

# Part (1)

# Control Profile Development

# Introduction

- Control profile definition:

“A control profile describes how a regulatory action, proposed control strategy or a technological change impacts an emission source category over time.”
- CEFS will no longer support ARB’s former control category level control information
- CEFS requires emission control rules to be linked directly to the emission processes in the inventory
- Rule 1 in the science of control profile development = it is as much art as science

# Preliminaries

- Things to consider when constructing control profiles
  - What categories are targeted in the rule?
  - Relational links between the rule and inventory (i.e. EIC/SCC/SIC etc.)
  - What is the behavior of the rule (i.e. is it implemented in a **STEP** or **LINEAR** fashion or a **COMBINATION** of the two)?
  - Does the rule penetrate the entire emission category(s) or is it less than 100%?
  - How will Rule Effectiveness be treated?
  - Are there other rules that hit the category?

# Preliminaries

(continued)

- What calendar year inventory is used to map rule to the source categories impacted?
  - Emission inventory process identification can change from year to year
  - Knowledge of the inventory and applicable rules / source connections are critical for successful forecasting
  - A switch in base year EI can cause control factors to be missed if not properly mapped

# Assignment of Rule-EI Category Links

- CEIDARS and CEFS use the EIC/SCC/SIC coding system to manage the emissions and control data -- all 14 digit fields
- EIC codes often have a mixture of point and area source categories
- For an EIC that contains a mixture, the areawide portion is identified by EIC/SCC/SIC fields all containing the same 14 digit EIC code

# Assignment of Rule-EI Category Links

- The point source processes which are contained in the same EIC category are identified by the 8-digit SCC code filled in the SCC field, and the 4 digit SIC code filled in the SIC field

# Assignment of Rule-EI Category Links

- Example of Solvent EIC containing a mixture of point and area source emissions

Vapor Degreasing

EIC: 220,206,8106,0000

Areawide Portion

EIC	SCC	SIC
220,206,8106,0000	220,206,8106,0000	220,206,8106,0000

# Assignment of Rule-EI Category Links

Point Source Process (there could be many others)

SCC: 40100398 (Cold Cleaning)

SIC: 3479 (Fabricated Metal Products)

EIC	SCC	SIC
220,206,8106,0000	40100398	3479

# Growth and Control Data Hierarchy

## Region Selection:

1. District, Air Basin, County, Sub-County
2. District, Air Basin, County
3. Air Basin, County
4. County
5. Air Basin
6. District
7. California

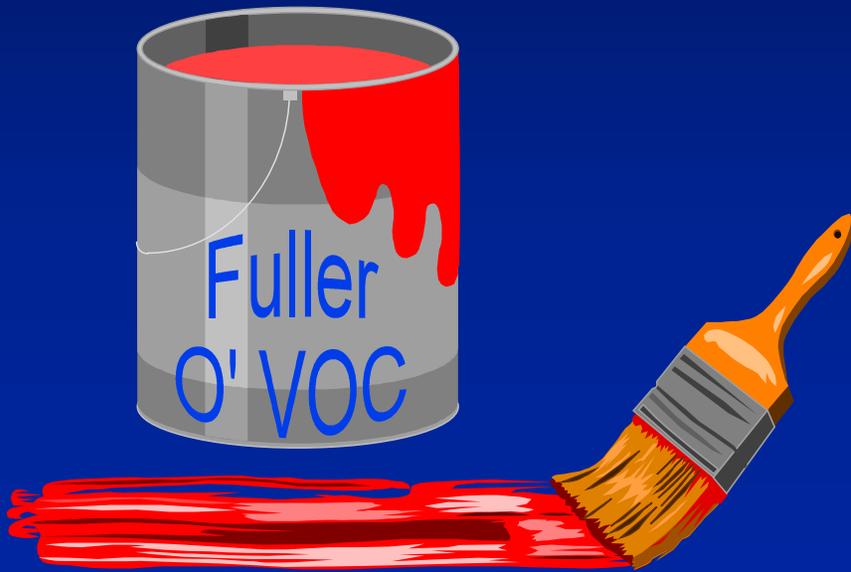
## Category Selection:

- |                       |                        |
|-----------------------|------------------------|
| 1. Facility, SCC, SIC | 8. SIC                 |
| 2. Facility           | 9. EIC, SIC            |
| 3. Facility, EIC      | 10. EIC                |
| 4. SCC, SIC           | 11. CES                |
| 5. SCC6, SIC          | 12. SIC2               |
| 6. SCC3, SIC          | 13. Facility, EIC, SIC |
| 7. SCC                |                        |

Note: Currently, options 1,2,3, and 13 are only available with GIS forecast module

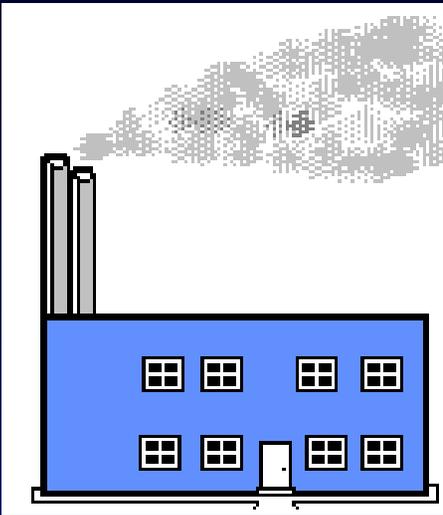
# Assignment of Rule-EI Category Links

- Rules that affect categories that are **purely areawide** such as architectural coatings, or **stationary aggregated** such as gas stations, should be assigned controls at the EIC level (CATFLAG 10).



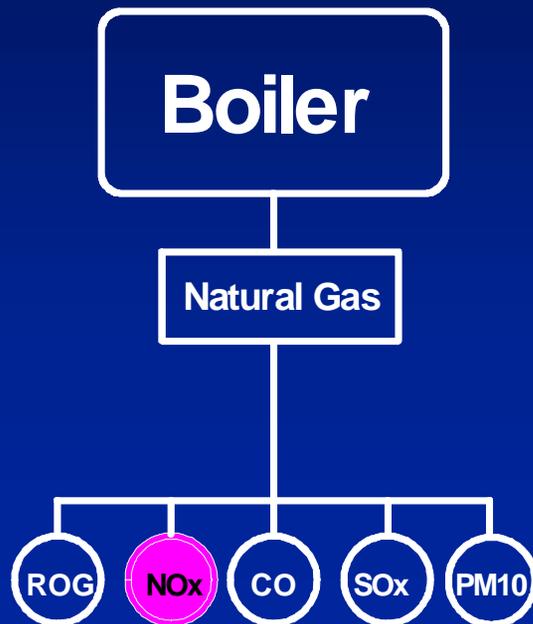
# Assignment of Rule-EI Category Links

- Rules that affect categories that are **purely point** sources, assign control at the SCC level (CATFLAG 7) and/or SCC/SIC level (CATFLAG 4)  
(Note: If the rule affects certain industries uniquely, SCC/SIC level data can be layered within the SCC level data)



# Point Source Control Layering

Rule X places NO<sub>x</sub> limits on natural gas fired boilers and heaters > 100 MMBTU/HR (SCC: 10300601)



SCC	SIC
10300601	3678 (Electronics)
	4961 (Steam Supply)
	8062 (Medical Services)
	8211 (Elementary Schools)
	8221 (Universities)
	9711 (National Security)

- Category Selection "Option 7" used if rule applies to the entire universe of SCC: 10300601.
- Category Selection "Option 4" used if the rule targets a particular industry sector more or less stringently than the other industries.

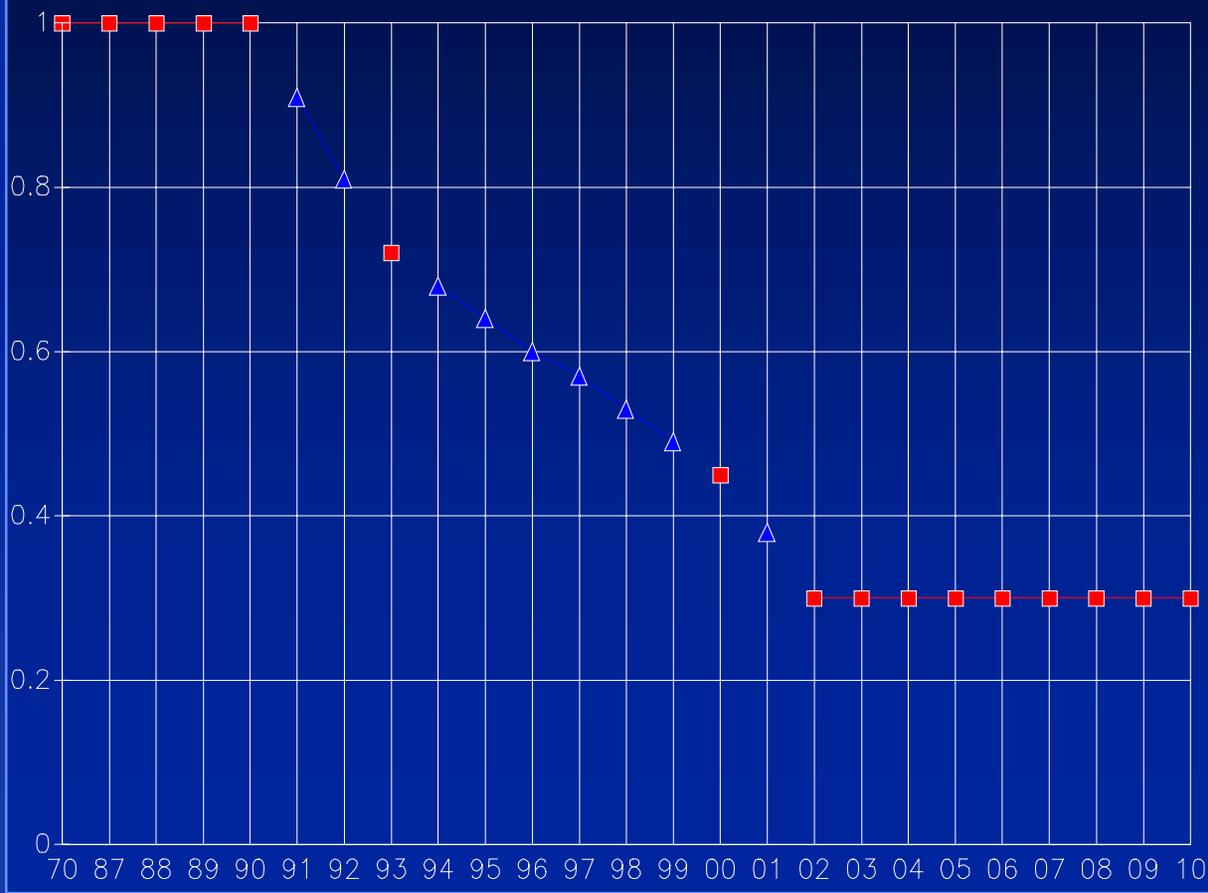
# Assignment of Rule-EI Category Links

- In cases like solvents, where there is a **mix of point and area sources** within an EIC, control rules can be linked to the categories in “**Layers**” but be careful!
  - Rule X can be assigned to specific point source processes by SCC (CATFLAG 7) or SCC/SIC (CATFLAG 4) combinations within an EIC
  - Then Rule X can be assigned to the EIC level (CATFLAG 10) to capture the balance of the SCC/SIC combinations within this EIC as well as the areawide portion

# Development of Control Profiles

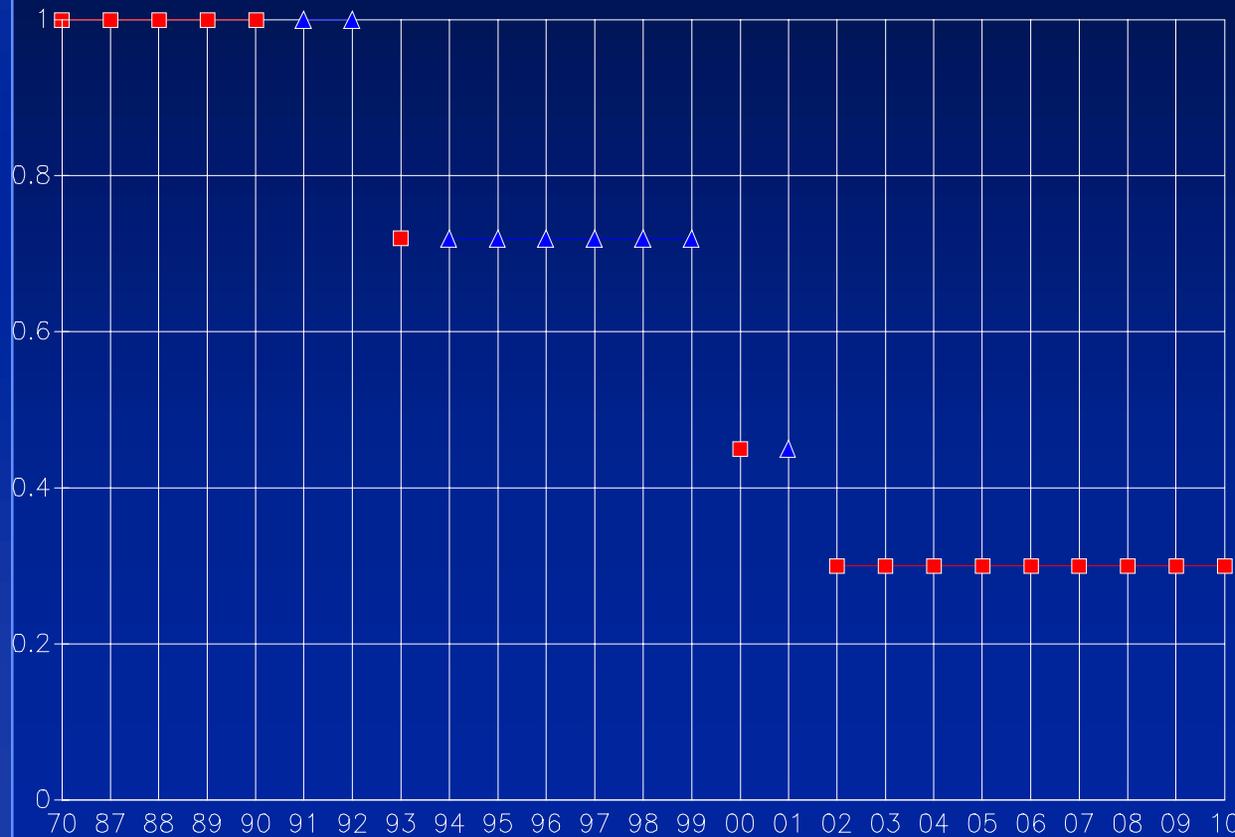
- Choosing a **reference year** for the control rule data set
  - › CEFS performs global interpolation of all the control data for a given agency in a single pre-process step and inserts interpolated values into the data table. Each control rule profile must include a common reference year (e.g. 1990) in its profile for CEFS to do its job right. This choice of reference year is arbitrary and is the choice of the responsible agency

# Sample Control Profile w/ Linear Interpolation



	Raw Data	Interpolated
70	1	
87	1	
88	1	
89	1	
90	1	
91		.91
92		.81
93	.72	
94		.68
95		.64
96		.60
97		.57
98		.53
99		.49
00	.45	
01		.38
02	.3	
03	.3	
04	.3	
05	.3	
06	.3	
07	.3	
08	.3	
09	.3	
10	.3	

# Sample Control Profile w/ Step Interpolation



	Raw Data	Interpolated
70	1	
87	1	
88	1	
89	1	
90	1	
91		1
92		1
93	.72	
94		.72
95		.72
96		.72
97		.72
98		.72
99		.72
00	.45	
01		.45
02	.3	
03	.3	
04	.3	
05	.3	
06	.3	
07	.3	
08	.3	
09	.3	
10	.3	

# Development of Control Profiles

## 1 Determine the Control Efficiency (CE)

- Generally falls right out of the rule requirements
- In simple terms...

CE = Post-controlled Emission Rate /  
Pre-controlled Emission Rate

- pounds of NO<sub>x</sub> per million BTU heat input
- grams of VOC per liter of product
- pounds of NO<sub>x</sub> per brake horsepower-hour
- etc.

# Development of Control Profiles

(continued)

- 2 Determine the Rule Penetration (RP) (sometimes referred to as Impact Factor; Default=1.0)
  - RP factor is handy for ...
    - Apportioning control to categories that are only partially regulated by a rule (i.e. accounting for sources that are either exempt or already compliant)
    - Describing the phase-in characteristics of the rule

# Development of Control Profiles

(continued)

## 3 Determine the Rule Effectiveness (RE) factor (Default = 1.0)

- RE factor is used to adjust for “Real-World” operating conditions
- EPA has given guidance for the use of 80% as default
- Most agree that a blanket 80% default is not advised because this can lead to overprojected emissions
- RE factors should be based on category specific compliance studies if possible

# Development of Control Profiles

(continued)

## 4 Calculate the control profile

$$CL = 1 - \{CE * RP * RE\}_{(r,m,s,p,y)}$$

where:

CL = Control Level

CE = Control Efficiency

(CE can be expressed as the fraction controlled or the fraction of remaining emissions)

RP = Rule Penetration

RE = Rule Effectiveness

r = region

m = the measure

s = source category

p = pollutant

y = year

# Control Data Relationships In CEFS

- Rule Description Table

- Agency \*
- Rule Number \*
- Rule Title
- Other general rule info

- Region Type Table

- Region ID \*
- Region Flag \*
- District
- Air Basin
- County

- Control Data Table

- Agency \*
- Rule Number \*
- Region ID \*
- Category ID \*
- Pollutant
- All control profile info

- Category Type Table

- Category ID \*
- Category Flag \*
- SCC
- SIC
- EIC

\* Key Fields

# Control Data Notes

- Cannot add overwrite data at the same region\_id and category\_id level
- Must delete data before new data can be added
- OR, new data must be at a higher priority level
- Look at the entire profile for a rule, not just a single year

# The Approach

- Phase I: Conduct a “comprehensive” study to develop control rule data set for *adopted* local rules  
*(Post-1990 Implementation at a minimum--go back to 1975 if possible)*
- Electronic data exchange approach
- Replaces ARB’s Rule Tracking (RT) form system for control inputs to CEFS

# Problems with RT Form for Forecasting

- Form submittals began in 1993, therefore, control profiles don't represent a comprehensive data set needed for forecasting
- Forms have not been used properly in many cases (e.g. growth often included)
- Control data sets can become far too massive to rely on paper data submittal alone

# Future Role of RT Form

- Future role of the forms will be limited to a cross-check for newly adopted rules which are submitted for SIP completeness but will not be the official data record for forecasting
- The RT form does not utilize RP and RE factors. If the effects of RT and RP are lumped with the CE factor, then the basic tenets of the RT form instructions still apply

# Helps

- Existing control data by ARB control categories are mapped in CEFS to SCC/SIC/EIC in CEFS
  - This data set represents the prior control assumptions (responsible agencies are “COMBINED”)
  - These data are outdated and should be used only as a limited reference
  - Control levels which can not be associated with a rule or technology change should be removed from the data set

# Helps

(continued)

- Guidance document for CEFS Rule Tracking System Data Set Construction
  - Note: Although CEFS has rigid data transaction formats, data can be submitted in much simpler formats
- Limited control rule data submitted to ARB to date
- SCC Manual
- SIC Manual
- EIC/CES List