POWC MACT Example Case Study

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Approach

- Discuss some overall "truths"
- Look at a basic example

Truth #1

- **IF**: Your average coating content is less than:
  - 0.8 kg HAP / kg coating

  OR
  - 4.0 kg HAP/ kg solids

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Truth #1 (concluded)

- **THEN**: The 95 percent option is ALWAYS **more stringent** than complying with the respective content limits through a combination of controls and content.

Truth #2

- **IF**: Your average solids content is **greater than** 20 percent…
- **THEN**: 0.2 kg HAP / kg solids is ALWAYS the less stringent content option.

Truth #3

- **IF**: your average solids content is **less than** 20 percent…
- **THEN:** 0.04 kg HAP/ kg coating is ALWAYS the less stringent content option.

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And Finally…

- **IF** your average solids content equals 20 percent
- **THEN** both content-based options are equal.

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One last overall truth…

- Many facilities will have trouble demonstrating that they have a PTE.

  [This may be okay.]
- You do not have to demonstrate a capture efficiency (if using solvent recovery)

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Case Study 1- Background

- Facility XYZ has current HAP emissions of over 25 tons/year.
- Facility has 1 line, using three different coatings

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Some caveats

- Example uses 3 coatings
  - Facilities will likely have more
  - Contents are not real coatings
  - Providing entire coating, not components
- Only using 3 months of data
- Ignoring solvent recovery or other control

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Where does coating information come from?

- **M**aterial **S**afety **D**ata **S**heets
- Other source: certified product data sheet
- Data Hierarchy
  - Method 311 (HAP)
  - Method 24 (VOC, solids)
  - Formulation data

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12% HAP / 100 = 0.12 HAP/coating

The Coatings

Coating	% HAP	%VOC	% Solids	Type	HAP/coating
A	12%	20%	80%		0.12
B	40%	80%	20%		0.40
C	3%	30%	10%	aqueous	0.03

% HAP = lb HAP / lb coating * 100

Divide by 100 to compare to 0.04 lb HAP / lb coating limit

NOTE: Exactly the same as kg HAP / kg coating

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Calculating "per unit solids"

Percent HAP: $\frac{\text{lb HAP}}{\text{lb coating}} * 100$ / Percent solids: $\frac{\text{lb solids}}{\text{lb coating}} * 100 =$

$$\frac{\text{lb HAP}}{\text{lb coating}} * \frac{\text{lb coating}}{\text{lb solids}} = \frac{\text{lb HAP}}{\text{lb solids}}$$

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The Coatings

Coating	% HAP	%VOC	% Solids	Type	HAP/solids
A	12%	20%	80%		0.15
B	40%	80%	20%		2.00
C	3%	30%	10%	aqueous	0.30

12% HAP / 80% Solids = 0.15 HAP/solids

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Compare to the Limits

Coating	HAP/ coating	Meets MACT? (0.04)	HAP/ solids	Meets MACT? (0.20)
A	0.12	N	0.15	Y
B	0.40	N	2.00	N
C	0.03	Y	0.30	N

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Which Option Would Work Best for this Facility?

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Things to Consider

- How much of each coating will be used?
- Is averaging an option?
  - Definitely!
  - Actually the only option (other than material substitution)

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3 Months of Data

Month	Line	Material Code	Usage (lb)
Jan-02	1	A	600
Jan-02	1	B	250
Jan-02	1	C	300
Feb-02	1	A	1000
Feb-02	1	B	90
Feb-02	1	C	800
Mar-02	1	A	1000
Mar-02	1	B	400
Mar-02	1	C	600

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To Calculate Values

Monthly Coating Usage (lbs) * **Percent of {HAP, VOC, Solids}** = **Monthly Usage of {HAP, VOC, solids} (lbs)**

3 Months of Data

Month	Material Code	Usage (lb)	Lb HAP	Lb VOC	Lb Solids
Jan-02	A	600	72	120	480
Jan-02	B	250	100	200	50
Jan-02	C	300	9	90	30
Feb-02	A	1000	120	200	800
Feb-02	B	90	36	72	18
Feb-02	C	800	24	240	80
Mar-02	A				800
	B				80
	C				60

Usage of A [600] **X** HAP content for A (Slide 14) [12 %] **=** Lb of HAP [72]

Lb HAP/ Lb Coating

						0.04	0.2
Month	Mat'l	Usage (lb)	Lb HAP	Lb VOC	Lb Solids	lb HAP/lb Coating	lb HAP/ lb solids
Jan-02	A	600	72	120	480	0.12	0.15
Jan-02	B	250	100	200	50	0.40	2.00
Jan-02	C	300	9	90	30	0.03	0.30
Feb-02	A	1000	120	200	800	0.12	0.15
Feb-02	B	90	36	72	18	0.40	2.00
Feb-02	C	800	24	240	80	0	
		1000	120	200	800	0	
		0				0	
		0				0	

Lb of HAP [72] **/** **Lb of Coating [600]** **=** **Lb of HAP per lb of Coating [0.12]**

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Lb HAP/ Lb Solids

						0.04	0.2
Month	Mat'l	Usage (lb)	Lb HAP	Lb VOC	Lb Solids	lb HAP/lb Coating	lb HAP/ lb solids
Jan-02	A	600	72	120	480	0.12	0.15
Jan-02	B	250	100	200	50	0.40	2.00
Jan-02	C	300	9	90	30	0.03	0.30
Feb-02	A	1000	120	200	800	0.12	0.15
Feb-02	B	90	36	72	18	0.40	2.00
Feb-02	C	800	24	240	80	0	
		1000	120	200	800	0	
		0				0	
		0				0	

Lb of HAP [72] / **Lb of Solids [480]** = **Lb of HAP per lb of solids [0.15]**

Same Results as Slide 15

						0.04	0.2
Month	Mat'l	Usage (lb)	Lb HAP	Lb VOC	Lb Solids	lb HAP/lb Coating	lb HAP/ lb solids
Jan-02	A	600	72	120	480	0.12 N	0.15 Y
Jan-02	B	250	100	200	50	0.40 N	2.00 N
Jan-02	C	300	9	90	30	0.03 Y	0.30 N
Feb-02	A	1000	120	200	800	0.12	0.15
Feb-02	B	90	36	72	18	0.40	2.00
Feb-02	C	800	24	240	80	0.03	0.30
Mar-02	A	1000	120	200	800	0.12	0.15
Mar-02	B	400	160	320	80	0.40	2.00
Mar-02	C	600	18	180	60	0.03	0.30

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Summing All Coatings by Month

Month	Mat'l	Usage (lb)	Lb HAP	Lb VOC	Lb Solids
Jan-02	A	600	72	120	480
Jan-02	B	250	100	200	50
Jan-02	C	300	9	90	30

Month	Total Coating	Total HAP	Total VOC	Total solids
Jan-02	1150	181	410	560
Feb-02	1890	180	512	898
Mar-02	2000	298	700	940

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Comparing to MACT Limits

Month	Total Coating	Total HAP	Total VOC	Total solids	Lb HAP/ Lb coating	Lb HAP/ Lb solids
Jan-02	1150	181	410	560	0.157	0.323
Feb-02	1890	180	512	898	0.095	0.200
Mar-02	2000	298	700	940	0.149	0.317

Only one month is in compliance for all coatings averaged together.

Percent of Standard

e.g., 0..157/ 0.04 * 100 = 393%

Month	Lb HAP/ Lb coating	Lb HAP/ Lb solids	Average solids	% Standard (coating)	% Standard (solids)
Jan-02	0.157	0.323	49%	393%	162%
Feb-02	0.095	0.200	48%	238%	100%
Mar-02	0.149	0.317	47%	373%	159%

e.g., 0.317/ 0.20 * 100 = 159%

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Looking Back at our Truth #2

Month	Lb HAP/ Lb coating	Lb HAP/ Lb solids	Average solids	% Standard (coating)	% Standard (solids)
Jan-02	0.157	0.323	49%	393% →	162%
Feb-02	0.095	0.200	48%	238% →	100%
Mar-02	0.149	0.317	47%	373% →	159%

Solids contents are all over 20% and lb/lb solids is always a lower % of standard

What would you do next?

- Consider ability to adjust coating usage
  - Different coatings
  - Different relative amounts
- Consider solvent recovery

[Even a little can be a lot!]

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To Wrap Things Up

- There are multiple compliance options under this rule
- The “best” depends on many factors
- Need to evaluate specific operations

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