

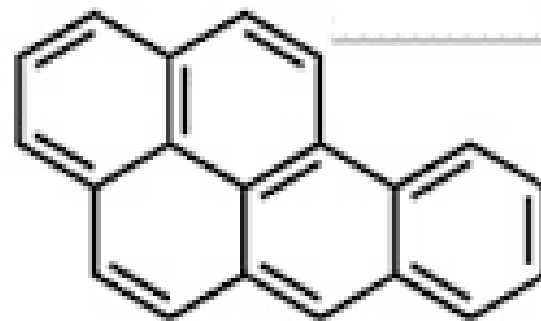
PAH Update





CHANGES TO SOIL STANDARDS

1. NEW B(A)P TOXICITY LEVELS
2. NEW EXPOSURE ASSUMPTIONS
3. PAH CUMULATIVE ASSESSMENT
4. PAH BACKGROUND STUDY



Benzo[A]Pyrene



1. New BaP Toxicity Levels

- DNR non-industrial direct contact RCL increased from **15 ppb** to **115 ppb**.
- DNR industrial direct contact RCL increased from **211** to **2,110** ppb.
- DNR groundwater protection RCL did not change.

2. New Exposure Assumptions



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2. New Exposure Assumptions

- Exposure assumptions changed.
 - Standard person was 70kg, now 80kg
 - Larger people = More surface area
 - Changes residences more frequently
- Will affect all compounds on soil standard spreadsheet
- Results in less than 10% difference in calculated RCL values



NR 720 Soil Standards

- Residual Contaminant Levels (RCLs)
 - Direct Contact Non Industrial
 - Direct Contact Industrial
 - Groundwater Pathway
 - Background Threshold Values

NR 720 Soil Standards

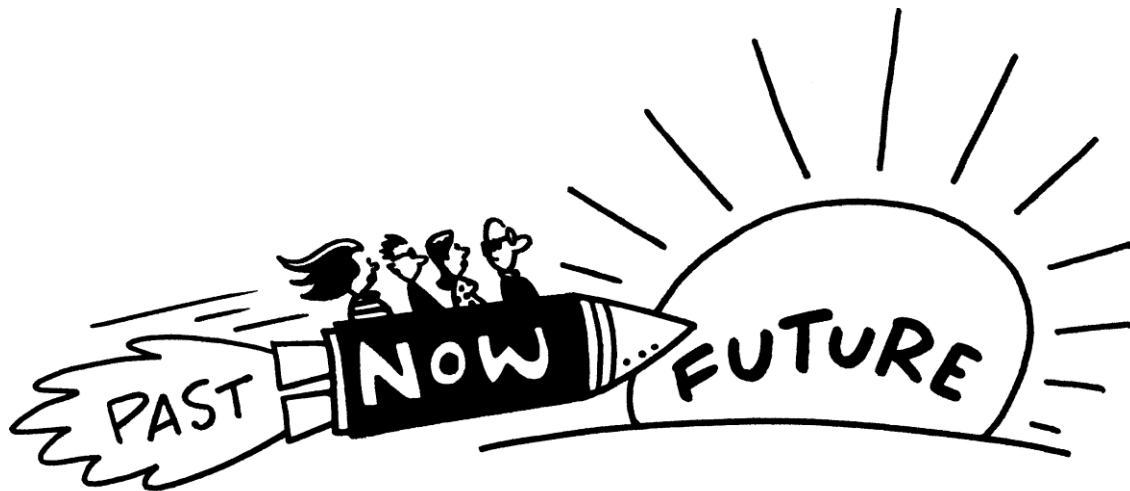
7										
8	(Contaminants not listed can be added starting at Row 912.)									Comparison / h
9										
10	Find ... Contaminant	CAS Number	NC RCL (mg/kg)	C RCL (mg/kg)	Not-To-Exceed D-C RCL (mg/kg)	Basis	Background Threshold Value (mg/kg)	INPUT Site Data (mg/kg)	Flag E = Individual Exceedance!	
11	Benzene	71-43-2	111.	1.49	1.49	ca				
12	Ethylbenzene	100-41-4	4,220.	7.47	7.47	ca				
13	Toluene	108-88-3	5,300.	-	818.	Csat				
14	Xylenes	1330-20-7	878.	-	260.	Csat				
15	Methyl tert-Butyl Ether (MTBE)	1634-04-4	23,800.	59.4	59.4	ca				
16	Dichloroethane, 1,2-	107-06-2	46.7	0.608	0.608	ca				
17	Dibromoethane, 1,2-	106-93-4	107.	0.047	0.047	ca				
18	Trichloroethylene	79-01-6	6.05	1.26	1.26	ca				
19	Tetrachloroethylene	127-18-4	115.	30.7	30.7	ca				
20	Vinyl Chloride	75-01-4	93.3	0.067	0.067	ca				
21	Dichloroethylene, 1,1-	75-35-4	342.	-	342.	nc				
22	Dichloroethylene, 1,2-trans-	156-60-5	1,560.	-	1,560.	nc				
23	Dichloroethylene, 1,2-cis-	156-59-2	156.	-	156.	nc				
Overview Non-Industrial_DC_RCLs Industrial_DC_RCLs Summary_Soil_DC_Data GW_RCLs										

Click to Clear
INPUT Site
Data Entries
(Column H)



What's Next?

- PAH Cumulative Assessment
 - Changes to the RCL Spreadsheet
- PAH Background Study





3. PAH Cumulative Assessment

DHS determined cPAHs:

- Are always found as a mixture of cPAHs, never independently.
- Toxicologically, cPAHs act in an identical manner on humans.

DHS concludes it is appropriate to assess cPAHs on a cumulative basis.



New Information from DHS

- NR 720.12(1) target excess cancer risk thresholds:
 - 1×10^{-6} for individual compounds, **and**
 - 1×10^{-5} for cumulative risk



PAH Cancer Risk – cPAH Compounds

- Benzo(a)pyrene
- Dibenz(a,h)anthracene
- Benz(a)anthracene
- Benzo(b)fluoranthene
- Ideno(1,2,3-cd)pyrene
- Benzo(k)fluoranthene
- Chrysene
- Naphthalene
- 1-methylnaphthalene

cPAHs

Cumulative Risk

cPAHs

Individual Basis



New Information from DHS

- Risk-based approach allowed under NR 722.11(1)(b) when attaining compliance with the RCLs in NR 720 is not practicable.
- Proposed Approach:
 - Allow for cumulative assessment of 7 cPAHs using a modified RCL spreadsheet.
 - Develop a cumulative, non-industrial RCL threshold that is less stringent than individual RCLs, but still protective.



PAH Cancer Risk

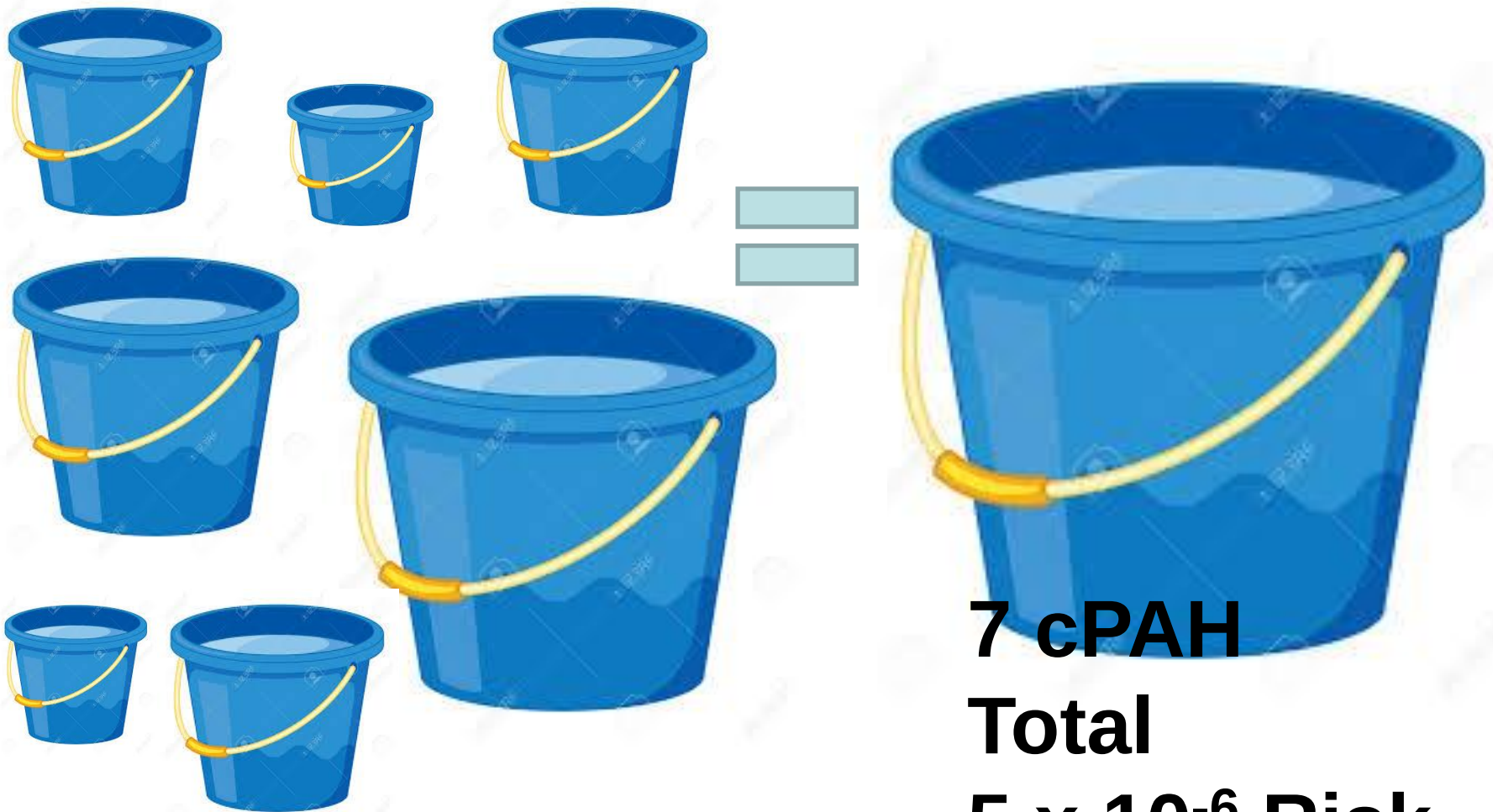
- Cancer Risk for Benzo(a)pyrene =



PAH Cancer Risk

- Benzo(a)pyrene = 
- Dibenz(a,h)anthracene = 
- Benz(a)anthracene =  
- Benzo(b)fluoranthene = 
- Ideno(1,2,3-cd)pyrene = 
- Benzo(k)fluoranthene = 
- Chrysene = 

cPAH Cancer Risk



7 cPAH

Total

5×10^{-6} Risk

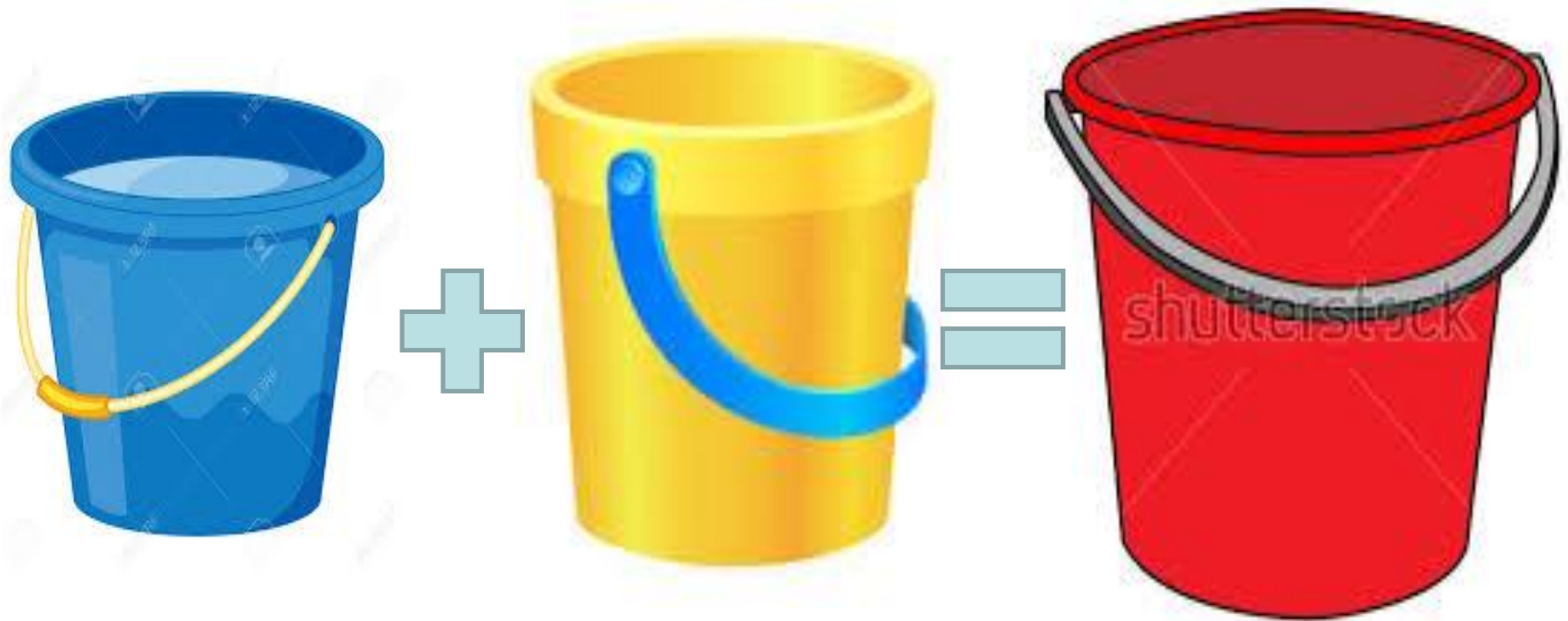


cPAH Cancer Risk

Why use only half of the 1×10^{-5} cumulative excess cancer risk at this time?

- Only 7 cPAHs included now.
- More potent cPAHs known.
- Additional potent compounds reduces “effective B(a)p concentration” within cumulative total.
- Half the cumulative risk “bucket” held in reserve:
 - for future compounds
 - changes in risk of current compounds

Total Cancer Risk



7 cPAHs

**Non “7 cPAH”
Carcinogens**

**Total
Carcinogens**

Total Cancer Risk



**Total
Carcinogens
= 1×10^{-5}**



3. PAH Cumulative Assessment

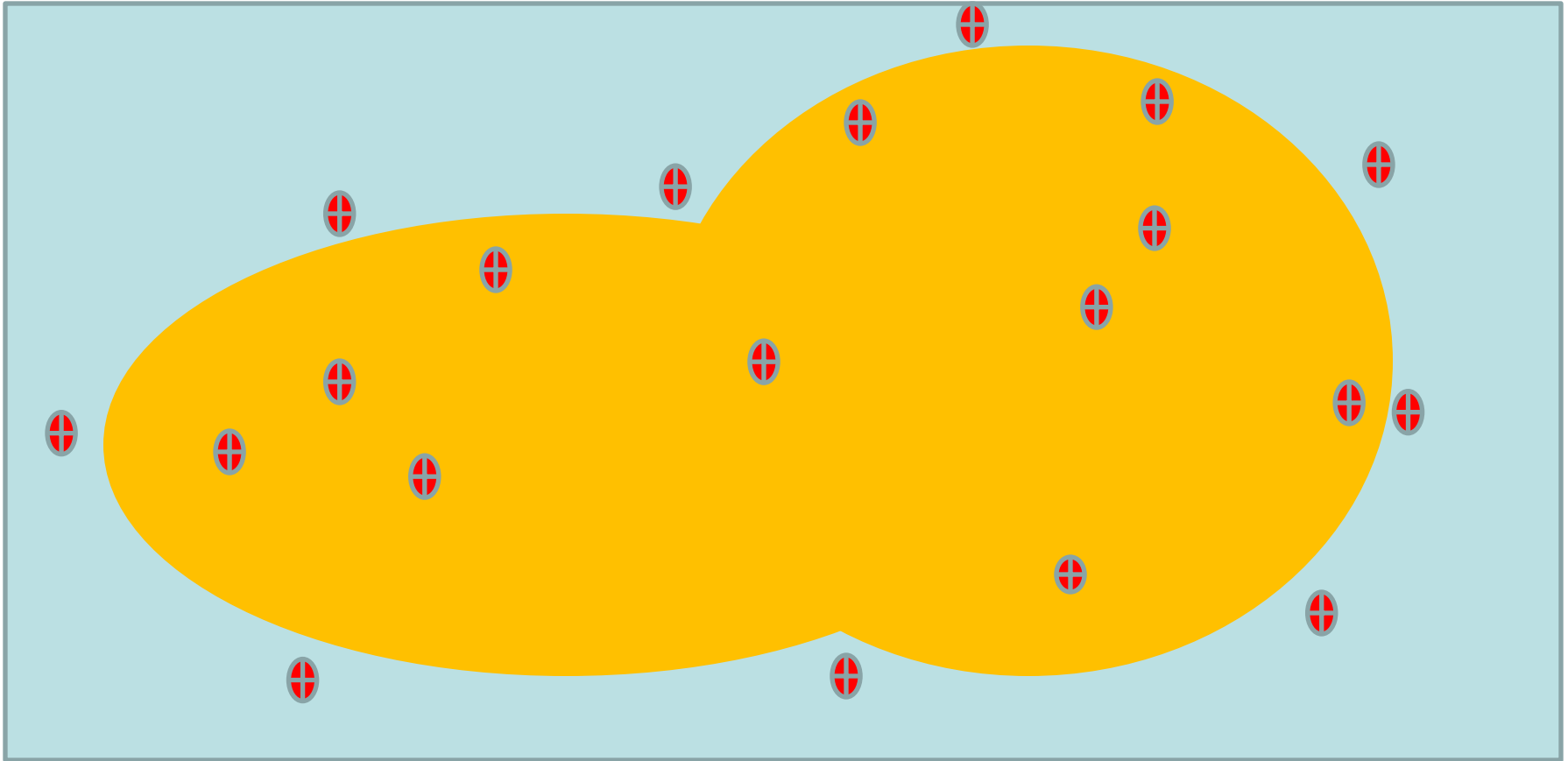
What will change?

- Non-industrial Direct Contact RCLs

What will not be affected:

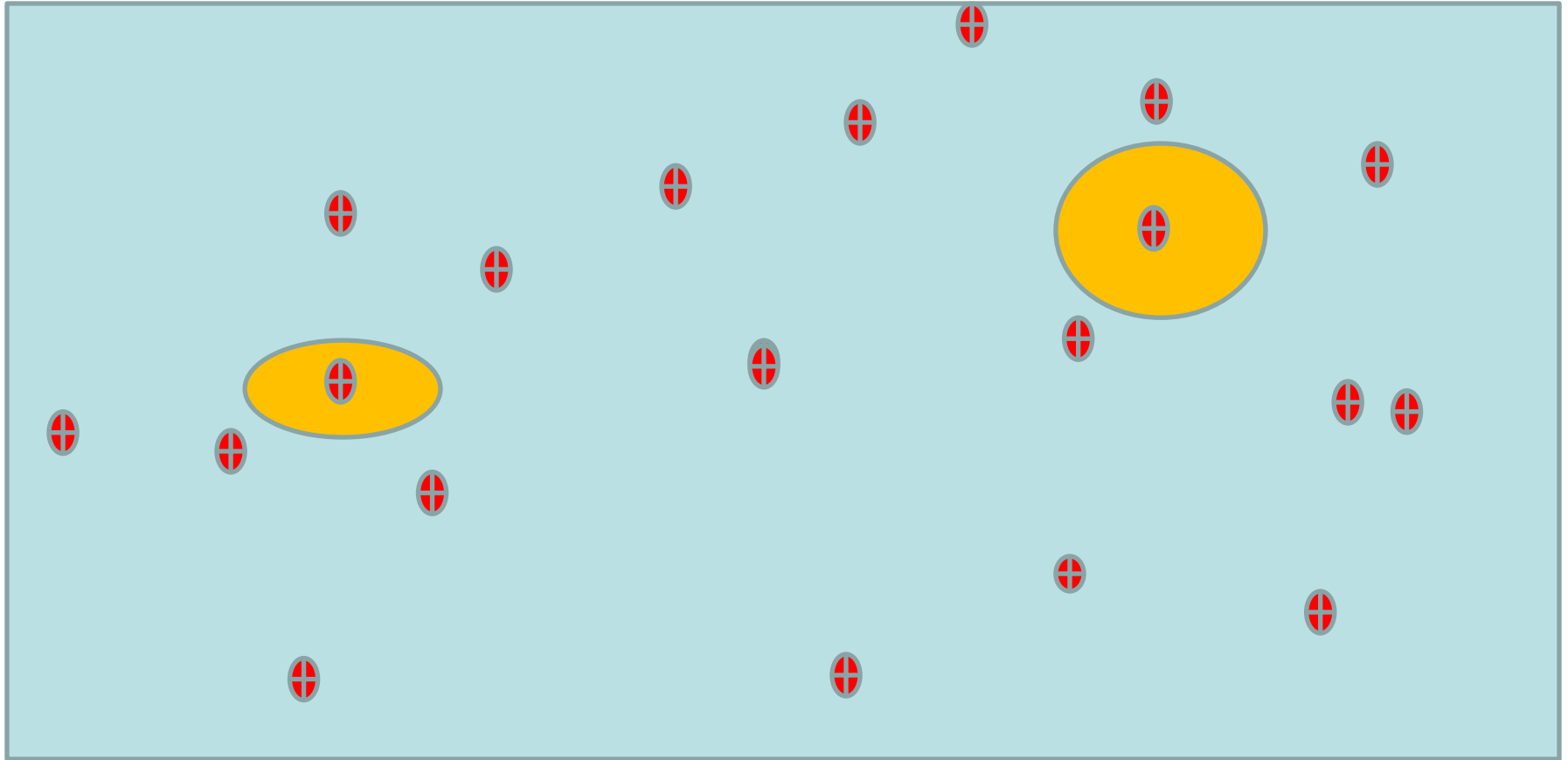
- Non-cancer risk summation
- Industrial Direct Contact RCLs
- Groundwater Pathway RCLs
- Total cumulative risk for all carcinogenic compounds

3. PAH Cumulative Assessment



Example Site – Cap area with current RCLs

3. PAH Cumulative Assessment



Example Site-Cap area with proposed RCLs



3. PAH Cumulative Assessment

- Risk-based approach allowed when attaining compliance with the RCLs in NR 720 is not practicable.
- Modified RCL spreadsheet proposed
- Process out for public comment



PAH BACKGROUND STUDY IN MILWAUKEE



4. PAH Background Study

- Shallow soil samples collected in Milwaukee County parks.
- Samples analyzed for PAHs.
- Determine background threshold value for PAHs originating from atmospheric deposition.
- Use findings to guide site remediation requirements.