Air Quality Division
March 6, 2002

MEMORANDUM

TO: Lori Cherry, Toxics Protection Branch
Steve Schliesser, Toxics
AQ Supervisor, MRO
Bill Kissell, MRO

FROM: Tom Anderson, Meteorologist, AQAB

THROUGH: Jim Roller, Supervisor, AQAB

SUBJECT: Revised Modeling for Salisbury Asphalt Conglomerate – Associated Asphalt, APAC, Concrete Supply, and Vapor Recovery Remediation Sites
Salisbury, NC Rowan County

I have completed the revised modeling analysis for the combined asphalt and concrete production facilities located southwest of the city of Salisbury near the intersection of Jake Alexander Blvd. and Western N.C. Railroad. In fall of 2000, the Toxics Protection Branch requested the modeling analysis to evaluate area impacts of multiple pollutants due to citizen complaints in the area surrounding the facilities. The facilities included in the study were: Associated Asphalt, APAC, Concrete Supply, and two vapor recovery remediation areas at the former Exxon and Southern States property. An initial analysis by the AQAB was conducted and reported in a memorandum dated February 8, 2001. Results of that analysis prompted further investigation of the facilities' operational processes along with ambient monitoring in the vicinity of the facilities. The revised analysis was based on more accurate emissions and process parameter data. The revised analysis considered twelve N.C. regulated toxics common to two or more of the facilities and also six criteria pollutants. All pollutants evaluated in the analysis are outlined in the attached modeling results tables (Tables 1 and 2).

Emissions were considered from all sources at each of the aforementioned facilities and included numerous point sources and volume sources (eg. railcar unloading, truck loading and yard traffic at Assoc. Asphalt and APAC). A total of 15 sources were modeled and are outlined, grouped by facility, in attached Table 1 along with a description of the source type. Emission rates for each source used in the analysis are also provided as attachments.

ISCST3 (version 00101) using five years (1987-1991) of meteorological data from Charlotte (surface) and Greensboro (upper air) was used to evaluate impacts in simple and complex terrain from the combination of facilities. Direction-specific building dimensions, determined using EPA's BPIP program (95086), were used as input to the model for building wake effect determination. Receptors were placed around the Associated Asphalt and APAC facilities and the remediation boundaries at 25-meter intervals and extended outward to a distance of approximately 2 kilometers at grid resolutions of 50 meters (out to 500 meters distance), 100 meters (from 500 metes to 1 kilometer), and 250 meters (from 1 km to 2 km). Property boundaries were not obtained for the Concrete Supply facility; therefore, receptors were placed within the property owned by those facilities. SCREEN3 (96043) was also used to evaluate cavity impacts for several sources; however, cavity concentrations were less than ISC3 simple terrain impacts and no further analysis was necessary.

Results Discussion:

As shown in Table 1, only benzene exceeded its respective annual AAL as outlined in NCAC 2D .1104. However, as the attached concentration isopleth analyses demonstrate, maximum impacts are centered solely around the Southern States vapor remediation sources and concentrations drop rapidly outside the immediate vicinity of those sources. Several other isopleths for H_2S impacts for various scenarios have been provided to Bryan Lange during the course of the modeling study but are omitted in this report. Generally, the isopleth analyses for H_2S also shows that maximum impacts are distributed at and along the northern property boundary of the Associated Asphalt facility and drop rapidly as you move away from the facility.

Including background concentrations, none of the criteria pollutants exceeded the NAAQS as shown in Table 2.

The results of the modeling demonstration assumes the emission rates and stack parameters provided are correct

Table 1. Maximum Modeled Impacts for Toxic Air Pollutants

Toxic Air Pollutant	Averaging Period	Maximum Impact (µg/m^3)	AAL (µg/m^3)	Percent of AAL (%)
Benzene	annual	1.02	0.12	850
Benzo(a)pyrene	annual	0.00002	0.03	0
Carbon disulfide	24-hour	0.38	186	0
Formaldehyde	1-hour	26.3	150	18
Hydrogen sulfide	1-hour	404	2,100	19
Methylene chloride	annual	0.00002	24	0
	24-hour	0.00140	1,700	0
n-Hexane	24-hour	3.88	1,100	0
Phenols	1-hour	0.793	950	0
Styrene	1-hour	0.14	10,600	0
Toluene	24-hour	120	4,700	3
	1-hour	1,706	56,000	3
Trichlorofluoromethane	1-hour	0.01	560,000	0
Xylene	24-hour	279	2,700	10
	1-hour	3,959	65,000	6

Table 2. Maximum Modeled Impacts for Criteria Air Pollutants

Criteria Pollutant	Averaging Period	Study Impact (ug/m^3)	Background Concentration (ug/m^3)	Total Impact (ug/m^3)	NAAQS (ug/m^3)	Percent of NAAQS (%)
Carbon monoxide	8-hour	241	3.6	244.6	10,000	2.5
	1-hour	1,441	7.6	1448.6	40,000	3.6
Nitrogen Oxide	Annual	15.7	0.018	15.7	100	16
TSP	Annual	1.3	48.0	49.3	75	66
	24-hour	12.0	73.0	85.0	150	57
PM10	Annual	1.3	30.0	31.3	50	63
	24-hour	7.90	47.0	54.9	150	37
Sulfur Dioxide	Annual	0.09	0.004	0.1	80	0.1
	24-hour	0.99	0.014	1.0	365	0.3
	3-hour	3.0	0.066	3.1	1,300	0.2
VOCs	Annual	9.2	NA	9.2	NA	NA
	1-hour	397	NA	397	NA	NA

Figure 1. All Facilities Dispersion Model Prediction for H_2S.

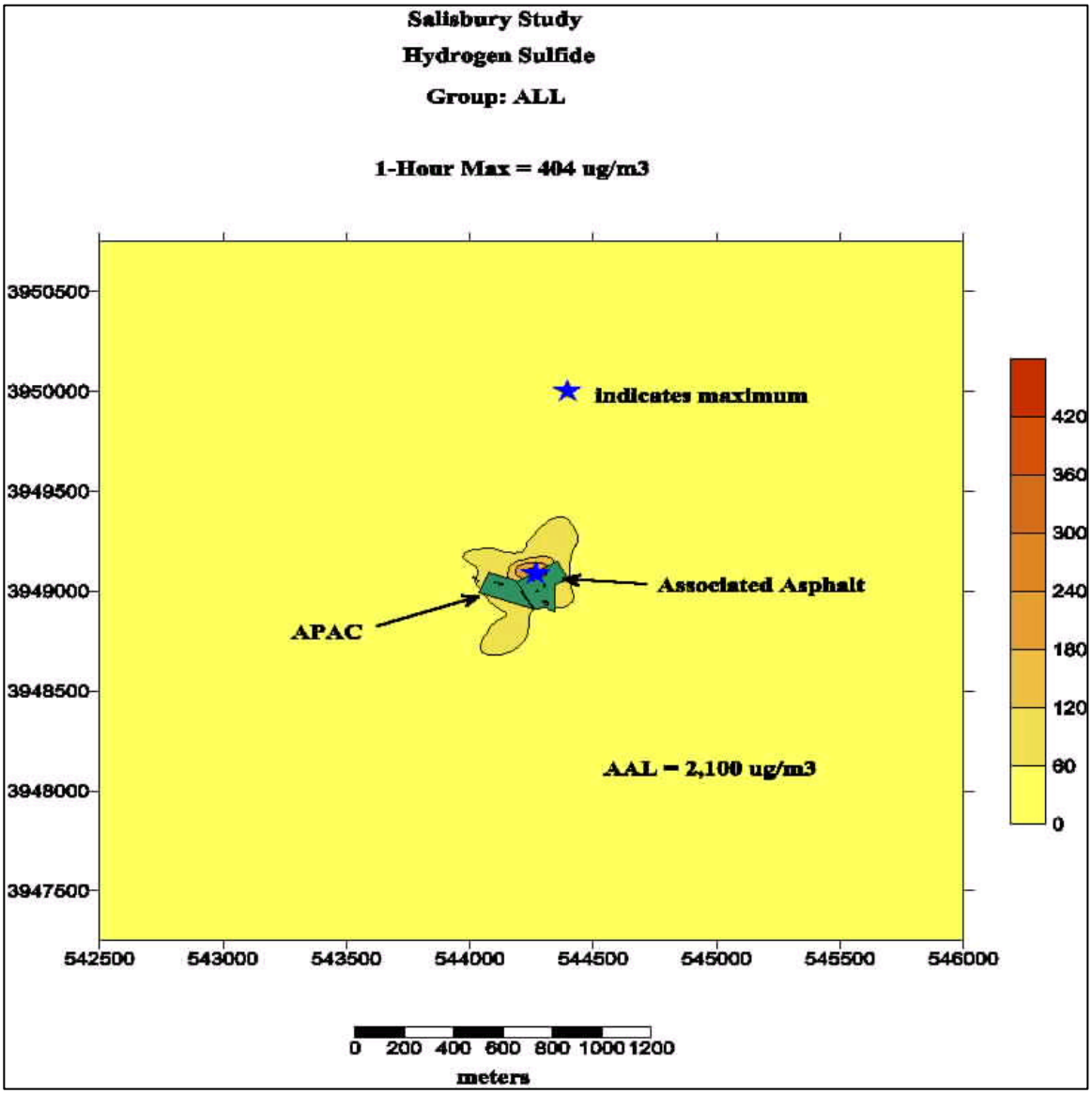

Figure 2. Associated Dispersion Model Prediction for H_2S.

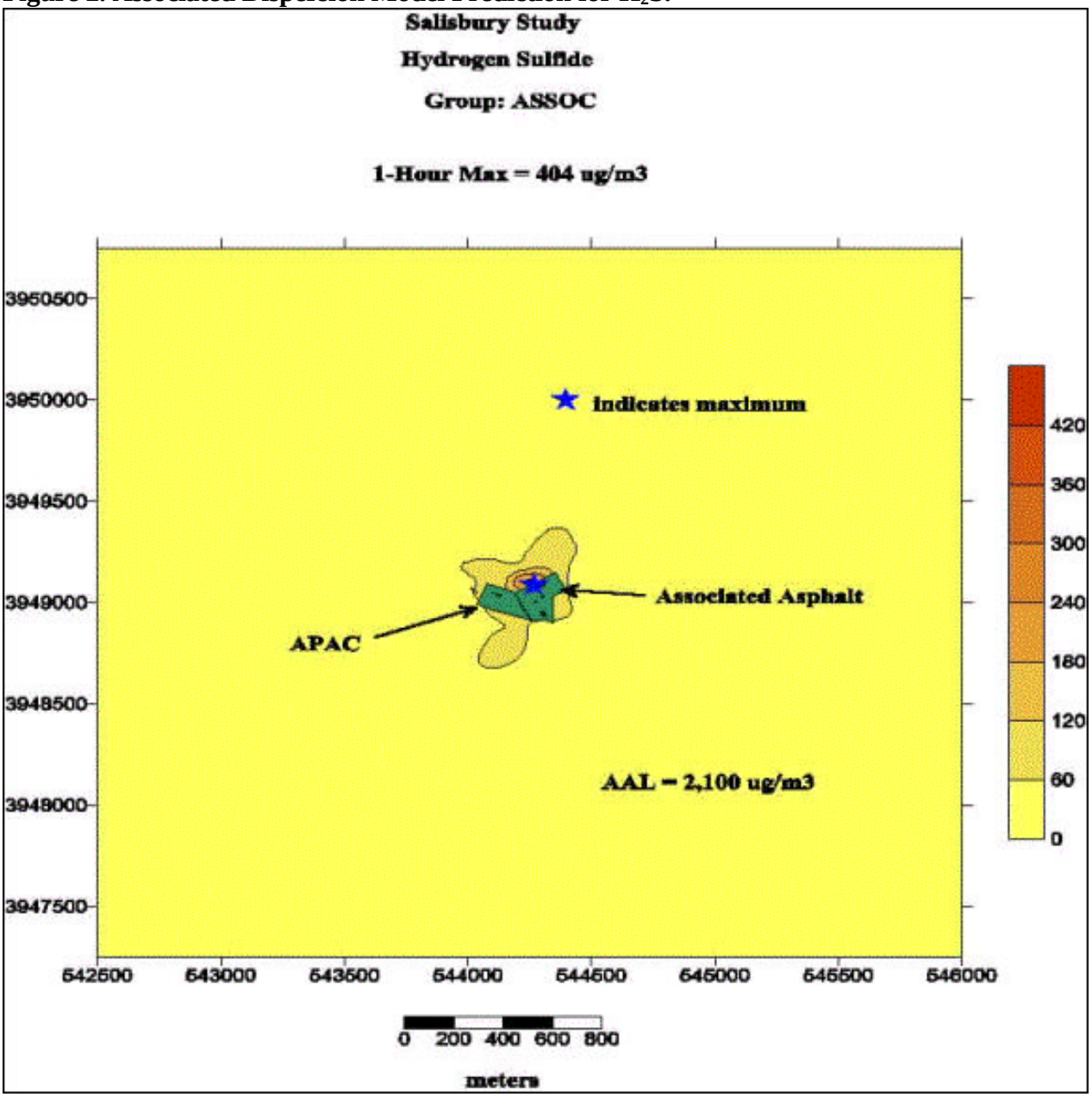

Figure 3. APAC Dispersion Model Prediction for H_2S.

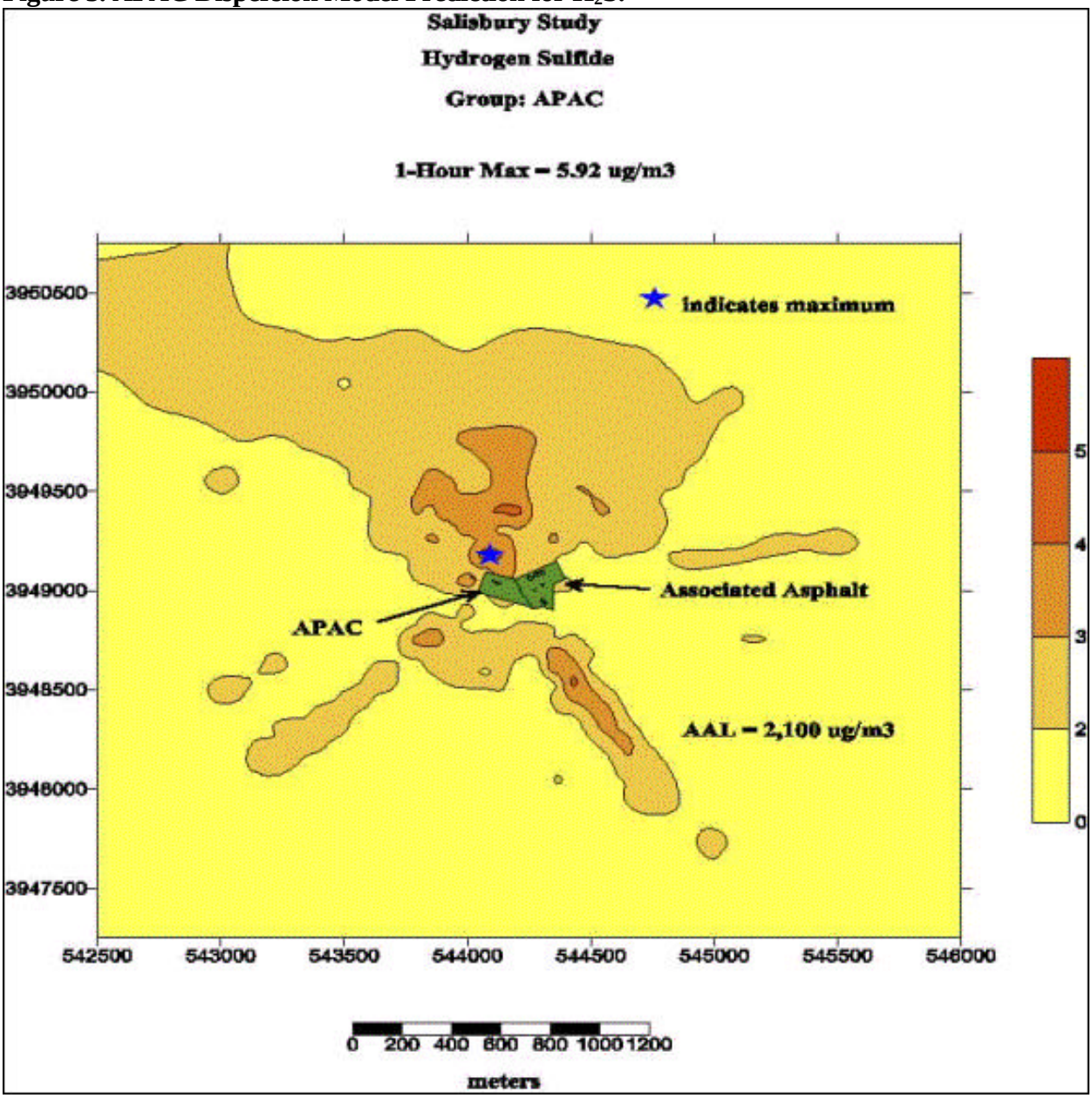

Figure 4. All Facilities Dispersion Model Prediction for Benzene.

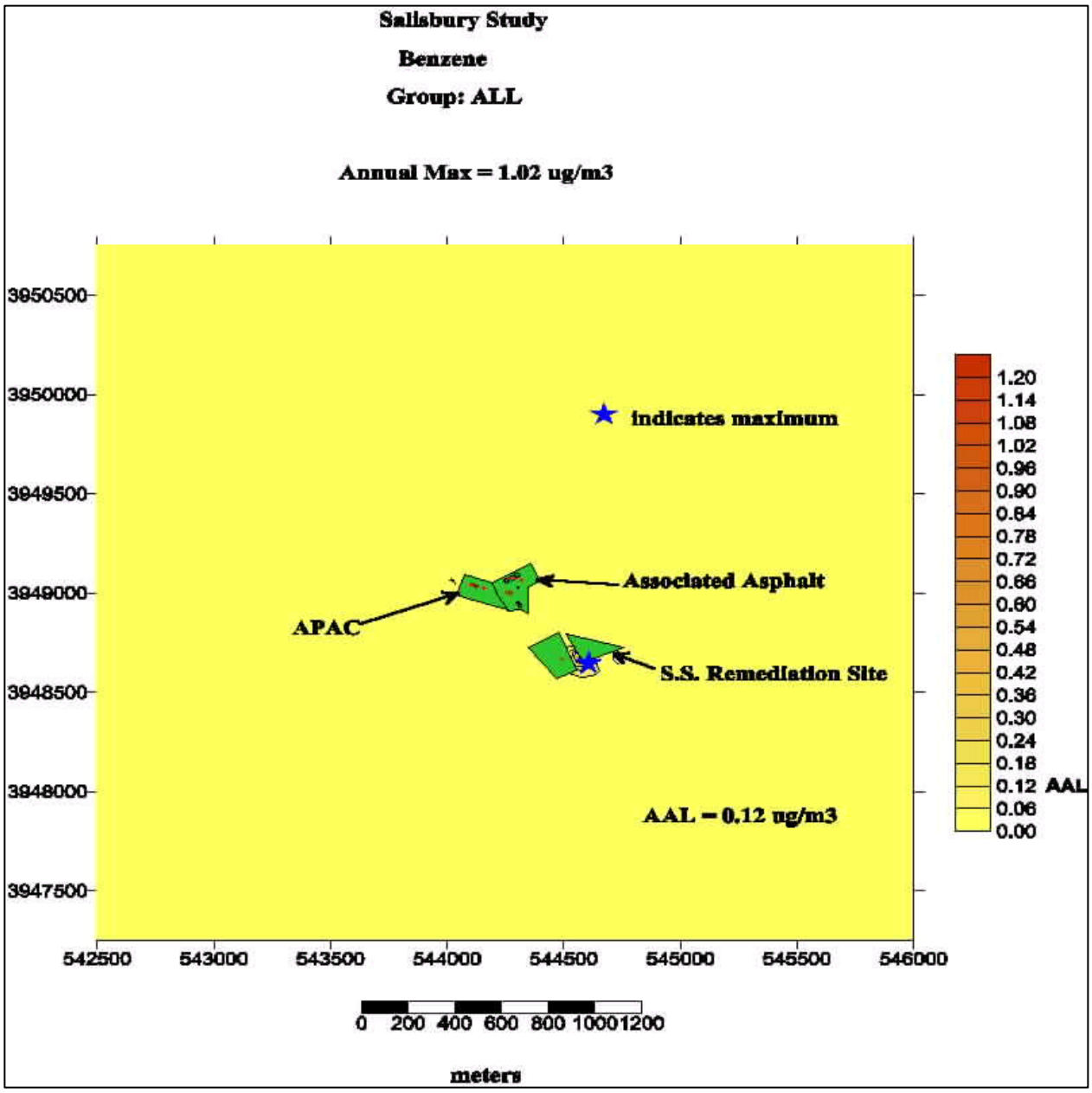

Figure 5. Southern States Remediation Unit Dispersion Model Prediction for Benzene.

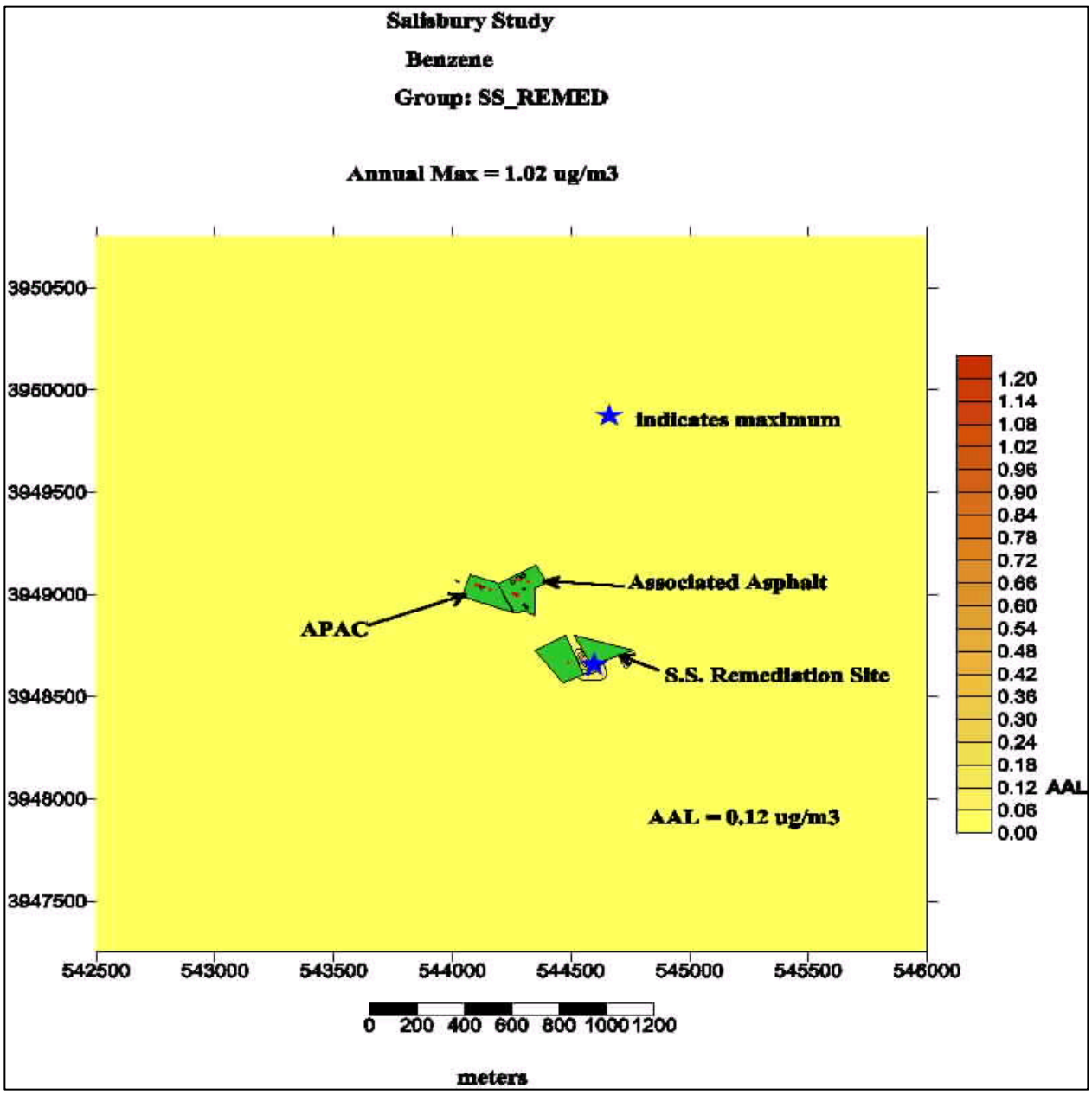

Figure 6. APAC Dispersion Model Prediction for Benzene.