What is actually emitted from Area Sources: Results of a Special Study of Metals Recyclers

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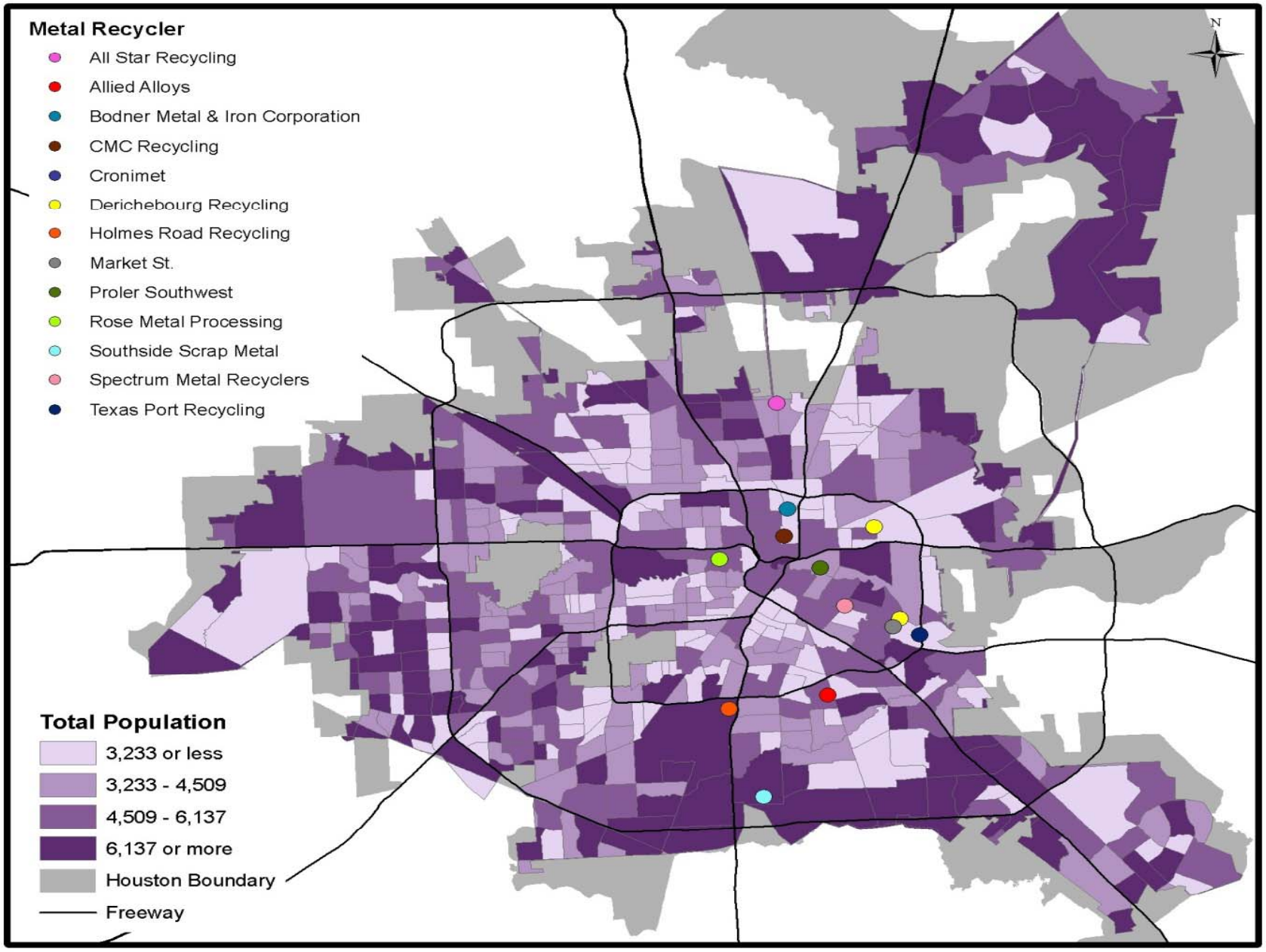
Houston Air Facts:

“A plethora of toxic pollutants are emitted into Houston's air by more than 400 chemical manufacturing facilities, including 2 of the 4 largest refineries in the U.S.”

What are they?

- Recycle metal waste
- Simple to sophisticated process and controls
- Not all the same focus
- Considered an Area Source
- No zoning
- Permit by Rule

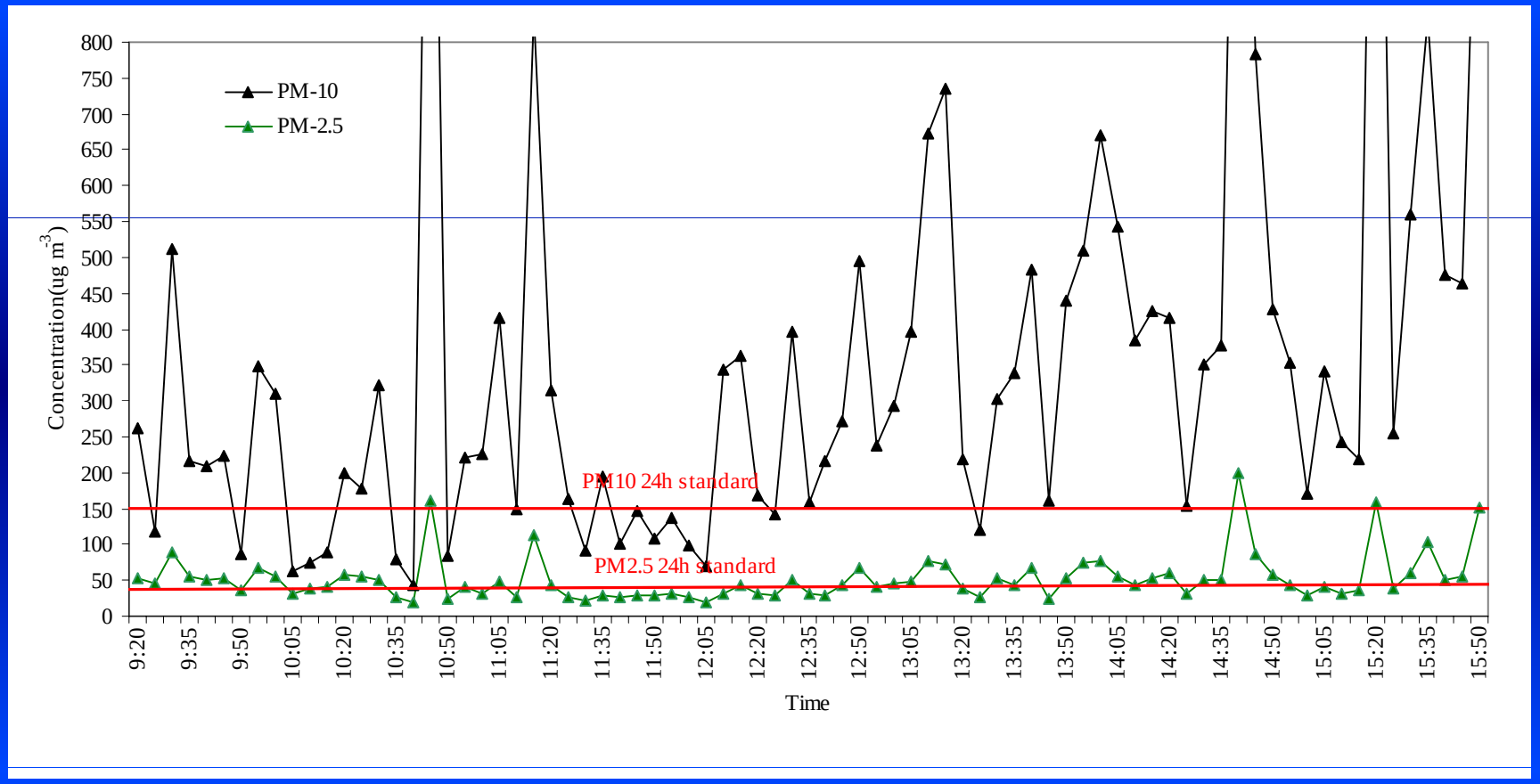
Metal Recycling Sites and Houston Population



CMC Metals

304 A/C
Allied Alloys

PM10 and PM2.5 1/5/2012



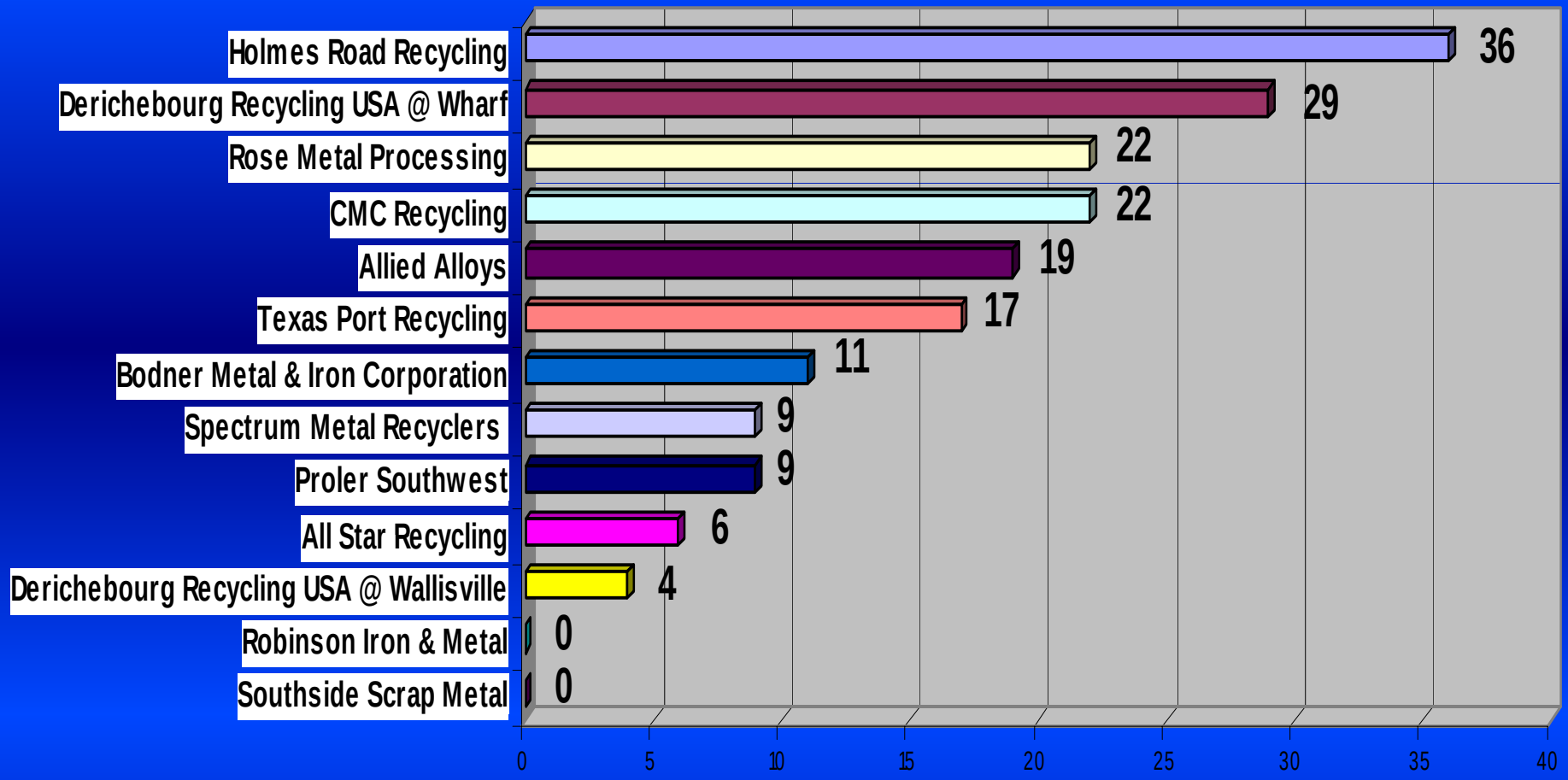
Priority Ranking System for Emission Sources

Priority Assigned is total of points

	Points
Death or serious injury onsite	4
Explosion or fire affecting offsite	3
Explosions onsite	2
Fires onsite	1
Adjacent Schools, Hospitals etc.	4
Adjacent Residential	3
Commercial	2
Industrial Area	1
Isolated Site	0
Large number of complaint <1 yr	3
Large number of complaint <5 yr	2
Few complaints in 5 yrs	1
No complaints	0
HAP metal > ESL	4
One or more metals > ST ESL	3
One or more metals > LT ESL	2
Many metals detected	1

	Points
Iron above LT ESL (not authorized)	1
HAP VOC > ESL	4
VOCs > ST ESL	3
VOCs > LT ESL	2
Many VOCs detected	1
Nuisance Odor	1
Freon compounds found	1
PM exceeds ST ESL	3
PM exceeds LT ESL	2
Many PM spikes above ST ESL	1
MS4 threatened by toxics	2
MS4 threatened by nontoxics	1
No MS4 issues identified	0
City NOVs or Citations	1
Opacity limit exceeded	1
Other agency NOV or Citation	1

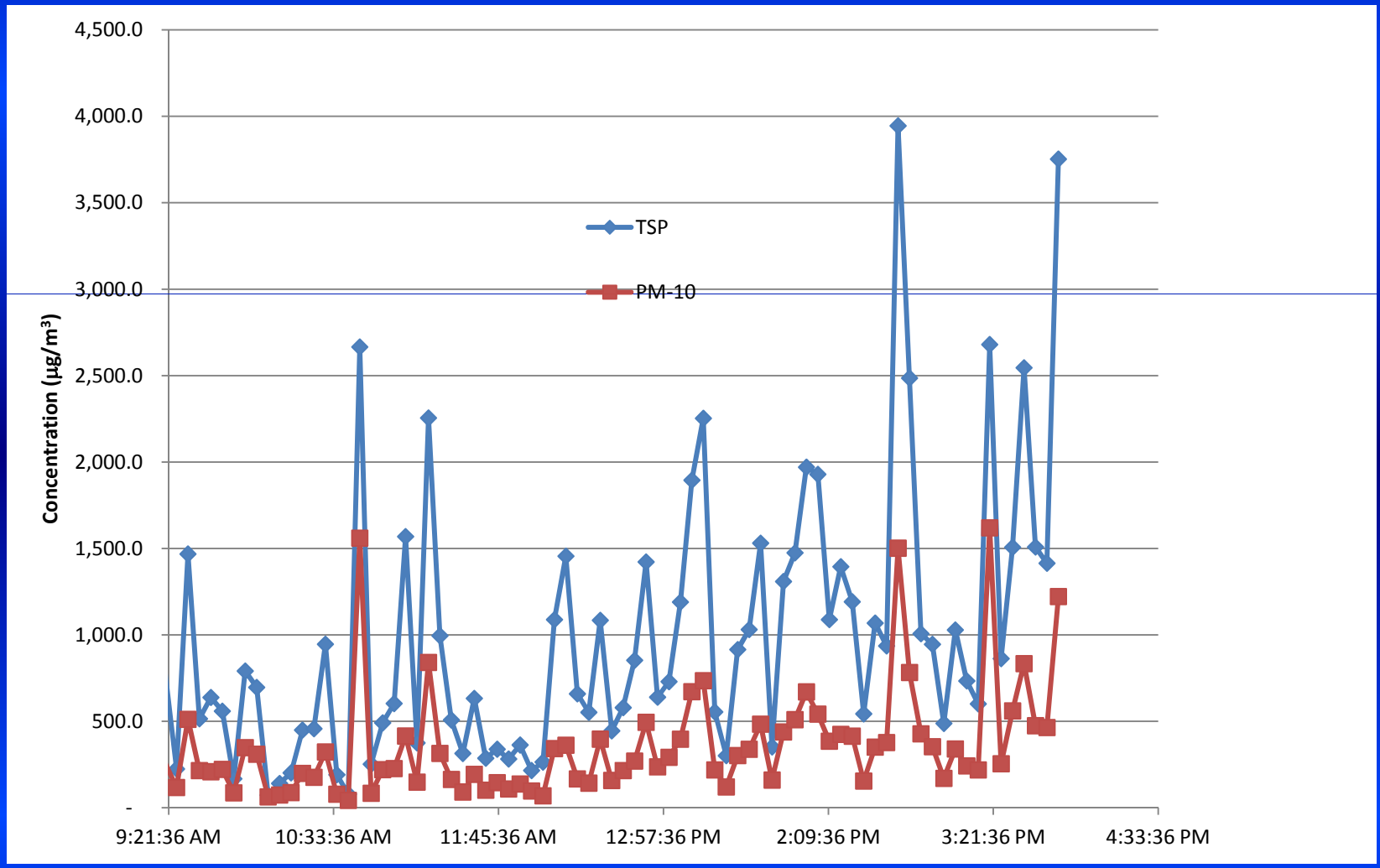
Metal Recyclers Priority Ranking - November 2011



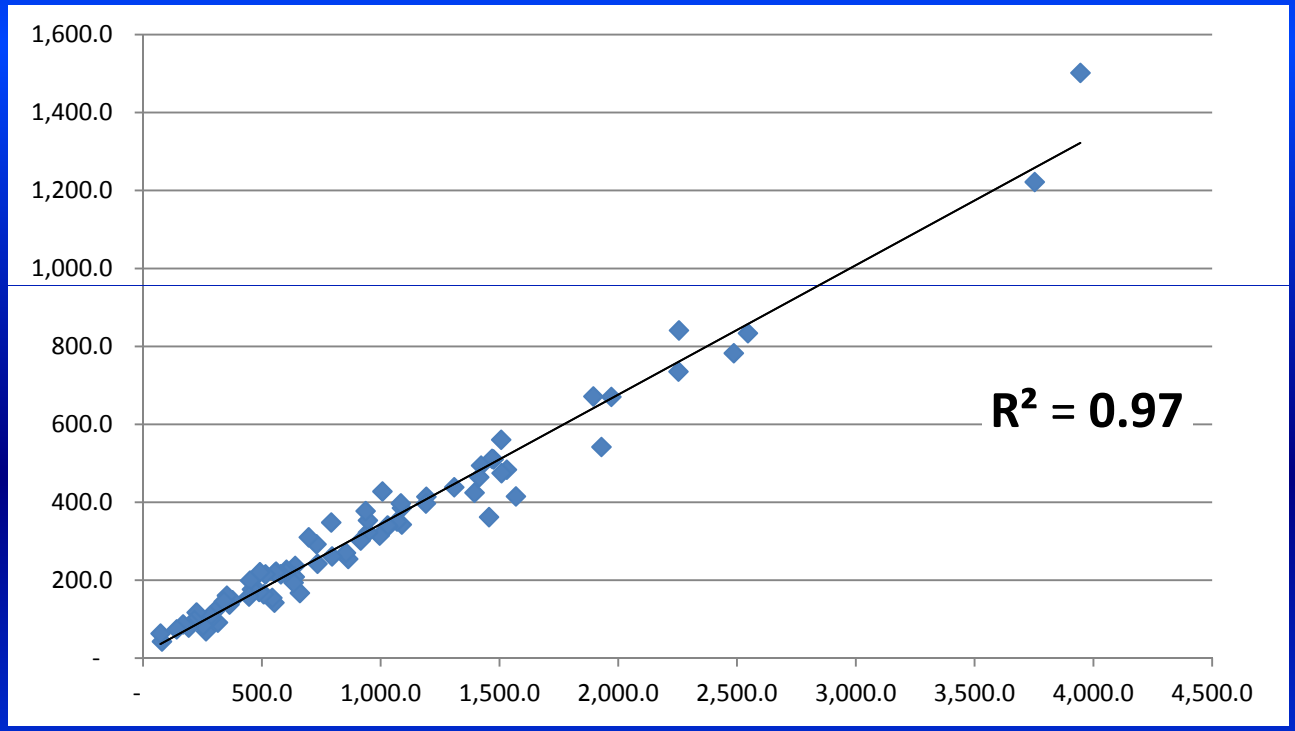
Sampling and Analysis

- 11 Metals and 75 VOCs:
  - Ag Cd Cr Cu Mn Ni Pb Zn Fe Co Hg
  - Zn eliminated
  - Cr (VI)

TSP and PM10 1/5/2012



Holmes Road 1/5/2012: PM10 from TSP



	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	12.24	8.17	1.49	0.13
TSP	0.331	0.006734	49.3	6.61E-59

Summary Statistics of Metals (μg/m³)

Variable	N	Min	Max	Mean	Median	SD	% NDs
Cr (total)	72	0.013	1.641	0.155	0.0575	0.237	15.28%
Cu	72	0.02	2.63	0.372	0.202	0.45	5.56%
Mn	72	0.02	2.02	0.303	0.196	0.399	5.56%
Ni	65	0.038	2.07	0.28	0.116	0.394	29.23%
Pb	69	0.06	6.22	0.354	0.15	0.79	37.68%
Fe	65	0.375	354.00	25.95	10.95	50.45	3.08%
Cd	12	0.014	0.09	0.0274	0.0195	0.0228	66.67%
Co	16	0.013	0.34	0.0583	0.018	0.0982	43.75%
Ag	5	0.022	0.15	0.0722	0.065	0.05	20.00%

Risk Methodology

RAGS Part F

- Risk = IUR x EC
- Toxicity data from region 3 calculator

- Exposure concentration measured then assessed using EPA ProUCL

Toxicity IUR

Default

Resident Risk-Based Screening Levels (RSL) for Air

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),

ca** (Where nc SL < 10 x ca SL),

max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat

Chemical	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Carcinogenic SL TR=1.0E-6 (ug/m^3)	Noncarcinogenic SL HI=1 (ug/m^3)	Screening Level (ug/m^3)
Cadmium	1.80E-03	I	2.00E-05	C	1.35E-03	2.09E-02	1.35E-03 ca*
Chromium(VI)	8.40E-02	S	1.00E-04	I	1.14E-05	1.04E-01	1.14E-05 ca
Cobalt	9.00E-03	P	6.00E-06	P	2.70E-04	6.26E-03	2.70E-04 ca*
Manganese	-		5.00E-05	I	-	5.21E-02	5.21E-02 nc
Nickel Refinery Dust	2.40E-04	I	5.00E-05	C	1.01E-02	5.21E-02	1.01E-02 ca**

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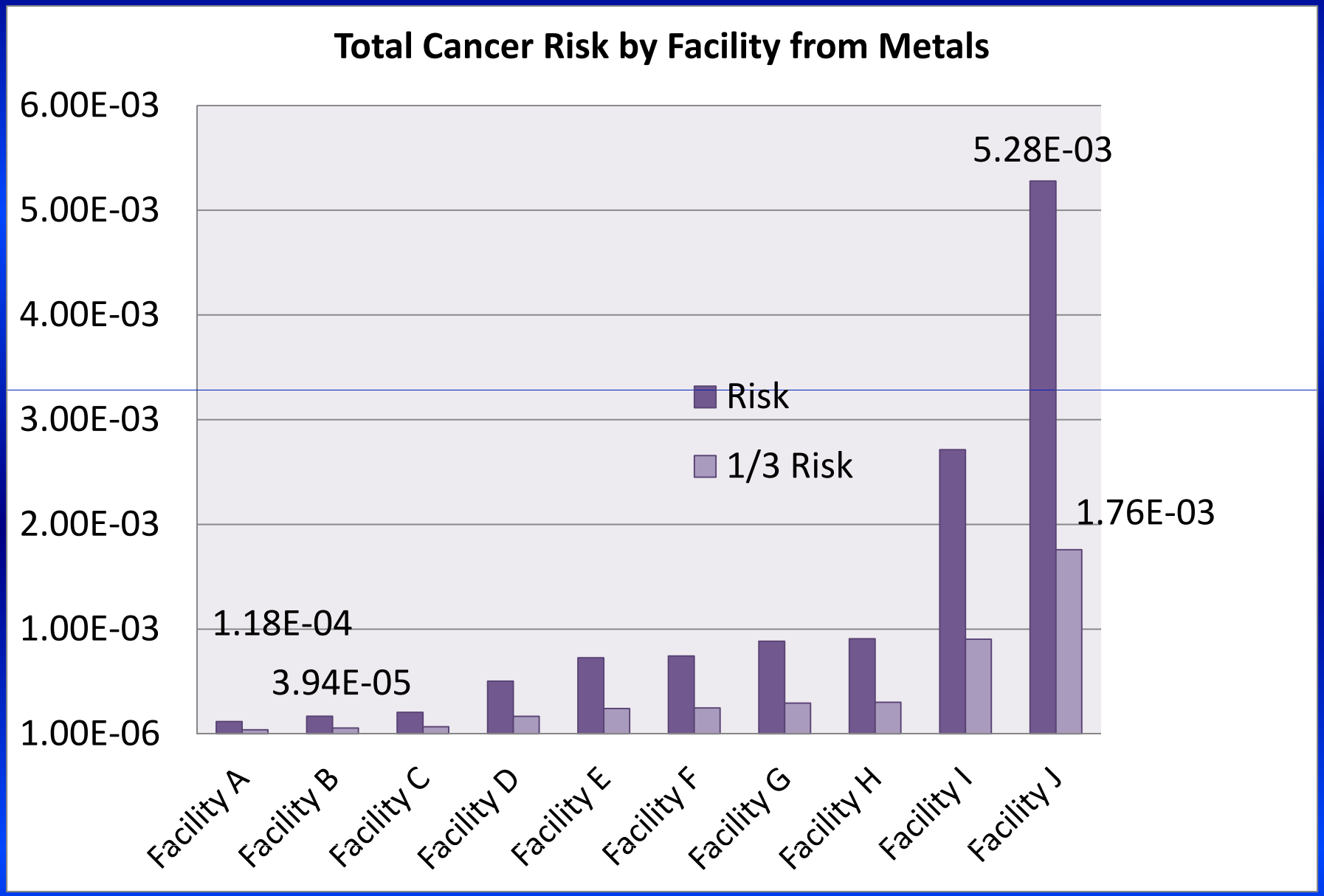
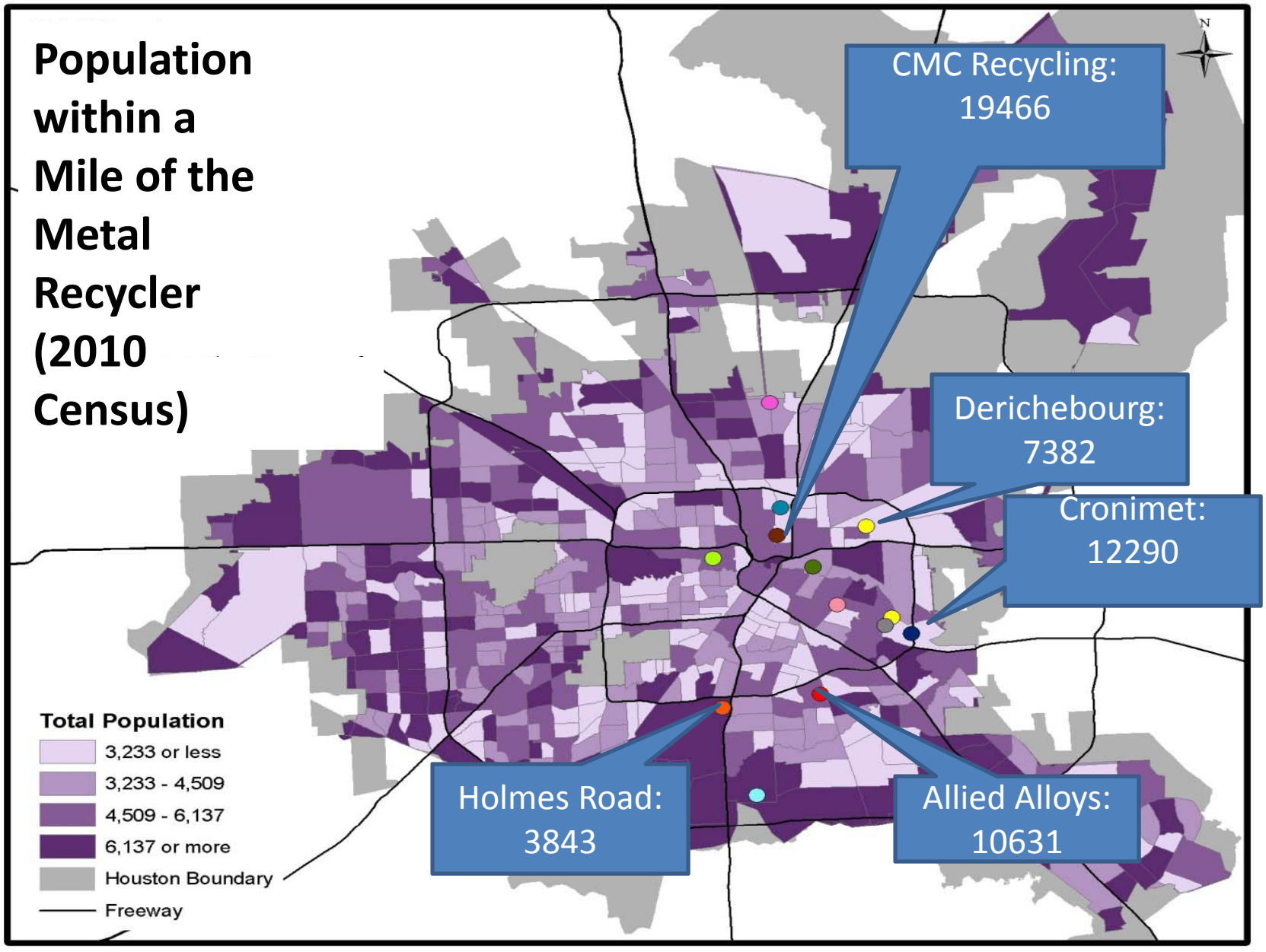

Total Cancer Risk by Facility from Metals
6.00E-03
5.00E-03
4.00E-03
3.00E-03
2.00E-03
1.00E-03
1.00E-06
Risk
1/3 Risk
5.28E-03
1.76E-03
1.18E-04
3.94E-05
Facility A
Facility B
Facility C
Facility D
Facility E
Facility F
Facility G
Facility H
Facility I
Facility J

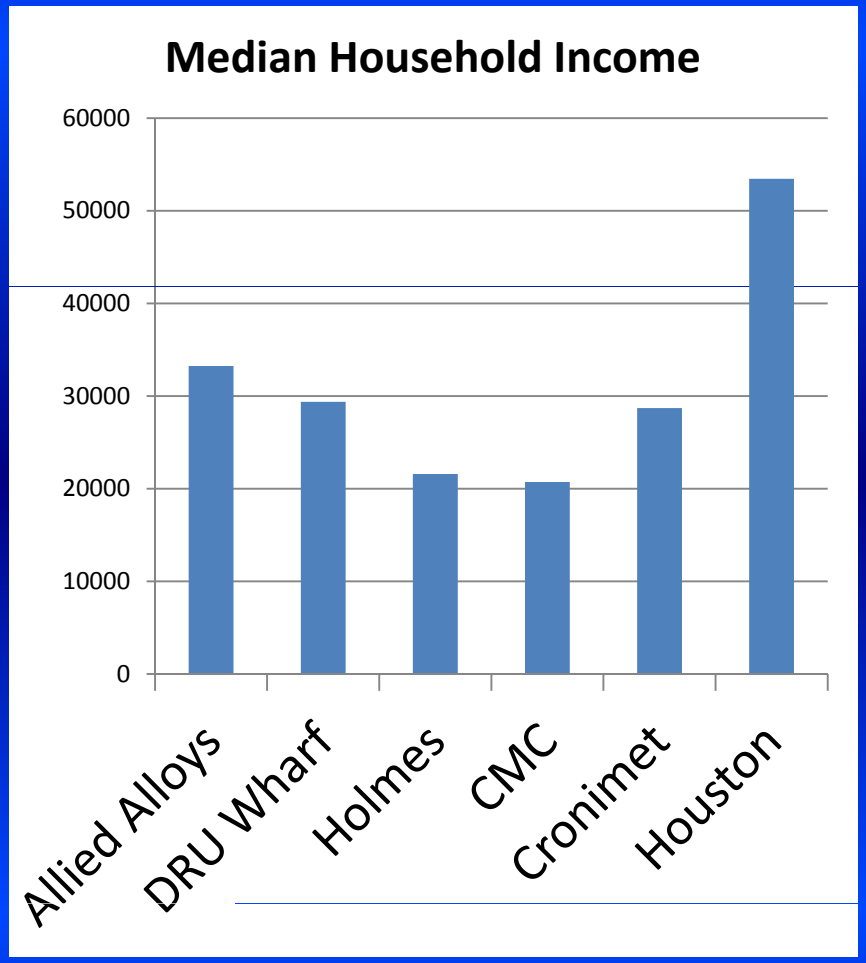
Site Specific Total Risk Estimate

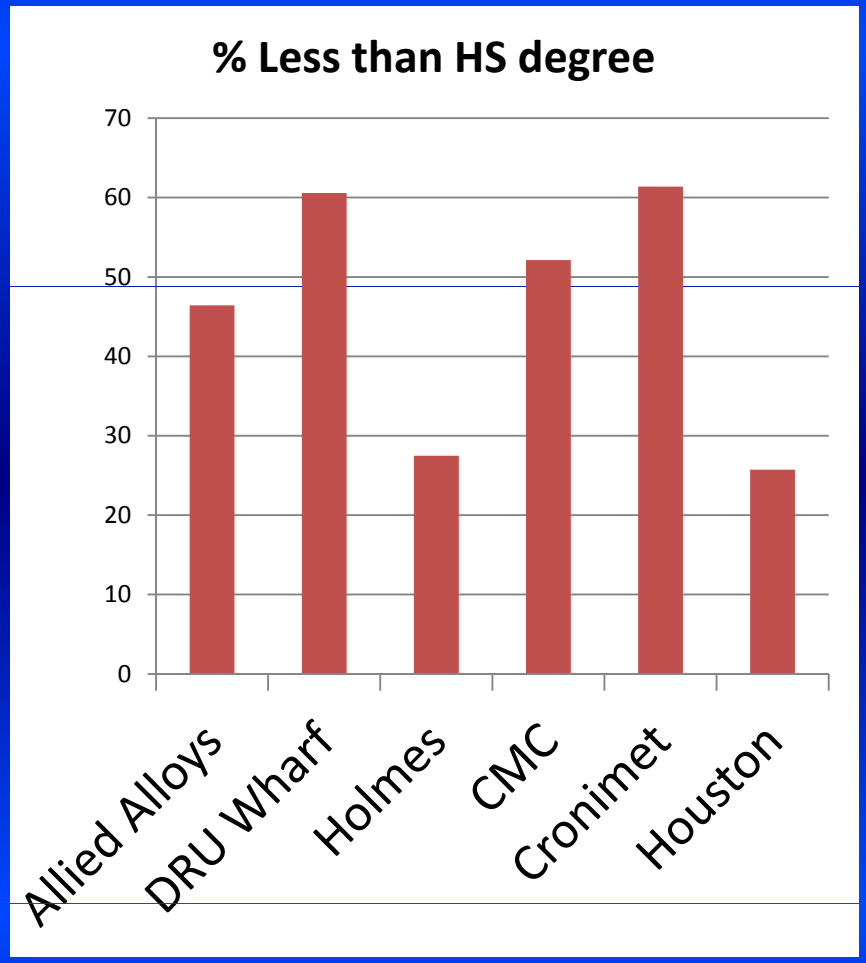
COC	IUR $(ug/m^3)^{-1}$	Conc ug/m^3	Cancer Risk
1,4-Dichlorobenzene	1.10E-05	1.82E+00	2.00E-05
Benzene	7.80E-06	3.07E+00	2.39E-05
1,3 Butadiene	3.00E-05	6.15E-01	1.85E-05
Ethylbenzene	2.50E-06	4.10E+00	1.02E-05
MethyleneChloride	1.00E-08	9.14E-01	9.14E-09
Tetrachloroethylene	2.60E-07	7.85E-01	2.04E-07
VinylChloride	4.40E-06	2.31E-01	1.01E-06
Cr VI	8.40E-02	0.008	6.72E-04
Ni	2.40E-04	0.234	5.62E-05
Total VOC Risk			**7.38E-05**
Total Metal Risk			**7.28E-04**
Total Risk			**8.02E-04**
Total Metal Risk by 1/3			**2.43E-04**

Metal Recycling Sites and Houston Population



Demographics Near Recyclers: Disadvantaged Population





NATA *Under* Estimates

Recycler	Facility X	Facility Y		
Metal	Cr(VI)	Cr(VI)	Ni	Co
Risk City of Houston	1.26E-02	3.18E-02	2.74E-04	1.17E-03
NATA Risk	2.61E-06	1.19E-05	3.72E-07	0.00E+00

Recycler	Facility Z		Facility AA		
Metal	Cr(VI)	Ni	Cr(VI)	Ni	Co
Risk City of Houston	1.71E-02	6.29E-05	1.25E-01	1.28E-04	1.49E-04
NATA Risk	1.99E-06	3.02E-07	3.93E-06	5.29E-07	0.00E+00

Strengthes and Weaknesses

Strengths:

- Measured data
- Negotiation leverage
- Verifiable improvements

Weaknesses:

- Relying on PM10 to TSP ratio
- Total Chromium to Hexavalent ratio

In Summary

Based on the current data and assumptions, we see a need to:

- Validate our findings
- Continue to work with companies to reduce exposure
- Work with the state to refine PBR
- Work with the impacted communities