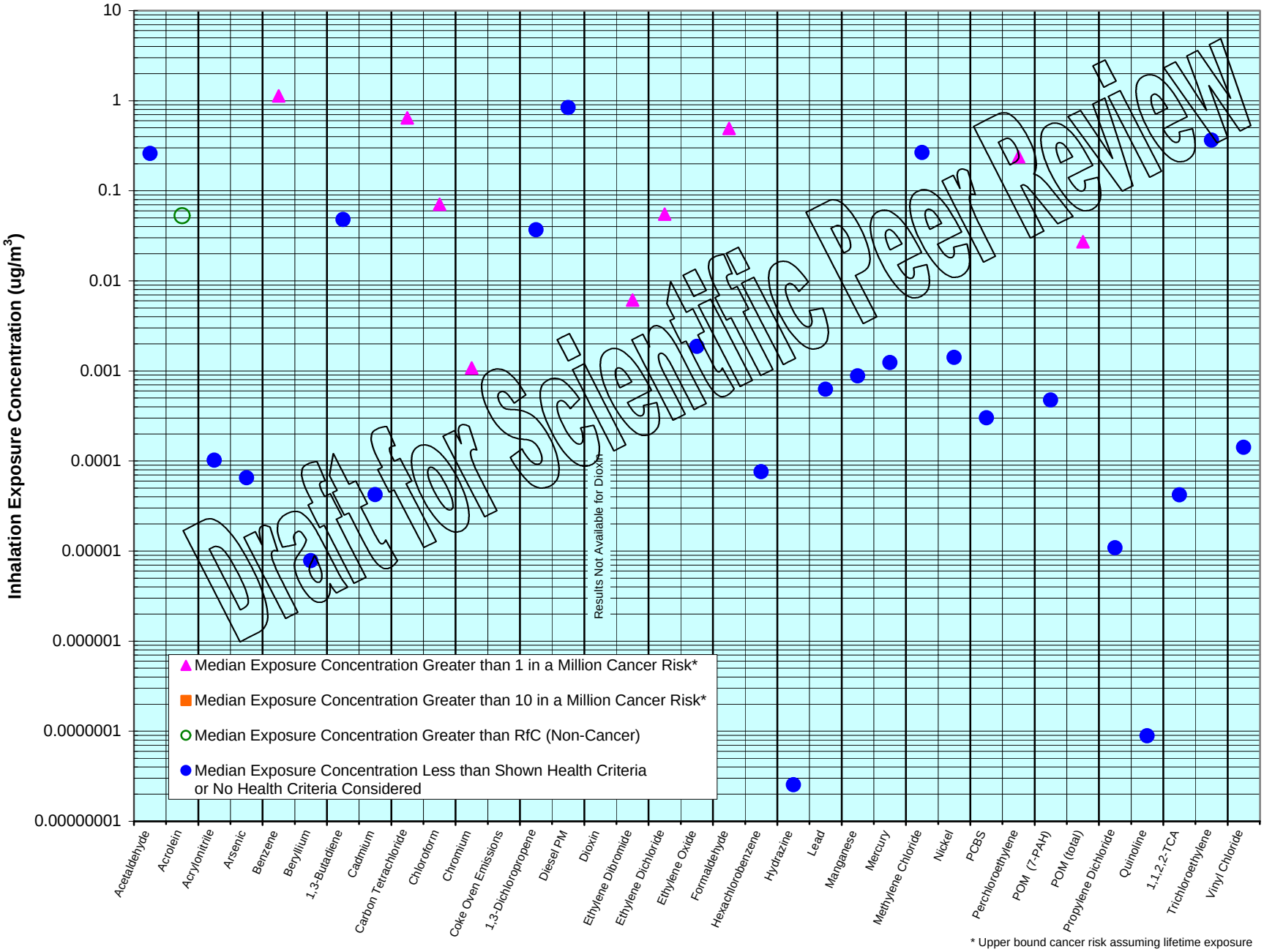
1996 Modeled Median Exposure Concentrations for Wisconsin
(For Limitations On The Use of These Data See Page 2)



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1996 Modeled Median Exposure Concentrations for Wyoming
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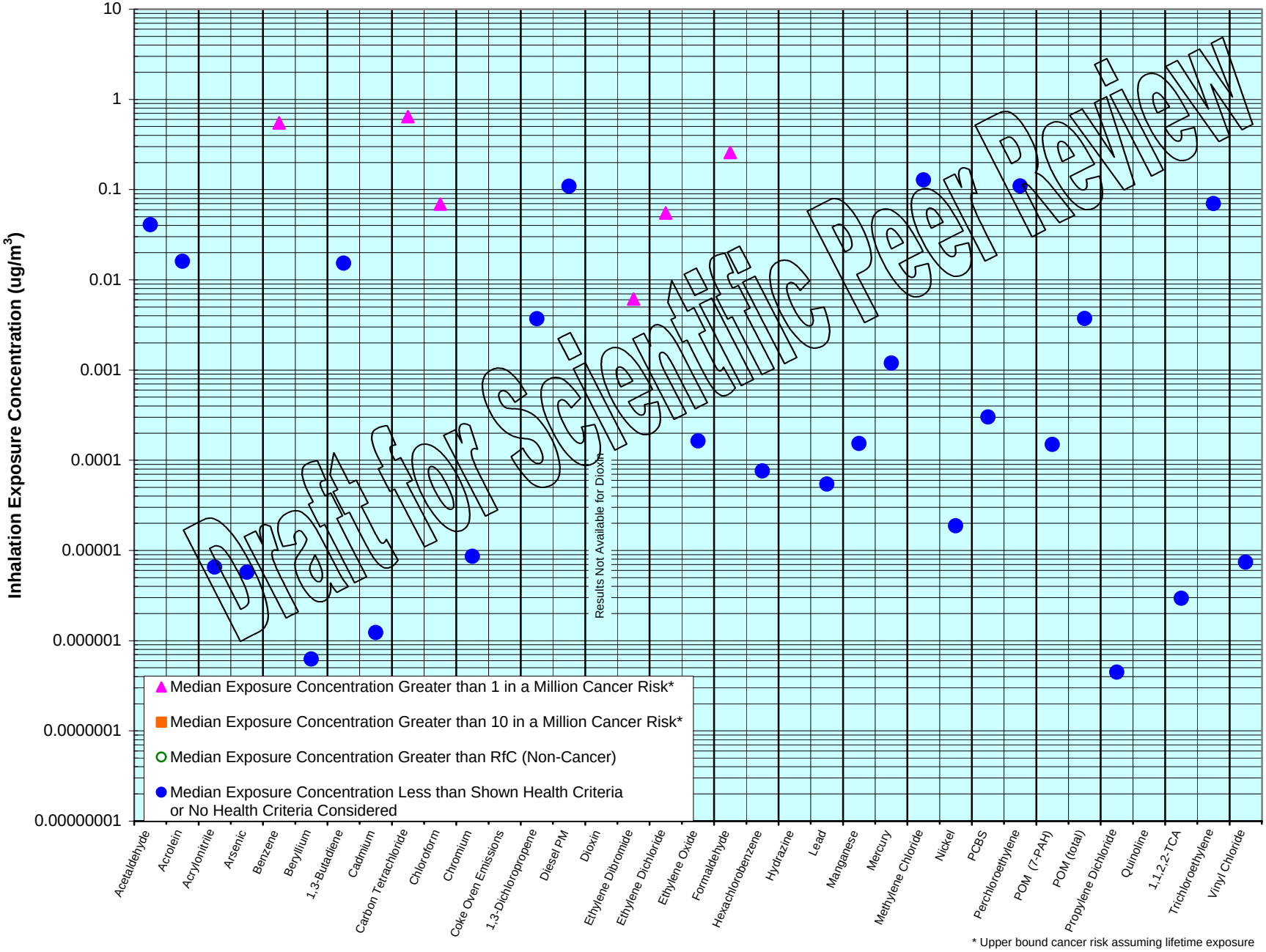

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EPA strongly cautions that these modeling results should not be used to draw conclusions about local exposure concentrations or risk. The results are most meaningful when viewed at the state or national level; for smaller areas, the modeling becomes less certain. In addition, these results represent conditions in 1996 rather than current conditions and only include exposures from outdoor sources of air toxics.

- The exposure estimates presented above represent midrange estimates of population exposures. Due to a number of factors, some individuals may have substantially higher or lower exposures. It is important to note that the model, as applied on the national scale, is not designed to quantify these extreme values of individual exposures.

- Note that for certain chemicals, exposure pathways other than inhalation as well as indoor sources of air toxics may contribute substantially to total exposures of concern. This assessment does not address these other routes of exposure (i.e., ingestion or dermal) or inhalation exposure resulting from indoor sources.

- The emissions used in this assessment do not reflect potentially significant emission reductions that have taken effect since 1996, including those from: 1) mobile source regulations which are being phased in over time; 2) many of the air toxics regulations EPA has issued for major industrial sources; 3) State or industry initiatives; and 4) any facility closures.

- Simplified modeling assumptions may introduce significant uncertainties into each component of the assessment. See the full discussion of these limitations.

- Because of these uncertainties, EPA will not use the results of this assessment to determine source-specific contributions or to set regulatory requirements. However, EPA expects to use these results to inform decisions about the priorities of the air toxics program as well as to guide the collection of additional data that could lead to regulatory decisions.

- EPA provides cancer risk estimates for carcinogens at various exposure levels (e.g., 100 in a million) to assist readers in placing the exposure levels in context. The interpretation of a risk level of 100 in a million is that an individual continually exposed to a pollutant at this level over the course of a lifetime sustains a 100 in a million chance of contracting cancer as a result of that exposure. All risk estimates are considered conservative, but not worst-case. True risk would probably be less, but could be greater.

- EPA also provides hazard quotient (HQ) values for non-carcinogens at various exposure levels (e.g., HQ=1.0) to assist readers in placing the exposure levels in context. The HQ is the ratio of a given exposure level to the reference concentration (RfC), which in turn is an estimate of the continuous lifetime inhalation exposure which the EPA believes is likely to be without appreciable risk of deleterious non-cancer effect. Thus, if HQ=1.0, the predicted exposure concentration is equivalent to the RfC level for that pollutant. While exposures below the RfC are believed safe, exposures above the RfC are not necessarily harmful. Nevertheless,as exposure increases above the RfC, the risk for adverse effects also increases.

- It is important to realize that these risk and HQ levels are not regulatory levels – they are provided to help in judging the relative importance of these different pollutants with regard to their potential to create adverse health effects . The determination of what risk or HQ levels are acceptable or unacceptable depends on additional factors and more refined information, and is not addressed in this assessment.

- Health effects information is available at: www.epa.gov/ttn/uatw/hapindex.html

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