Summary for OWB ISC-PRIME modeling, Round 2

"Two-foot-above-roofline analysis"

Test cases were largely modeled upon assumptions used in 2006 NYSDEC modeling

$PM_{2.5}$ modeling performed for 24-hour averaging period only

Predicted modeling impacts were compared to 21 $\mu g/m^3$, (the federal standard of 35 $\mu g/m^3$ minus the rural background value for Central Maine (14 $\mu g/m^3$)

Given the large variation of terrain in Maine, flat terrain was assumed.

Receptor Grid

Polar grid receptor placement every 10 degrees at the following spacing:

10 meter spacing from 0 to 200 meters
50 meter spacing from 200 to 500 meters
100 meter spacing from 500 to 1000 meters

Stack Parameters

Stack Heights:	18 feet, 24 feet, 30 feet
Stack Diameter:	0.66 feet (8 inches, suggested to be the industry standard)
Stack Temp:	294° F (418.71K), acceptable range 300° – 500° F
Stack Velocity:	3.44 feet/sec (1.05 m/s), number more likely to be in the vicinity of 2-4 m/s, but using 1.05 m/s will add conservatism

Building Downwash

OWB modeled as a 4 foot x 6 foot x 6.5 foot structure

3 house configurations:

Ranch (1 story): 40 feet long x 28 feet wide x 16 feet high
Cape (1 ½ stories): 40 feet long x 28 feet wide x 22 feet high
Colonial (2 stories): 40 feet long x 28 feet wide x 28 feet high

OWB Stack was assumed to be located on OWB within 20 feet of buildings

Meteorological Data

5/30/07

5 years of hourly Augusta meteorological data, 1984-1988

Emission Rate

3 different emission rates (g/s):

- 120 grams/hour (0.0333 g/s) – Current reasonable actual "upper limit" OWB emission rate, based upon manufacturers data and recommendations
- 60 grams/hour (0.0167 g/s) – just below Phase I upper limit of 70 grams/hour
- 15 grams/hour (0.0042 g/s) – Phase II limit

Conclusions

Furthest modeled distance (for all H8H modeling runs) to reach < 21 $\mu g/m^3$ was 361 feet, based upon the current 120 g/h emission rate and 18' stack (with structure present). Some setback to be required for all 120 g/h cases.

The presence of buildings greatly affects the local dispersion pattern, regardless of stack height. The two-feet-above-roofline assumption doesn't appear to have made any real improvement in final results (compared to previous modeling). The reduction in emission rate is more of the driving factor.

When structures were present, the maximum H8H impact of almost every model runs occurred very close to the stack/boiler, due to low stack velocity/building downwash.

5-30-07

ISC-PRIME OWB MODEL RESULTS, 3 SCENARIOS (120, 60, 15 grams/hour), 3 STACK HEIGHTS (18, 24, 30 feet)

SCENARIO #1

Stack Height (ft): 18.00

Building Type (ft): 28x40x16 Ranch

MET YEAR	120 grams/hour 0.0333 g/s Max Impact	Downwind Distance (ft) < 21 ug/m3	60 grams/hour 0.0167 g/s Max Impact	Downwind Distance (ft) < 21 ug/m3	15 grams/hour 0.00417 g/s Max Impact	Downwind Distance (ft) < 21 ug/m3
1984	49.51	98	24.83	66	6.20	0
1985	56.05	131	28.11	66	7.02	0
1986	52.09	98	26.12	66	6.52	0
1987	51.20	361	25.68	66	6.41	0
1988	49.49	98	24.82	66	6.20	0

SCENARIO #2

Stack Height (ft): 24.00

Building Type (ft): 28x40x22 Cape

MET YEAR	120 grams/hour 0.0333 g/s Max Impact	Downwind Distance (ft) < 21 ug/m3	60 grams/hour 0.0167 g/s Max Impact	Downwind Distance (ft) < 21 ug/m3	15 grams/hour 0.00417 g/s Max Impact	Downwind Distance (ft) < 21 ug/m3
1984	36.70	98	18.40	0	5.46	0
1985	41.21	98	20.67	0	6.29	0
1986	39.22	98	19.67	0	6.08	0
1987	38.36	98	19.24	0	5.62	0
1988	36.87	98	18.49	0	5.60	0

SCENARIO #3

Stack Height (ft): 30.00

Building Type (ft): 28x40x28 Colonial

MET YEAR	120 grams/hour 0.0333 g/s Max Impact	Downwind Distance (ft) < 21 ug/m3	60 grams/hour 0.0167 g/s Max Impact	Downwind Distance (ft) < 21 ug/m3	15 grams/hour 0.00417 g/s Max Impact	Downwind Distance (ft) < 21 ug/m3
1984	27.19	98	13.64	0	3.41	0
1985	29.61	98	14.85	0	3.71	0
1986	27.82	66	13.95	0	3.48	0
1987	28.61	66	14.35	0	3.58	0
1988	26.45	66	13.26	0	3.31	0

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DRAFT SETBACK PROPOSAL

Emission Limit	Installation Date	Setback	Nearest residence	Stack Height
greater than 0.60 MMBTU/hr input	up to April 2008 (except for sell through)	200 feet nearest property line	greater than 500 feet	10 feet above ground
			200-500 feet	2 feet higher than peak of structure being served
0.60 to 0.32 pound per MMBTU per hour input	up to April 2010	100 feet nearest property line	greater than 300 feet	10 feet above ground
			100-300 feet	2 feet higher than peak of structure being served
less than or equal to 0.32 pound per MMBTU per hour output	anytime	50 feet nearest property line	greater than 300 feet	10 feet above ground
			50-300 feet	2 feet higher than peak of structure being served

5/30/2007