Health Impact Assessment for Paint Booths

Prepared for:
Vaupell Industrial Plastics
Everett, Washington

Prepared by:
ENVIRON International Corporation
Lynnwood, Washington

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ENVIRON

Contents

List of Tables

List of Figures

List of Appendices

1 Introduction

Vaupell Industrial Plastics (Vaupell) operates an existing facility at 11323 Commando Road W, Suite 101, in unincorporated Snohomish County, near Everett, Washington (hereafter referred to as "the Facility"). The Facility was constructed in early 2012 and is a portion of a multi-tenant building leased by Vaupell. Following construction, the facility was initially sub-leased and operated by Enikon Composite NW (Enikon). Because the facility had neither applied for, nor received an air permit, a Notice of Violation (NOV # 3-005795) was issued by the Puget Sound Clean Air Agency (PSCAA), which has jurisdiction over air permitting in that area, on September 19, 2012. Enikon's sub-lease ended, and Vaupell began operating the facility on October 1, 2012. Vaupell submitted a Notice of Construction (NOC) and Application for Approval, along with all required fees, to PSCAA on October 12, 2012.

In the NOC and Application for Approval, Vaupell provided estimated annual coating and solvent usage rates based on the operating schedule at that time, which was approximately 9 hours per day, 5 days per week, 52 weeks per year (2,340 hours per year). PSCAA calculated Toxic Air Pollutant (TAP) emission rates from these usage rates and Material Safety Data Sheets (MSDS) provided by Vaupell. A single TAP, ethyl benzene (CAS # 100-41-4), was determined to exceed the Small Quantity Emission Rate (SQER) provided for that compound in WAC 173-460-150. PSCAA calculated a maximum ambient ethyl benzene concentration using a screening air dispersion model (SCREEN3), and determined that the proposed coating usage rates would result in compliance with the Acceptable Source Impact Level (ASIL) of 0.4 $\mu g/m^3$ for ethyl benzene (also provided in WAC 173-460-150). To ensure ongoing compliance with WAC 173-460, PSCAA proposed a permit condition in the NOC and Application for Approval that would limit usage of the two coatings that contain most of the ethyl benzene to 240 gallons per year (gal/yr) each.

The NOC and Application for Approval submitted by Vaupell reflected operations at the Everett facility at that time, and not production increases that will be necessary to fulfill future contractual obligations. Vaupell estimates that, to fulfill those contractual obligations, operations will have to be increased to continuous (i.e., 24 hours per day, 7 days per week, 52 weeks per year), and the usage rates of the two coatings containing the majority of the ethyl benzene will have to increase to 400 gal/yr each. Because the screening dispersion modeling conducted by PSCAA indicated that these changes would result in ambient concentrations that would exceed the ethyl benzene ASIL, Vaupell retained ENVIRON to develop refined dispersion modeling. The refined dispersion modeling also predicted ethyl benzene concentrations greater than the applicable ASIL. Furthermore, no viable stack adjustment solutions (increased height and/or exit velocity) could be identified. At that point, Vaupell made the decision to pursue a 2nd Tier TAP review through the Washington Department of Ecology (Ecology), which requires a Health Impact Assessment (HIA).

The remainder of this document consists of a description of the source, including TAP emission rates, an outline of the air dispersion modeling methodology, including inputs and assumptions, the results of the modeling, and risk calculation information for TAPs exceeding SQERs and ASILs.

2 Project Description

2.1 Project Location

As stated in the previous section, the Facility is a leased portion of a multi-tenant building located at 11323 Commando Road W, Suite 101, in unincorporated Snohomish County, near Everett, Washington. Aerial photos showing the location of the Facility and the surrounding area are provided in Figure 2-1 and 2-2. Other tenants of the building include Little Nickel Publishing, Kaman Engineering Services, and Mobile Tool Management.

The demographics of Snohomish County, as well as the cities of Everett and Mukilteo, which are near the Facility, are summarized in Table 2-1. All data were obtained from the U.S. Census Bureau, and represent data from the 2010 census.

Table 2-1. Demographics of Nearby Jurisdictions

Metric	Snohomish County	Everett	Mukilteo
Population, 2010	713,335	103,019	20,254
Percent of persons under 5 years, 2010	6.6%	7.2%	4.5%
Percent of persons under 18 years, 2010	24.4%	22.7%	23.2%
Percent of persons 65 years and over, 2010	10.3%	10.3%	10.6%

The Facility is located in an area that is zoned Light Industrial. Figure 2-3 presents the current zoning in the areas surround the Facility. The nearest residence, which is in an area zoned Business Park, is located approximately 0.4 kilometers (km) south-southeast of the Facility. Other residential areas lie approximately 0.6 km to the east, 0.8 km to the southeast, and 0.8 km to the south. The Facility is adjacent to Paine Field Airport, which extends approximately 1 km to the west and 3 km to the north.

2.2 Emission Units

The Facility manufactures engineered plastic and composite components for the aerospace industry. Four spray booths are used to apply surface coatings to the manufactured components. Three are down-draft booths with working volume of 513 cubic feet, and the fourth, used as a batch unit, is a semi-down-draft booth with a working volume of 1,100 cubic feet. Two of the three down-draft booths (Units #2 and #3) are used to apply all ethyl-benzene-containing coatings. The spray booth ventilation systems exhaust to the atmosphere through stacks located on the roof of the building in which the Facility operates.

2.3 Emission Rate Calculations

Proposed coating or solvent usage rates in gallons per year were converted to a mass basis using the density from a manufacturer-provided MSDS. TAP emission rates were calculated using the mass usage rates and TAP weight fractions from the MSDS. A list of the coatings and solvents used in the spray booths, with density and TAP contents by weight, is provided in Table 2-2.

Table 2-2. List of Coatings and Solvents with TAP Contents

Coating/Solvent	Density[1] (lb/gal)	Percent by Weight[1]				
		Ethyl Benzene [100-41-4]	Isopropyl Alcohol [67-63-0]	MEK[2] [78-93-3]	Toluene [108-88-3]	Xylenes [108-38-3]
Isopropyl Alcohol	7.5	--	100	--	--	--
Sherwin-Williams Polane L	10.15	0.2	--	10	4	1
Mankiewicz ALEXIT-FST-Topcoat 346-55	13.4	0.0336	--	--	--	0.1
Mankiewicz ALEXIT-FST-Klarlack 404-15 Clearcoat	9.2	14.667	--	--	--	18.1445
Mankiewicz ALEXIT-FST-Décor 404-55 Basecoat	8	12.86	--	--	--	16.88
Mankiewicz Thinner 62	7.34	3	--	--	--	9
Sherwin-Williams Polane White Primer E61WC40	10.35	0.2	--	--	--	--

1 Taken from MSDS (see Appendix A); number of significant figures is as reported by the manufacturer/supplier.
2 MEK = Methyl Ethyl Ketone (Butanone)

Table 2-3 presents the proposed annual usage rates for each coating and solvent, and the maximum potential TAP emissions from each, as well as the total potential TAP emissions with a comparison to the SQERs. Only ethyl benzene is expected to have the potential to exceed the SQERs. It should be noted that the TAP emission rate calculations are based on the conservative assumption that 100 percent of every TAP fully evaporates and is emitted. In actuality, some portion of each TAP remains in the coating following application.

The annual usage rates of all coatings and solvents, except those for the Mankiewicz ALEXIT-FST-Klarlack 404-15 Clearcoat (hereafter ALEXIT 404-15) and the Mankiewicz ALEXIT-FST-Décor 404-55 Basecoat (hereafter ALEXIT 404-55), are based on a maximum expected hourly usage scaled up to continuous operation (i.e., 8,760 hours per year). The usage rates for ALEXIT 404-15 and 404-55 are based on Vaupell's estimate of the annual throughput necessary to meet production targets required by existing contracts with customers.

Table 2-3. Toxic Air Pollutant Emission Rate Calculations

Coating/Solvent	Usage Rate (gal/yr)	Maximum Potential Emission Rate[1,2] (lb/avg per)				
		Ethyl Benzene [100-41-4] (lb/yr)	Isopropyl Alcohol [67-63-0] (lb/hr)	MEK [78-93-3] (lb/day)	Toluene [108-88-3] (lb/day)	Xylenes [108-38-3] (lb/day)
Isopropyl alcohol	135	--	0.115	--	--	--
Sherwin-Williams Polane L	750	15.2	--	2.09	0.834	0.209
Mankiewicz ALEXIT-FST-Topcoat 346-55	900	4.05	--	--	--	0.0331
Mankiewicz ALEXIT-FST-Klarlack 404-15 Clearcoat	400	540	--	--	--	1.83
Mankiewicz ALEXIT-FST-Décor 404-55 Basecoat	400	412	--	--	--	1.48
Mankiewicz Thinner 62	135	29.7	--	--	--	0.244
Sherwin-Williams Polane White Primer E61WC40	450	9.32	--	--	--	--
Total (lb/avg per)	--	1,010	0.115	2.09	0.834	3.79
SQER (lb/avg per)	--	76.8	7.01	657	657	29
Over SQER?	--	Yes	No	No	No	No

1 The applicable averaging periods for the TAPs of concern are as follows: 1-hour – isopropyl alcohol; 24-hour – MEK, toluene, xylenes; annual – ethyl benzene. (From WAC 173-460-150).

2 Short-term emission rates (i.e., hourly and daily) are based on the annual usage rate divided by 8,760 hours per year for the hourly rate, and the hourly rate was multiplied by 24 hours per day for the daily rate.

2.4 Control Technology

Per WAC 173-460-060, new or modified sources that increase TAP emission rates must employ Best Available Control Technology for toxics (tBACT). Coatings are applied in the spray booths using high volume low pressure (HVLP) spray equipment with a transfer efficiency demonstrated to be greater than or equal to 65 percent. All booths have an active exhaust system, and each employs a dry filter system to reduce overspray emissions. The filter media used, regular density (15 grams per square foot) fiberglass paint arrestor, has been confirmed through testing to provide an average removal efficiency in excess of 98 percent.

The Facility is not expected to emit Hazardous Air Pollutants (HAPs)[1] at rates that exceed the major source threshold for the National Emission Standards for Hazardous Air Pollutant (NESHAP) program, and there are no area source NESHAP rules that apply to the Facility. Nevertheless, the primer and topcoat application requirements of 40 CFR Part 63, Subpart GG (National Emission Standards for Aerospace Manufacturing and Rework Facilities) are considered tBACT for limiting emissions of HAPs from those operations. Subpart GG limits organic HAP emissions from primers to 350 grams per liter (g/l), or 2.9 pounds per gallon (lb/gal), and limits organic HAP emissions from topcoats to 420 g/l, or 3.5 lb/gal. The coatings used at the Facility do not exceed these Subpart GG organic HAP limits, and do not contain any inorganic HAPs.

Add-on TAP control systems (e.g., adsorption, oxidation, etc.) are available, but the capital costs associated with such systems start at more than $250,000. Assuming an add-on control system would eliminate all TAP emissions from the Facility (approximately half a ton – see Table 2-2), the cost effectiveness of such a system, amortizing that minimum capital cost over 20 years with a 7 percent interest rate, and ignoring operating costs, would approach $50,000 per ton of TAPs reduced. Operating and maintenance cost would create a significant increase in this cost-effectiveness metric. Clearly, add-on controls can be eliminated from consideration as tBACT on a cost-effectiveness basis.

Vaupell proposes that the work practice standards outlined above (i.e., spray equipment, filter media, limits on HAP contents of coatings) constitute tBACT for the spray booths. PSCAA concurs with this tBACT proposal, which is reflected in the draft Order of Approval issued by PSCAA.

[1] Ethyl benzene, MEK, toluene, and xylenes are HAPs.

3 Hazard Identification

The hazard identification process is used to briefly identify health effects may occur in humans exposed to a chemical. As noted above, ethyl benzene is the only TAP required to be addressed in this 2nd Tier analysis.

Ethyl benzene is a colorless liquid found naturally in petroleum oil and used in the production of styrene, fuels, and solvents[2]. It has an aromatic odor, and it is flammable and combustible. Based on its physicochemical properties (Table 3-1) ethyl benzene can easily volatilize from soil or water and therefore partitions largely to air. Aerobic conditions and direct and indirect photolysis can lead to its degradation in the environment, with a half-life of only 1-2 days[2]. The products of this degradation can include ethylphenols, benzaldehyde, acetophenone, and m- and p-nitroethylbenzene, which may have hazards of their own[3]. Given its prevalence in air, inhalation is the most common route of exposure, though ingestion and dermal absorption are possible.

Table 3-1. Selected Physical and Chemical Properties of Ethyl Benzene

Physical and Chemical Properties[2]	
Chemical formula	C_8H_{10}
Molecular weight	106.16 g/mol
Vapor pressure	9.53 mm Hg (at 25 °C)
Henry's Law Constant	$7.9x10^{-3}$ atm-m^3/mol
Octanol/water partition coefficient (log Kow)	3.13
Air Concentration Conversion[4]	1 ppm = 4.35 mg/m^3 at 25°C

Short term (acute) effects of inhalation exposure to ethyl benzene at high concentrations may include: respiratory irritation, irritation of the eyes, and neurological effects (dizziness)[5]. Chronic inhalation of ethyl benzene has been shown to cause effects on the kidneys, blood, and liver, as well as developmental toxicity and increased incidence of cancer[2,5]. The next steps in the HIA will examine ethyl benzene exposure concentrations (ECs) around the Facility and provide additional details regarding the known toxic effects in order to characterize risk.

[2] Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological Profile for Ethylbenzene. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 2010.
[3] Hoshino M, Akimoto H, Okuda M. 1978. Photochemical oxidation of benzene, toluene, and ethylbenzene initiated by hydroxyl radicals in the gas phase. Bull Chem Soc Jpn 51:718-724.
[4] Office of Environmental Health Hazard Assessment, 2007, Long-term Health Effects of Exposure to Ethylbenzene, Air Toxicology and Epidemiology Branch, Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, Oakland, CA. 2007. http://www.oehha.ca.gov/air/hot_spots/pdf/Ethylbenzene_FINAL110607.pdf
[5] U.S. Environmental Protection Agency. Integrated Risk Information System (IRIS) on Ethylbenzene. National Center for Environmental Assessment, Office of Research and Development, Washington, DC. 1999.

4 Pollutant Concentration Calculations

4.1 Modeling methodology

Air dispersion modeling is frequently used to provide ambient air concentrations for calculating inhalation exposure to airborne toxic compounds. This section provides the methodology used to calculate ambient concentrations, and the results of the modeling analysis.

4.1.1 Model Selection

Regulatory modeling techniques were reviewed to select the most appropriate air quality dispersion model to simulate dispersion of air pollutant emissions attributable to the proposed project. AERMOD, the preferred model in the U.S. Environmental Protection Agency's (USEPA's) "Guideline on Air Quality Models" (codified as Appendix W to 40 CFR Part 51, hereafter referred to as the "Guideline"), was selected for the modeling analysis primarily because it is the most up-to-date dispersion model currently available, and is recommended for use in Ecology's 2nd Tier guidance document.[6]

4.1.2 Modeling Procedures

AERMOD was applied using regulatory defaults, and the options and data discussed in this section.

4.1.2.1 Setup and Application

The most recent version of AERMOD (Version 12345) was applied using the default options for dispersion that depend on local meteorological data, regional upper air data, and the local physical characteristics of land use surrounding the Facility.

Auer's method of classifying land-use as either rural or urban was used to analyze the region around the Facility. This method calls for analysis of the land within a 3-km of the Facility to determine if the majority of the land is classified as rural or urban. If more than 50 percent of the area within this 3-km radius is classified as industrial, commercial or residential land types, then urban dispersion coefficients should be used in modeling; otherwise, rural dispersion coefficients should be used. To implement the Auer method, 1992 National Land Cover Data (NLCD) was downloaded from the United States Geological Survey (USGS) Seamless Data Distribution website, and the land cover categories were mapped to the Auer classifications. Approximately 41 percent of the area within 3-km of the Facility is classified as urban. Therefore, the Facility is categorized as rural for modeling purposes, and rural dispersion coefficients were used.

4.1.2.2 Averaging Periods

The TAPs listed in WAC 173-460-150 have assigned averaging periods: 1-hour, 24-hour, and annual. Emission rates for TAPs present in the coatings and solvents used at the Facility were calculated based on the assigned averaging periods. Only one TAP, ethyl benzene, exceeded the assigned SQER, and, therefore, required an ambient concentration calculation using

[6] Department of Ecology, "Guidance Document: First, Second, and Third Tier Review of Toxic Air Pollution Sources (Chapter 173-460 WAC)." Publication Number 08-02-025, revised September 2013.

AERMOD. Because the ASIL for ethyl benzene has an annual average basis, AERMOD was executed to provide ambient concentrations on that basis. However, because some toxicity literature suggests that more acute exposure to ethyl benzene may have non-cancer health effects on humans, AERMOD was also configured to provide 24-hour average results.

4.1.3 Terrain Elevation Data and Receptor Network

The 10-km-by-10-km domain used for the modeling simulations is shown in Figure 2-1. Terrain elevations for receptors, as well as the base elevations of onsite structures and emission units, were prepared using available data from the National Elevation Dataset (NED) developed by the United States Geological Survey (USGS); these data have a horizontal spatial resolution of approximately 10 m. The elevation and hill height scale for each receptor were determined using the AERMOD terrain preprocessor, AERMAP (version 11103). All receptor locations are in Universal Transverse Mercator (UTM) coordinates using the spatial reference of NAD 83, Zone 10.

Receptors spaced 500 meters (m) apart were placed throughout the modeling domain. Nested grids of receptors with 25-m, 50-m, and 200-m spacing were within 1.8-km, 3-km, and 5-km square areas, respectively. Receptors were also located at 10-m intervals along the perimeter of the building in which the Facility is located. Because the 2nd Tier Guidance document recommends using receptors spaced 10 m apart to ensure that sampling error does not reduce the maximum computed concentration by more than 10 percent, the location and magnitude of the maximum concentration was refined by re-executing AERMOD with a newly created 10-m grid located within the nearest receptors surrounding the maximum concentration receptor. The receptor locations are shown in Figure 4-1.

4.1.4 Meteorological Data

ENVIRON conducted a survey of available meteorological data for use in the modeling simulations. A representative five-year data set was prepared using available surface and upper air data for the period 2007 through 2011. Surface meteorology data from the National Weather Service (NWS) Automated Surface Observing System (ASOS) station at Paine Field, in Everett, Washington, and upper air data collected at the NWS station in Quillayute, Washington were used. A windrose summarizing the Paine Field wind speed and wind direction data over the five-year period is provided in Figure 4-2.

Additional meteorological variables and geophysical parameters are required for use in the AERMOD dispersion modeling analysis to estimate the surface energy fluxes and construct boundary layer profiles. Surface characteristics including albedo, Bowen ratio, and surface roughness length were determined for the area surrounding the Paine Field meteorological station using the AERMET surface characteristic preprocessor, AERSURFACE (Version 08009), and the USGS 1992 National Land Cover (NLCD92) land use data set.[7] The NLCD92

[7] The USGS NLCD92 data set is described and can be accessed at http://landcover.usgs.gov/natllandcover.php.

data set used in the analysis has a 30 m mesh size and 21 land use categories. Seasonal surface parameters were determined using AERSURFACE according to the EPA's guidance.[8]

Seasonal albedo and Bowen ratio values were based on averaging over a 10-km by 10-km region centered on the Paine Field meteorological station. An unweighted arithmetic average was used for calculating seasonal albedo; and an unweighted geometric average was used for calculating seasonal Bowen ratio. Seasonal surface roughness values were calculated for 12 30 degree sectors within 1 kilometer of the Paine Field meteorological station. An inverse-distance weighted geometric average was used to calculate seasonal surface roughness length values for each of the 12 sectors.

The AERSURFACE input file requires the user to provide additional location and climatological information regarding the primary meteorological station (in this case, Paine Field). The following information was used to process seasonal surface parameters for the meteorological station:

- The site was assumed to not have continuous snow cover most of the winter. There is typically little or no snowfall at Everett, Washington (the city nearest the meteorological station with historical climate data), and the annual average total snowfall for Everett, Washington is 7.3 inches.
- The site is located at an airport.
- The site was assumed to not be located in an arid region.
- The annual average precipitation at Everett, Washington from 2007 through 2011 was between the 30th and 70th percentiles for the past 30 years (average surface moisture conditions).[9]

The land-use processing domains are shown in Figure 4-3. Table 4-1 presents the AERSURFACE calculated seasonal albedo, Bowen ratio, and surface roughness length values for area surrounding the Paine Field meteorological station.

The EPA meteorological program AERMET (Version 11059) was used to combine the surface meteorological observations collected by the Paine Field meteorological station with the twice-daily upper air soundings from Quillayute, Washington and to calculate the meteorological variables and profiles required by AERMOD. Following recommendations in the March 8, 2013 EPA memorandum regarding the use of ASOS metrological data in AERMOD dispersion modeling, AERMINUTE (version 11325) was used to resolve calm and variable wind conditions in the standard ASOS data using 1-minute wind speed and wind direction data gathered at Paine Field over the concurrent time period, and a minimum wind speed threshold of 0.5 meters per second (m/s) was used when executing AERMET.

[8] The AERMOD Implementation Guide (EPA, 2009) and the AERSURFACE User's Guide (EPA-454/B-08-001, January 2008).
[9] Western U.S. Climate Historical Summaries can be accessed at http://www.wrcc.dri.edu/Climsum.html

Table 4-1. Paine Field Surface Characteristics

AERSURFACE Sector	Albedo	Bowen Ratio	Surface Roughness Length (meters)	Albedo	Bowen Ratio	Surface Roughness Length (meters)
	Winter			Spring		
1	0.15	0.5	0.052	0.14	0.41	0.063
2	0.15	0.5	0.05	0.14	0.41	0.055
3	0.15	0.5	0.052	0.14	0.41	0.058
4	0.15	0.5	0.054	0.14	0.41	0.062
5	0.15	0.5	0.043	0.14	0.41	0.056
6	0.15	0.5	0.036	0.14	0.41	0.043
7	0.15	0.5	0.163	0.14	0.41	0.224
8	0.15	0.5	0.442	0.14	0.41	0.607
9	0.15	0.5	0.372	0.14	0.41	0.497
10	0.15	0.5	0.399	0.14	0.41	0.536
11	0.15	0.5	0.315	0.14	0.41	0.431
12	0.15	0.5	0.151	0.14	0.41	0.182
	Summer			Fall		
1	0.14	0.33	0.071	0.14	0.5	0.066
2	0.14	0.33	0.059	0.14	0.5	0.056
3	0.14	0.33	0.063	0.14	0.5	0.059
4	0.14	0.33	0.068	0.14	0.5	0.063
5	0.14	0.33	0.067	0.14	0.5	0.059
6	0.14	0.33	0.049	0.14	0.5	0.044
7	0.14	0.33	0.27	0.14	0.5	0.254
8	0.14	0.33	0.722	0.14	0.5	0.713
9	0.14	0.33	0.562	0.14	0.5	0.557
10	0.14	0.33	0.604	0.14	0.5	0.597
11	0.14	0.33	0.482	0.14	0.5	0.475
12	0.14	0.33	0.201	0.14	0.5	0.196

4.1.5 Emission Unit Characterization

All coatings containing ethyl benzene are applied in only two of the four spray booths (#2 and #3). The locations of the vent stacks on the roof of the building in which the Facility is located are shown in Figure 4-4, along with the receptor locations nearby and around the perimeter of the building. The #2 and #3 spray booth vent stacks are identical, and the stack parameters used to represent these point sources in the modeling are summarized in Table 4-2.

Table 4-2. Stack Parameters

Parameter	Value and Units
Stack Height Above Grade	33.8 feet / 10.3 meters[1]
Inside Diameter of Stack	30 inches / 0.762 meters
Exhaust Exit Velocity	30.5 feet/second / 9.31 meters/second[2]
Exhaust Temperature	70 °F / 294 K

1 Building roof height is 25.8 feet (7.86 meters) above grade, and each vent stack is 8 feet (2.44 meters) above roof height.

2 Based on a flow rate of 9,000 actual cubic feet per minute.

Downwash algorithms incorporated into AERMOD account for the plume dispersion effects of the aerodynamic wakes and eddies produced by buildings and structures. In addition to providing a Good Engineering Practice (GEP) evaluation, the BPIP-PRIME program was used to determine direction-specific downwash parameters for each point source. Using the output from BPIP-PRIME, AERMOD calculates fields of turbulence intensity, wind speed, and slopes of the mean streamlines as a function of projected structure shape. AERMOD also uses a numerical plume rise model to determine the change in plume centerline location and the rate of plume dispersion with downwind distance. Concentrations are predicted in both the near and far wake regions, with the plume mass captured by the near wake treated separately from the un-captured primary plume, and re-emitted to the far wake as a volume source. The building in which the Facility is located was the only significant structure provided to BPIP-PRIME.

4.2 Modeling Results

To evaluate the potential ambient ethyl benzene concentrations (i.e., impacts on air quality) attributable to the Facility, the emission rates and source release parameters described in the previous sections were applied using the modeling methodology outlined above. Three scenarios were executed: 1) ethyl benzene emissions divided equally between the Booth #2 and #3 vent stacks; 2) all ethyl benzene emissions from the Booth #2 vent stack; and 3) all ethyl benzene emissions from the Booth #3 vent stack. The results, which indicate little difference between the three modeled scenarios, are presented in Table 3-3.

Table 4-3. Ethyl Benzene Modeling Results

Scenario	Maximum Ethyl Benzene Concentration (µg/m^3)	
	24-Hour Average	Annual Average
Equally Divided Between Stacks #2 & #3	7.9	2.9
Stack #2 Only	8.0	2.9
Stack #3 Only	7.8	2.9
Acceptable Source Impact Level (ASIL)	N/A	0.4

The maximum concentration receptor is the same for all three scenarios: a receptor located along the perimeter of the building in which the Facility is located. Contour plots showing the spatial variation of the annual and 24-hour average concentrations throughout the modeling domain are shown in Figures 4-5 through 4-10, and in the area near the Facility in Figures 4-11 through 4-16. The building perimeter receptors are spaced at 10-m intervals around the building; to ensure adequate resolution of the maximum a 10-m spacing receptor grid was added in the area surrounding the maximum concentration receptor, and the model was rerun. The locations and magnitudes of the maximum concentration receptor results were unchanged following the addition of the 10-m spacing receptor grid. The locations of receptors predicted to exceed the ethyl benzene ASIL, along with the predicted concentrations, in µg/m^3, are shown in Figure 4-17.

4.3 Background Concentration

The USEPA has developed, and periodically updates, the National-Scale Air Toxics Assessment (NATA) to identify and prioritize air toxics, sources, and locations of concern. The most recently issued NATA was for 2005, and the total modeled annual average ethyl benzene concentration in the area of the Facility was 0.253 µg/m^3. Neither Vaupell nor ENVIRON is aware of any ambient monitoring studies conducted in the area that have included ethyl benzene.

5 Identification of Potentially Exposed Populations

The populations potentially exposed to ethyl benzene within the simulation domain are identified in this section. Various population groups include residents and workers as well as sensitive subpopulations.

5.1 Receptors of Concern

The primary populations that may be exposed to Facility emissions include residents and workers. As recommended by Ecology, the following exposure assessment will quantify exposure for the maximally impacted residential receptor (MIRR), maximally impacted commercial receptor (MICR), maximally impacted extra-boundary receptor (MIR), and the maximally impacted boundary receptor (MIBR). While the point of maximum impact may not correspond to an existing residential or commercial location, impacts provide an upper-bound estimate of potential exposures within the vicinity of the Facility.

5.2 Sensitive Populations

For the purpose of this HIA, sensitive populations are identified as children, the infirm (particularly those with dermatitis, liver or kidney disease or impaired pulmonary function[10]), and elderly persons. These subpopulations may be more sensitive to the effects of TAPs on their immune systems or other systems that are still developing, in the case of children. The nearest identified sensitive receptors are listed in Table 5-1, and the locations are presented in Figure 5-1. Additionally, populations with abnormally high exposure to automobile emissions, solvents, paints, and cigarette smoke will have an increased burden of ethyl benzene exposure.

Table 5-1. Nearest Sensitive Receptors

Type of Receptor	Name	Address
Place of Worship	Kingdom Hall	11422 Airport Road Everett, WA 98204
Daycare/Preschool	Harbour Pointe Kids	12602 Mukilteo Speedway Mukilteo, WA 98275
Convalescent Home	Amberlight Nursing Home	11715 Center Road Everett, WA 98204
Medical Facility	U.S. HealthWorks Medical Group	3101 111th Street Southwest Everett, WA 98204
School	Fairmount Elementary	11401 Beverly Park Rd. Everett, WA 98204

[10] Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological Profile for Ethylbenzene. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 2010.

6 Exposure Assessment

The exposure assessment describes the routes by which population groups identified in the previous section may be exposed to ethyl benzene emitted from the Facility. Ethyl benzene concentrations to which receptor populations may be exposed and key exposure assumptions are also described.

6.1 Identification of Exposure Pathways

Receptors presented in the previous section (residents, workers, and sensitive subpopulations), may be exposed to chemicals in the environment. Contact with ethyl benzene emitted from the Facility will occur through direct inhalation. Ethyl benzene is released as a gas and is degraded rapidly by reacting with photochemically derived hydroxyl radicals[11]. Due to its volatility and rapid degradation, ethyl benzene is not expected to be deposited in soils, and no ingestion or skin contact exposures are expected.

Ecology's 2nd Tier guidance document[12] references California Air Toxic Hot Spots Program guidance[13] to assess the need for consideration of indirect exposure pathways in addition to consideration of inhalation exposure. Ethyl benzene is not a chemical for which the California Air Toxic Hot Spots Program recommends consideration of multiple exposure pathways. Typically, chemicals considered for alternate ingestion pathways (e.g., soil, produce, breast milk, livestock/game, etc.) are those that are persistent and bio-accumulative. Ethyl benzene does not bio-accumulate and so it not prioritized for multi-pathway evaluation. Based on Ecology and California Air Toxic Hot Spots Program guidance, inhalation is the only exposure pathway assessed in the HIA.

6.2 Exposure Concentrations

Airborne exposure concentrations (ECs) of ethyl benzene were estimated for each identified "receptor of concern" type (e.g., MIRR, MICR, MIR, and MIBR). Using aerial photographs, zoning information, and online geographic information (e.g., Google Maps), the maximally impacted receptors located at or very close to each of the receptors of concern were identified, and the corresponding concentrations are summarized in Table 6-1. The locations of the identified receptors of concern are shown in Figure 5-1.

[11] Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological Profile for Ethylbenzene. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 2010.
[12] Department of Ecology, "Guidance Document: First, Second, and Third Tier Review of Toxic Air Pollution Sources (Chapter 173-460 WAC)." Publication Number 08-02-025, revised September 2013.
[13] Office of Environmental Health Hazard Assessment. "Air Toxics Hot Spots Program Risk Assessment Guidelines: The Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments." California Environmental Protection Agency. 2003. http://www.oehha.ca.gov/air/hot_spots/pdf/HRAguidefinal.pdf

Table 6-1: Maximum 24-Hour and Annual Average Ethyl Benzene Concentrations at Receptors of Concern

Receptor Type	24-Hour Average (µg/m^3)	Distance/ Direction from Source	Scenario	Annual Average (µg/m^3)	Distance/ Direction from Source	Scenario
MIRR	0.64	~675 m south (~-92°)	Stack 2	0.088	~675 m south (~-92°)	Stack 2
MICR	1.7	~112 m west-southwest (~-153°)	Stack 2	0.14	~125 m southwest (~-144°)	Stack 2
MIR	8.0	~52 m northwest (~145°)	Stack 2	2.3	~25 m west-northwest (~157°)	Stack 2
MIBR	6.9	~34 m northwest (~133°)	Stack 3	2.9	~14 m west-northwest (~158°)	Stack 3

6.2.1 Cumulative ECs

Cumulative exposures were evaluated by combining ECs based on facility-wide emissions and background air concentrations. No monitoring studies that included ethyl benzene have been conducted in the vicinity of the Facility, so it was not possible to construct background concentrations from monitoring data. However, as noted in Section 4.3, the most recently issued NATA (2005) estimated the annual average ethyl benzene concentration for the census tract in which the Facility is located to be 0.253 µg/m^3. This value of was added to the modeled annual average concentrations based on ethyl benzene emissions attributable to the Facility. The sum of the background concentration and the modeled annual average concentration at each of the identified exposure receptors was calculated to derive the cumulative annual ECs. The NATA does not provide concentrations for any short-term averaging periods, so, based on guidance from Ecology,[14] the 24-hour average ethyl benzene concentration in the vicinity of the Facility was estimated to be 0.759 µg/m^3, or three times the annual average concentration. This value was added to the 24-hour average concentrations to generate cumulative 24-hour ECs. These cumulative concentrations are presented in Table 6-2, and were used as the exposure levels for the calculations described in the risk characterization section (Section 8).

Table 6-2: Cumulative Exposure Concentrations

Receptor Type	24-Hour Average EC (µg/m3)	Cumulative 24-Hour EC (µg/m^3)	Annual Average EC (µg/m^3)	Cumulative Annual EC (µg/m^3)
MIRR	0.64	1.4	0.088	0.34
MICR	1.7	2.5	0.14	0.39
MIR	8.0	8.7	2.3	2.6
MIBR	6.9	7.6	2.9	3.1

[14] Email communication from Gary Palcisko of Ecology to Eric Albright of ENVIRON on November 20, 2013.

7 Toxicity Assessment

The toxicity assessment contains specific information on the toxicity of TAPs of concern, which include only ethyl benzene in this case. This evaluation includes a description of the toxic effects and the general concentrations associated with these effects in order to evaluate the risks of exposure. Regulatory values for both non-cancer and cancer risk are also presented here.

7.1 Health Effects

Ethyl benzene can be absorbed through lung tissue (49-64%), the gastrointestinal tract, and the skin, but it is rapidly eliminated in the blood, with a half-life of less than one hour[15]. Studies in rats and mice suggest that inhaled ethyl benzene partitions to adipose tissues, especially those in the kidneys, liver, and intestine, and once metabolized it is excreted in the urine. It does not bio-accumulate.

The health effects of ethyl benzene vary in acute and chronic exposure situations. Animal studies of acute inhalation exposure have shown effects in the respiratory, hepatic, renal, and ocular systems, as well as neurological effects. The lowest observable adverse effect level (LOAEL) for acute exposures was 50 ppm (217.5 mg/m^3)[15]. At intermediate exposures (15-364 days), animal studies have shown effects on the hematological, hepatic, ocular, and renal systems, along with developmental and neurological effects with a LOAEL of 50 ppm (217.5 mg/m^3). Chronic exposures resulted in hepatic, endocrine, and renal effects, with a LOAEL of 75 ppm (362 mg/m^3). Cancer was seen only in the chronic exposure scenario. Lung, renal tube, and liver cancers in rats and mice occurred with a LOAEL of 750 ppm (3262 mg/m^3).

There are limited data on ethyl benzene exposure in humans. Studies in humans have observed dizziness, vertigo, and chest constriction (over 8,700 mg/m^3 for 6 min). However most human studies and case studies have confounding factors (other toxins present) or do not include sufficient detail to draw conclusions from. There is also a lack of data on the effects of exposure to children. There are studies showing developmental effects in rats and rabbits (LOAEL of 1000 ppm, 4340 mg/m^3)[15]; however, the doses at which these effects are observed are high enough to result in maternal toxicity in some cases.

7.2 Non-Cancer Toxicity Values

Table 7-1 presents the non-cancer toxicity values derived by different agencies for ethyl benzene. In 1991 the EPA evaluated the toxicity of ethyl benzene and generated a chronic reference concentration (RfC) based on a study showing developmental toxicity. OEHHA has also developed a chronic non-cancer Reference Exposure Level (REL) for ethyl benzene, based on studies showing effects on the liver, kidney, and endocrine system in rats and mice. ATSDR determined intermediate and acute minimal risk levels (MRLs) for non-cancer toxicity to ethyl benzene, in addition to a chronic value. The most protective chronic value (chronic MRL), as

[15] Andrew, F.D., R.L. Buschbom, W.C. Cannon, R.A. Miller, L.F. Montgomery, D.W. Phelps, et al. 1981. Teratologic assessment of ethylbenzene and 2- ethoxyethanol. Battelle Pacific Northwest Laboratory, Richland, WA. PB 83-208074., 108.

well as the acute MRL are used in the risk characterization to determine hazard quotients for non-cancer toxicity for the different exposure scenarios associated with the Facility.

Table 7-1: Available Non-Cancer Toxicity Values

Toxicity Value Type	Source	Point of Departure ($\mu g/m^3$)	Uncertainty Factors	Non Cancer Value ($\mu g/m^3$)
Chronic RfC	EPA[16]	434	300 (sensitive individuals, interspecies conversion, absence of multigenerational studies)	1000 (low confidence)
Chronic REL	OEHHA[17]	326	30 (interspecies uncertainty, intraspecies uncertainty)	2000
Chronic MRL (≥ 365 days)	ATSDR[18]	75.9	300 (use of a LOAEL, interspecies uncertainty, human variability)	260
Intermediate MRL (15-364 days)	ATSDR[18]	277	30 (interspecies uncertainty, human variability)	8,700
Acute MRL (≤ 14 days)	ATSDR[18]	167	30 (interspecies uncertainty, human variability)	22,000

7.3 Toxicity Values for Cancer

The USEPA last evaluated ethyl benzene in its Integrated Risk Information System program in 1991[16]. At that time, the agency did not feel there were sufficient studies of ethyl benzene carcinogenicity to perform an assessment of the cancer risk. The USEPA labeled ethyl benzene as "not classifiable as to human carcinogenicity" and therefore did not derive an inhalation unit risk value (IRU). However, in 2000, the International Agency for Research on Cancer (IARC) used a study from the National Toxicology Program (NTP) to give ethyl benzene a classification of Group 2B, possibly carcinogenic to humans[19,20]. Though IARC acknowledged that there were no adequate human studies regarding ethyl benzene, the agency felt the NTP study was sufficient by showing increased lung, renal tube, and liver adenomas in rats exposed to inhaled concentrations of more than 3,000 mg/m^3. Based on this information, in 2007 OEHHA developed

[16] U.S. Environmental Protection Agency. Integrated Risk Information System (IRIS) on Ethylbenzene. National Center for Environmental Assessment, Office of Research and Development, Washington, DC. 1999.
[17] Office of Environmental Health Hazard Assessment. All OEHHA Acute, 8-hour and Chronic References Exposure Levels (chRELS) as of October 2013. California Environmental Protection Agency. 2013.
[18] Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological Profile for Ethylbenzene. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 2010.
[19] International Agency for Research on Cancer. Volume 77, Some Industrial Chemicals – Summary of Data Reported and Evaluation. 2000. http://monographs.iarc.fr/ENG/Monographs/vol77/volume77.pdf
[20] National Institutes of Health. NTP Technical Report on the Toxicology and Carcinogenesis Studies of Ethylbenzene in F344/N Rats and B6C3F_1 Mice. National Toxicology Program, Research Triangle Park, NC. 1999.

a unit risk value for ethyl benzene[21]. This value ($2.5x10^{-6}$ per $\mu g/m^3$) was used to determine cancer risk in the risk characterization section.

[21] Office of Environmental Health Hazard Assessment. California Human Health Screening Levels for Ethylbenzene. California Environmental Protection Agency. 2010. http://oehha.ca.gov/risk/pdf/Ethylbenzene092310.pdf

8 Risk Characterization

For the risk characterization, the results of the exposure and toxicity assessments are integrated into quantitative estimates of potential health hazards. Cancer risk and non-cancer hazard estimates are quantified for the MIRR, MICR, MIR, and MIBR.

8.1 Calculation of Non-Cancer Hazards

The potential for non-cancer adverse health effects from exposure to ethyl benzene are evaluated by comparing exposure concentrations at the identified receptors to relevant non-cancer toxicological reference values. A concentration that exceeds the relevant value indicates the potential for an adverse health effect. The magnitude of the potential is quantified by the hazard quotient (HQ), which is calculated by dividing the calculated ambient concentration by the relevant toxicological value. An HQ of one or less indicates that the predicted exposure is unlikely to result in adverse non-cancer health effects, while values greater than one indicate increased probability of health effects. However, because uncertainty factors are used to derive toxicological reference values, a value greater than one does not necessarily mean a negative health impact will occur.

8.1.1 Chronic Non-Cancer Hazards

Chronic non-cancer HQs were derived for each receptor from the cumulative annual average divided by the lowest and most protective of the three chronic toxicity values from Table 7-1, which is the chronic MRL of 260 µg/m^3. The resulting HQs are presented in Table 8-1.

Table 8-1. Chronic Hazard Quotients for Ethyl Benzene

Receptor Type	Cumulative Annual EC (µg/m^3)	Maximum Chronic HQ From Cumulative Annual EC
MIRR	0.34	0.0013
MICR	0.39	0.0015
MIR	2.6	0.0099
MIBR	3.1	0.012

All of the receptors have chronic HQs that are far less than one, meaning that operation of the Facility will not cause chronic adverse non-cancer health effects.

8.1.2 Acute Non-Cancer Hazards

Acute non-cancer HQs were derived for each receptor by dividing the 24-hour average for each receptor by ATSDR's acute MRL of 22,000 µg/m^3. The resulting acute hazard quotients are presented in Table 8-2.

Table 8-2. Acute Hazard Quotients for Ethyl Benzene

Receptor Type	Cumulative 24-Hour EC (µg/m^3)	Acute HQ from Cumulative 24-Hour EC
MIRR	1.4	0.000064
MICR	2.5	0.00011
MIR	8.7	0.00040
MIBR	7.6	0.00035

The HQs for all four receptors are far less than one, meaning that operation of the Facility willnot cause acute non-cancer health effects.

8.2 Quantifying Increased Cancer Risk

The cumulative annual average exposure concentrations for each receptor are adjusted for exposure frequency and duration and then combined with the OEHHA URF for ethyl benzene (2.5×10^{-6} per µg/m^3) to determine the increased cancer risk. Cancer risk is expressed as number affected per million people. It is calculated by the following equation:

$$\text{Risk} = \frac{\text{Concentration in Air} \times \text{URF} \times \text{ET} \times \text{EF} \times \text{ED} \times 10^6}{\text{AT}}$$

Where the exposure parameters are described in Table 8-3

Table 8-3. Exposure Parameters Used to Calculate Chronic and Intermittent ECs

Exposure Parameter	Resident (MIRR, MIR)	Commercial/Industrial Worker (MICR, MIBR)
ET (hours per day)	24	8
EF (days per year)	365	250
ED (years)	70	40
AT (hours; ED x 365 days/year x 24 hrs/day)	613,200	350,500

A residential exposure, represented by the MIRR and the MIR, is assumed to be continuous (24 hours/day, 365 days/year, for 70 years). A commercial or industrial exposure, represented by the MICR and the MIBR, is a continuous exposure but occurs over a slightly shorter time-frame and duration (8 hours/day, 250 days/year, for 40 years).

Table 8-4. Cancer Risk for Receptors of Interest

Receptor Type	Annual Average ($\mu g/m^3$)	Cumulative Annual EC ($\mu g/m^3$)	Cancer Risk per million
MIRR	0.088	0.34	0.85
MICR	0.14	0.39	0.22
MIR	2.3	2.6	6.4
MIBR	2.9	3.1	1.8

For each receptor the cancer risk from ethyl benzene emissions from the Facility and from background sources is less than Ecology's acceptable risk limit of 10 per million. For the MIRR and MICR, this means that less than 1 person in 1,000,000 who are exposed to ethyl benzene may experience cancer in excess of what an unexposed population would experience. For the MIR, the receptor with the highest cancer risk and a continuous exposure, there may be 6 people in 1,000,000 experiencing increased cancer risk, which is still below the acceptable risk limit.

9 Uncertainty Characterization

The HIA process involves several assumptions that can increase the uncertainty of the analysis. These uncertainties are explained as they pertain to the emission rate calculations, air dispersion modeling, exposure assumptions, and toxicity values.

9.1 Emission Rate Calculations

An emission rate, which is a quantity of pollutant per unit time (e.g., pounds per hour), is calculated from an emission factor, which is a quantity of pollutant per unit of an activity (e.g., pounds per gallon of paint sprayed), and an activity rate, which is a measure of an activity per unit time (e.g., gallons of paint sprayed per hour).

For analyses conducted in support of a permitting action, worst-case emission factors and activity rates are employed to ensure that regulatory limits or levels are not exceeded. In this case, the activity rates used to calculate emission rates is based on the maximum quantities of coatings and solvents that Vaupell expects to use over a 12-month period. For the primary ethyl-benzene containing coatings, these maximum quantities are limits in the current draft of the Order of Approval issued by PSCAA. The Order of Approval also contains reporting and recordkeeping mechanisms to ensure that Vaupell does not exceed the limits, meaning that the activity rates used to calculate emissions most likely represent real upper bounds that will not be exceeded.

The emission factors used to calculate the emission rates are based on density and composition information from MSDSs provided by the coating or solvent manufacturers or vendors. While the Hazard Communication Standard (HCS) adopted by the Occupational Safety and Health Administration (OSHA) requires that MSDSs provided by manufacturers or vendors be accurate, there is evidence based on a number of limited studies and investigations indicate that some MSDSs may contain errors. Short of sending samples to a laboratory to confirm the information provided, it is unclear whether reliance on information from the provided MSDSs would contribute to an over- or under-estimation of risk. However, the coatings in question are carefully formulated by the manufacturers to meet performance standards, so it is likely that the manufacturers would have detailed information on the contents and specification of the coatings, and be able to accurately transfer that information to an MSDS.

9.2 Air Dispersion Modeling

Any attempt to mathematically model a physical process will involve uncertainties. In this case, potential exposures were based on daily and annual average ambient concentrations calculated using AERMOD, a regulatory model designed and demonstrated to over-predict ambient concentrations. In addition, the concentration used to calculate exposure is an outdoor concentration, and does not account for effects that tend to reduce concentrations as air migrates indoors (e.g., absorption by building materials, deterioration, chemical reactions, or filtration by ventilation systems). Uncertainty associated with the design of the dispersion model is most likely characterized as the degree to which the predicted concentrations overestimate the actual concentrations.

Meteorological data can be a source of uncertainty, related to the quality of the data, and whether the selected data are representative of conditions at the area of interest. In this case, the level of uncertainty has been mitigated by selecting data gathered at the ASOS station located at Paine Field. The ASOS program is a joint effort of the NWS, the Federal Aviation Administration (FAA), and the Department of Defense (DOD), and is the primary surface weather observing network in the U.S. ASOS is designed primarily to support weather forecast activities and aviation operations, so it utilizes the most modern sensors, has excellent data recovery, and employs rigorous quality assurance procedures. With respect to representativeness, the terrain between Paine Field and Vaupell is not complex (i.e., it is relatively flat), and Vaupell is located less than a mile from the airport. Based on the quality of the data and the proximity of the source to the location where the data were collected, the meteorological data is not considered a significant source of uncertainty.

While there are uncertainties associated with estimating ambient concentrations, we believe that reasonable care has been taken to consistently err on the side of more exposure rather than less.

9.3 Exposure Assumptions

Background concentrations of a compound need to be added to emissions from a given source in order to accurately estimate the exposure that a population will experience. Because no ethyl benzene monitoring data are available in the vicinity of the Facility, background concentrations for ethyl benzene were estimated using an annual average concentration from the 2005 NATA. The NATA provides only annual average concentrations, so a 24-hour background concentration was estimated by multiplying the annual average background concentration from the NATA by a factor of 3. Although there is a certain amount of uncertainty associated with these background concentrations, the HQs are low enough that Facility emissions would be unlikely to increase total concentrations to a level of concern.

Ethyl benzene degrades rapidly in the atmosphere, a fact that was not considered in the model. With degradation half-life of 2 days, the annual exposure concentrations are overestimated. However, some of the degradation by-products may also have toxicity that can increase risk to the population. Because there are several by-products and environmental and seasonal conditions affect the degradation pathway, it was beyond the scope of this assessment to quantify the risks from these by-products.

Exposure parameters were used to estimate the risks from ethyl benzene emissions from the Facility. Though these parameters are intended to be protective of the different receptors in the area around the building, it is unclear how accurate they are. For the MIRR and the MIR, continuous exposure was assumed for 70 years. For much of the population this may overestimate exposure, and it is greater than the upper bound used by the USEPA. For the MICR and MIBR, the exposure assumption was 8 hours a day, 250 days per year for 40 years. As a commercial or industrial exposure, these assumptions could overestimate or in some cases under estimate risk. However, given the low values for cancer risk and HQs, even an increase in exposure duration or frequency should still be protective of these receptors.

9.4 Toxicity Values

Toxicity values are meant to represent concentrations above which there is a risk of adverse health outcomes. However, in order for these values to estimate risks for human exposures, uncertainty factors must be applied, as shown in Table 7-1. These uncertainty factors are used to make the toxicity value protective for various reasons. For example, uncertainty values were applied to the EPA RfC because the point of departure was derived from an animal study rather than a human study, because the study used did not examine multigenerational effects, and because the value needs to be protective of sensitive subpopulations. The use of uncertainty factors is an accepted practice, though it may result in values too high to be protective for some groups and overly protective for others. There are chronic toxicity values generated by three different agencies, ranging in value from 260-2,000 $\mu g/m^3$. Rather than critically evaluating the basis for each value, the ATSDR chronic MRL was used because it is the lowest, most protective value. Uncertainty factors were also required in calculating the human inhalation URF. Given how low the HQs and cancer risks are for the Facility, it is probable that even sensitive groups are protected from adverse health outcomes.

Figures

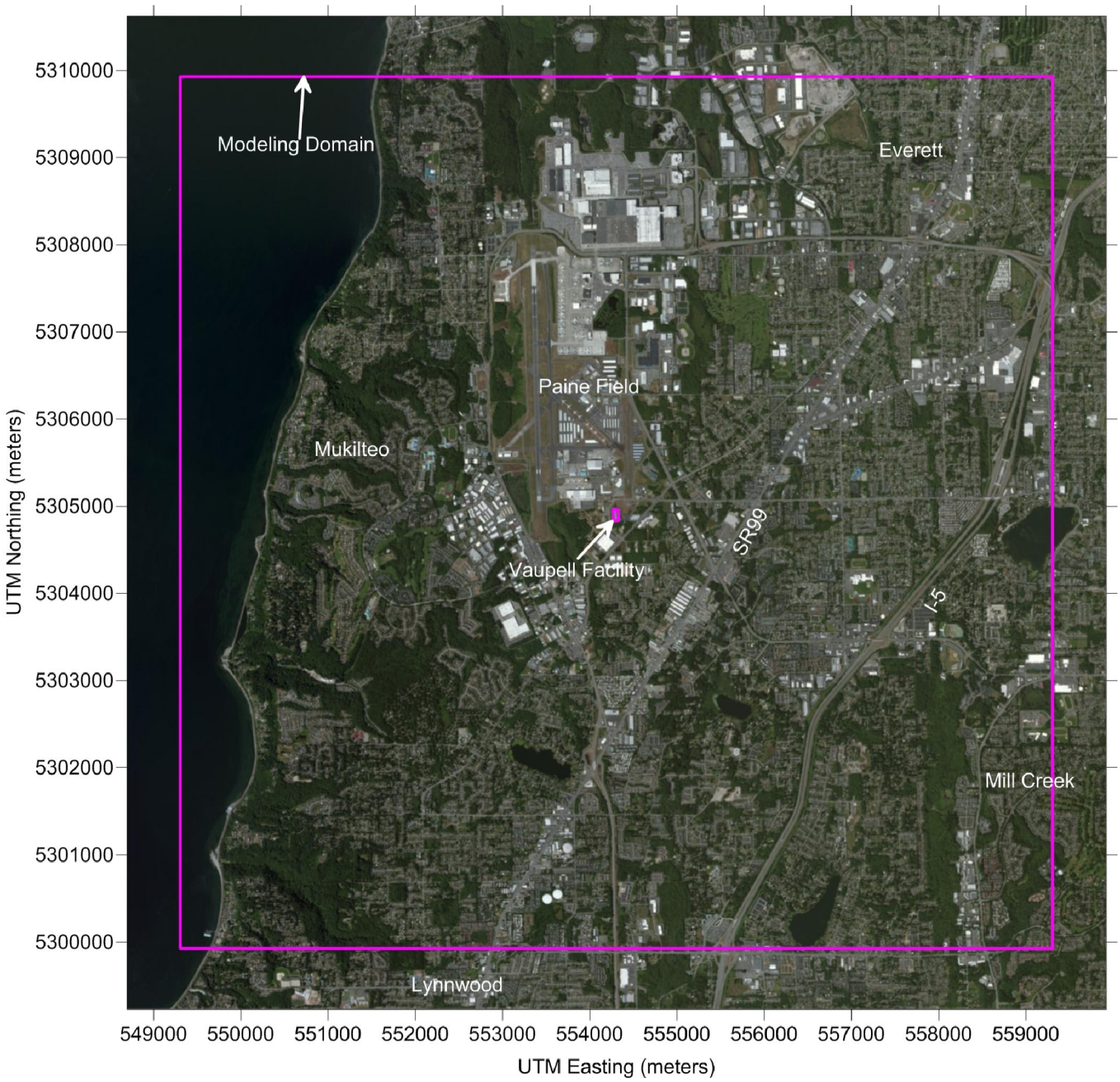

Figure 2-1: Locations of Facility and Modeling Domain

Figure 2-2: Area Surrounding Facility

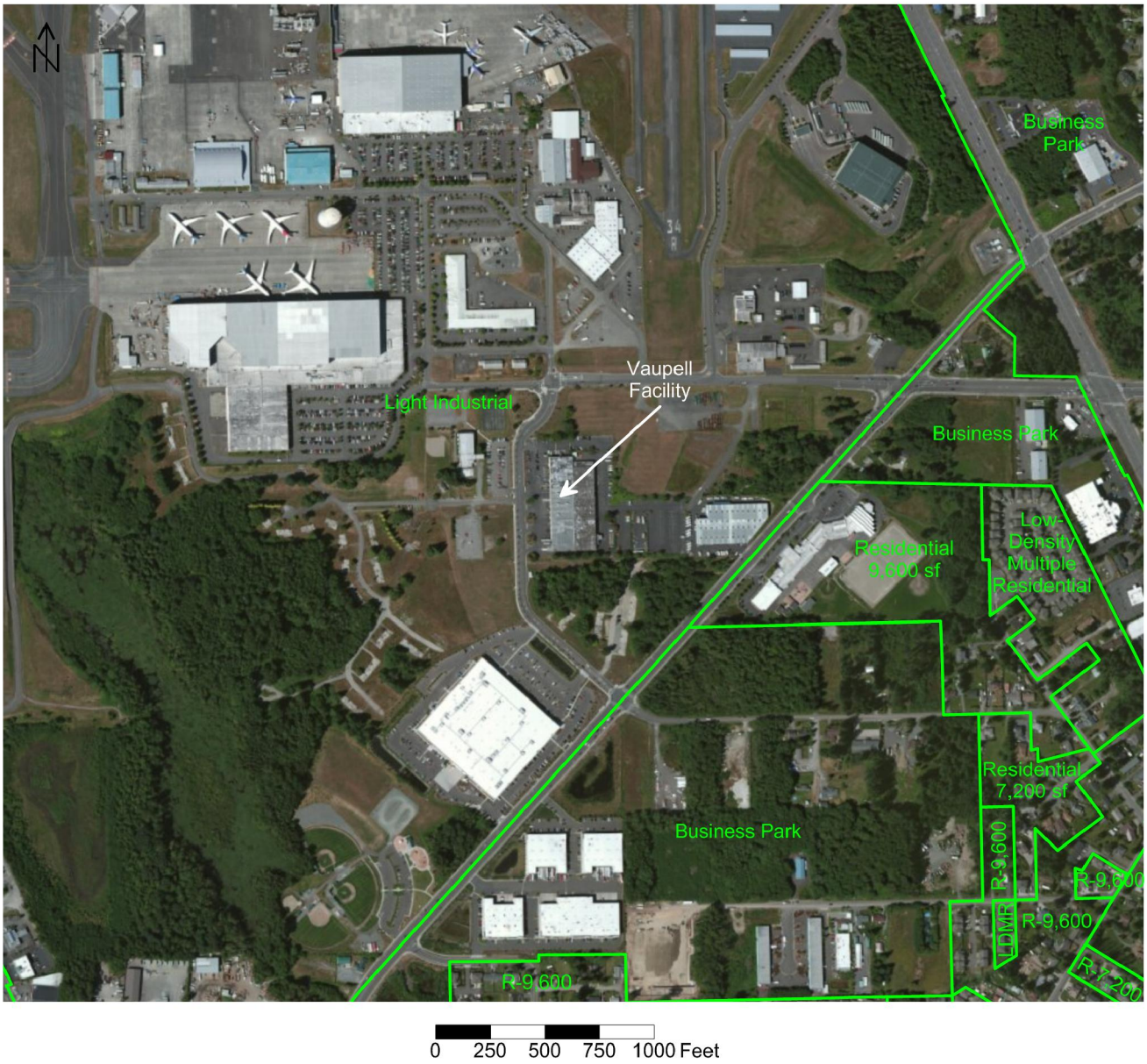

Figure 2-3: Zoning of Area Surrounding Facility

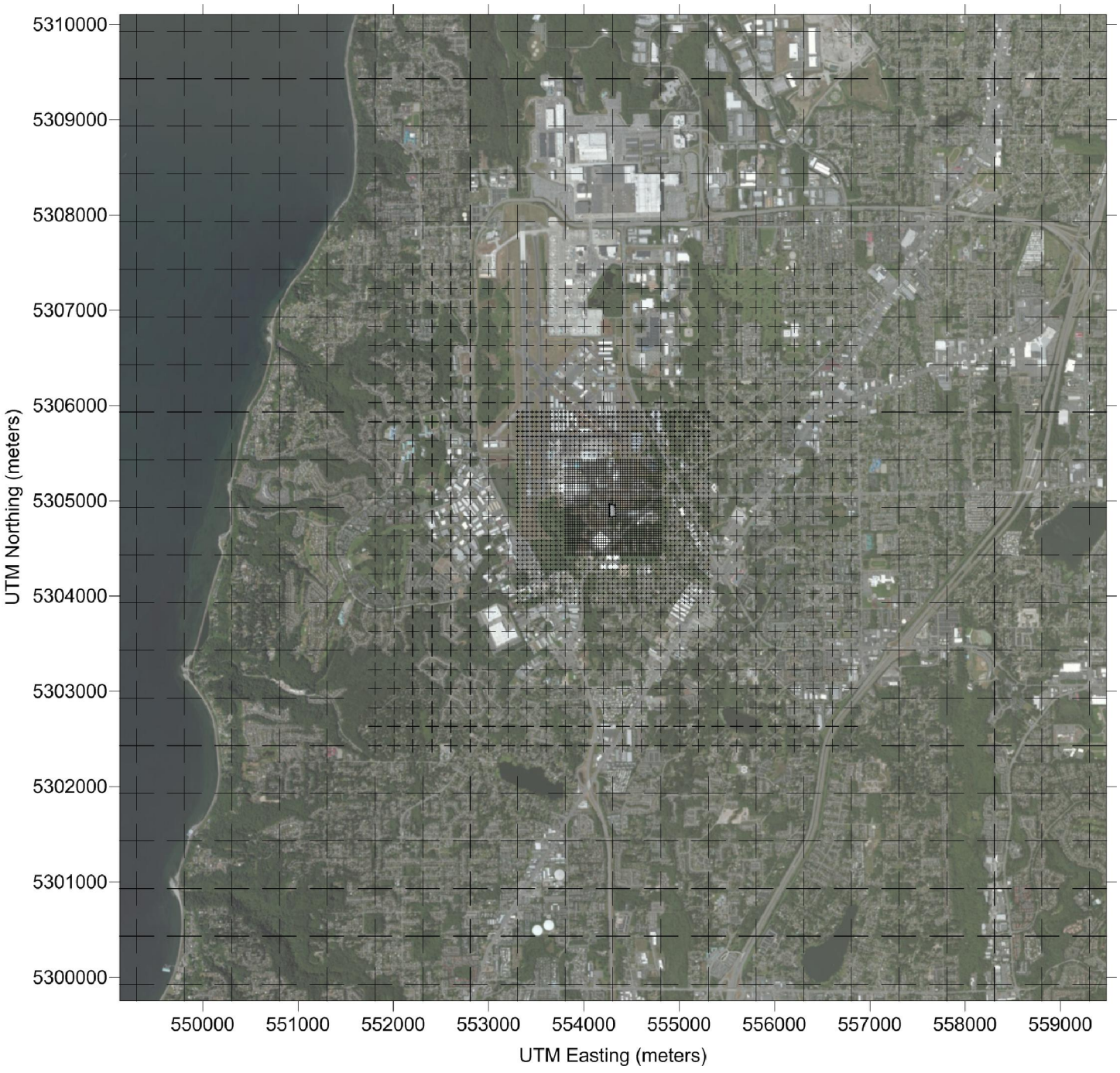

Figure 4-1: Receptor Locations

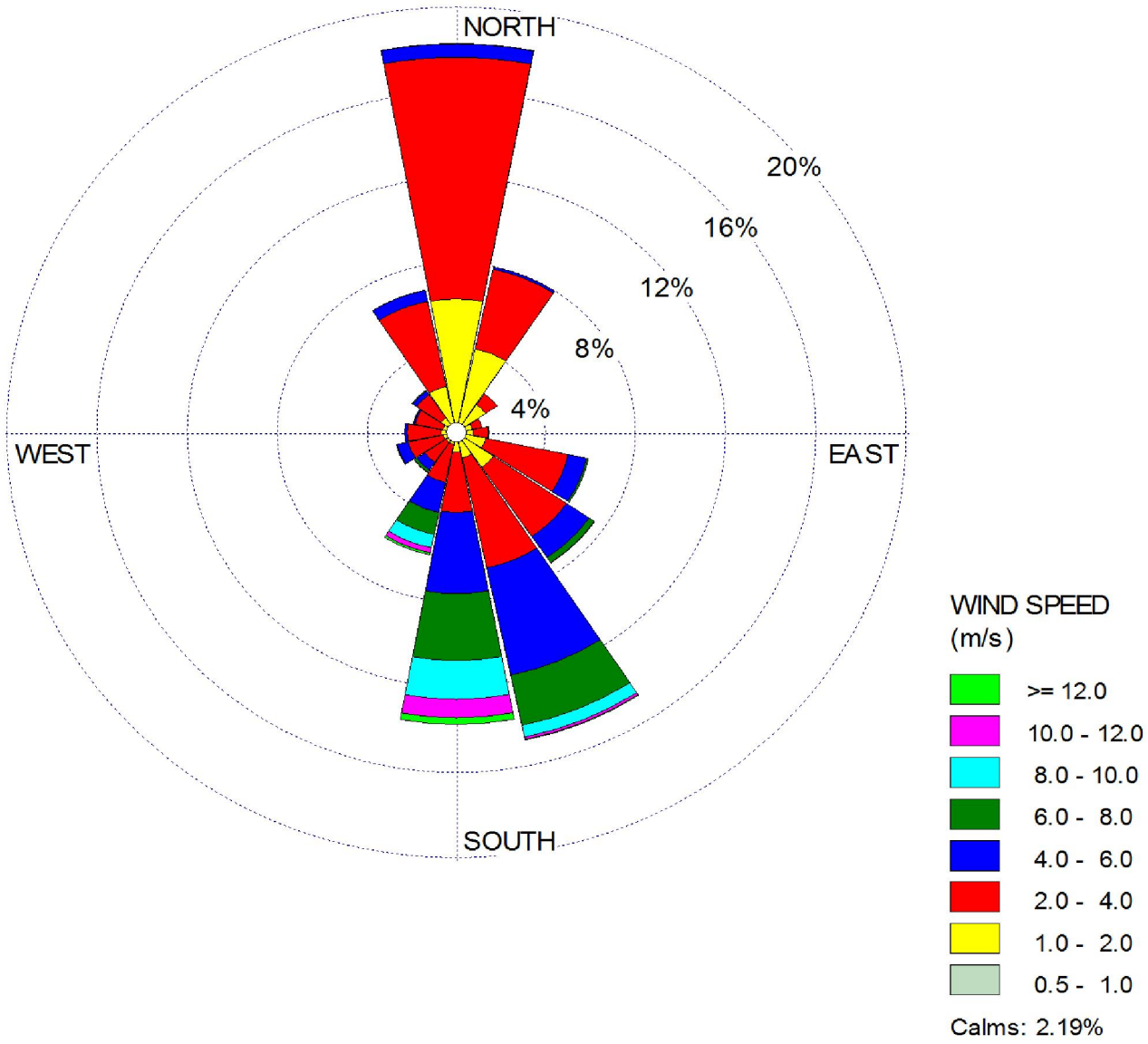

Figure 4-2: Wind Speed and Wind Direction at Paine Field, 2007 – 2011

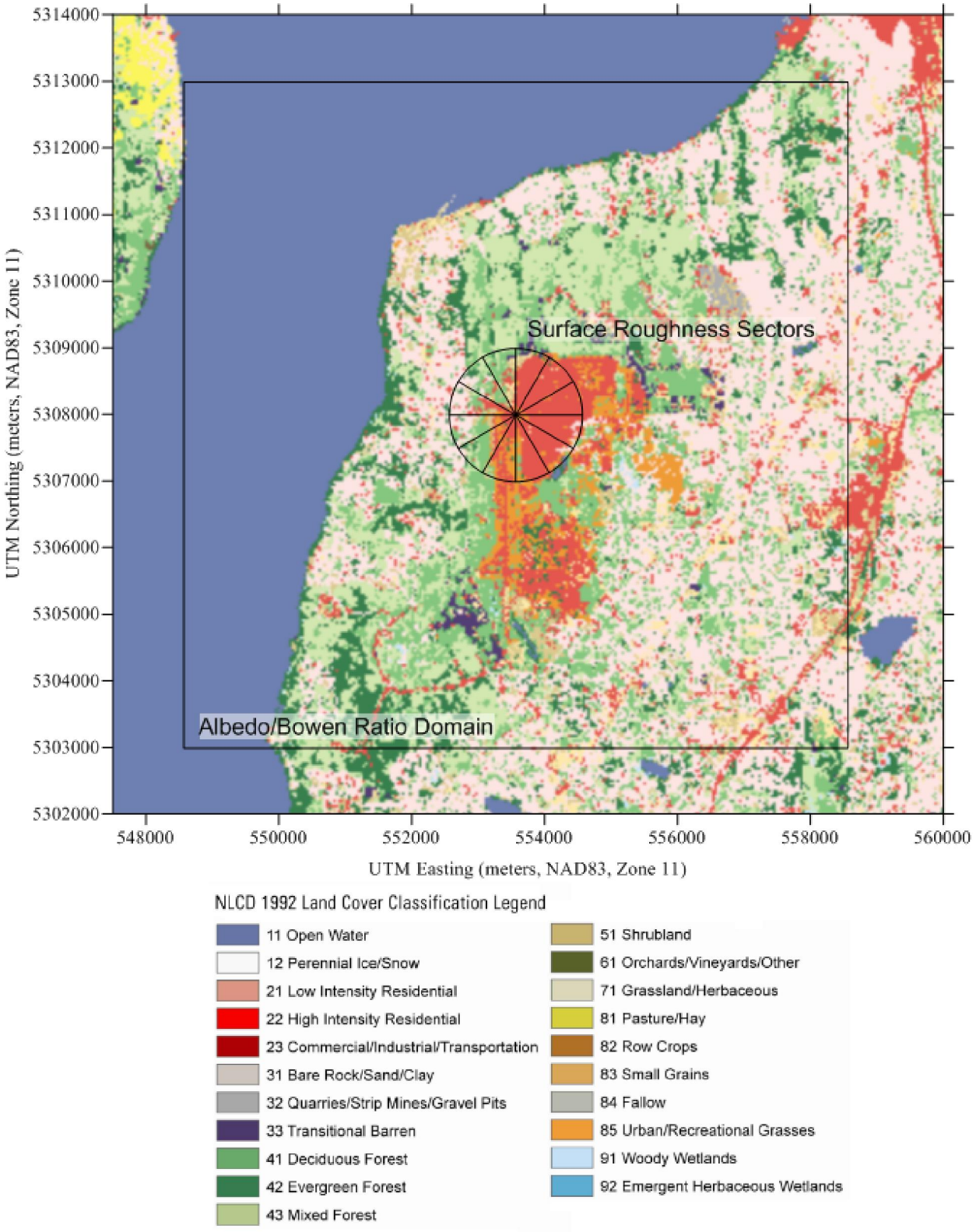

Figure 4-3: Land-Use Processing Domains

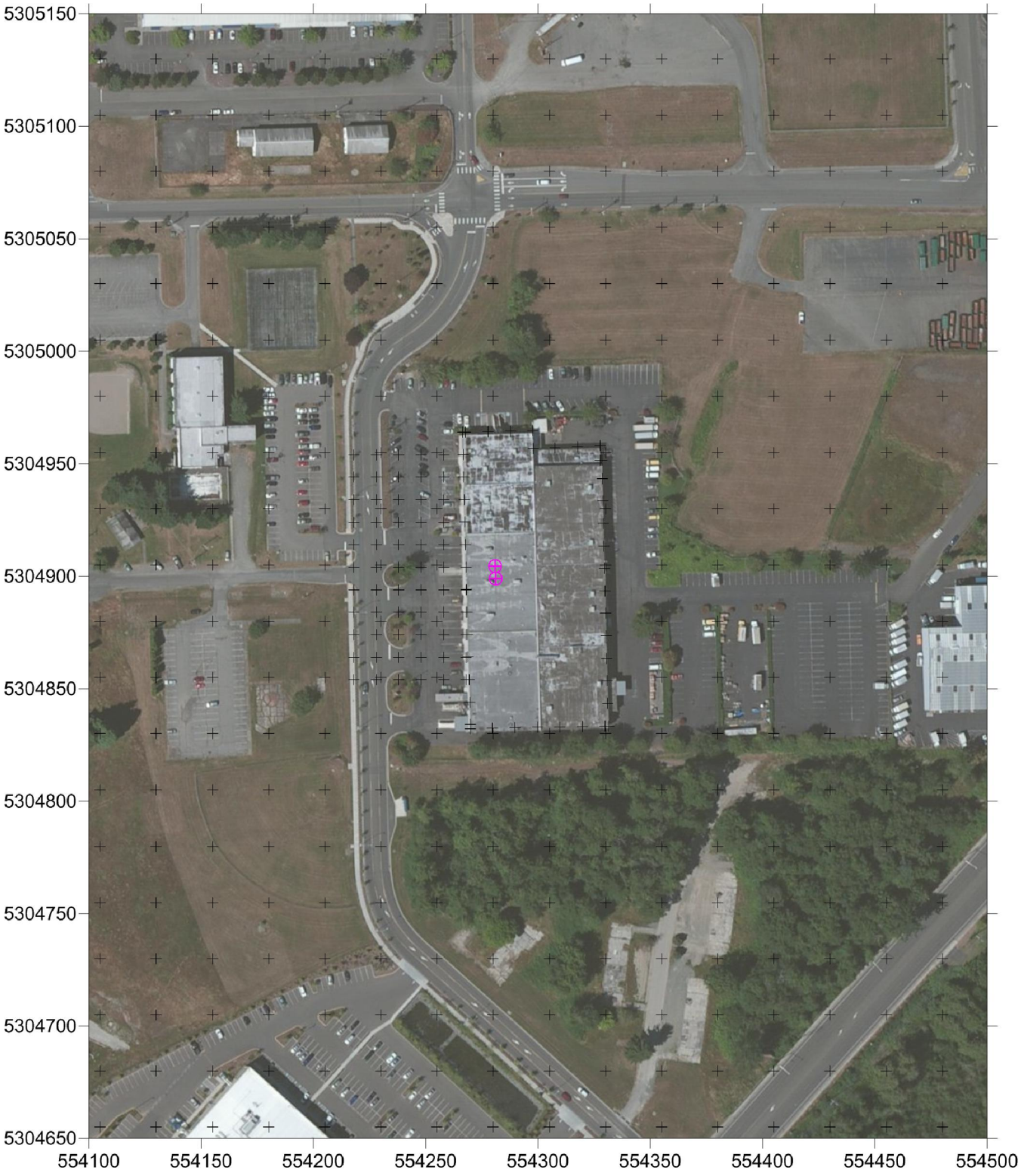

Figure 4-4: Locations of Paint Booth #2 and #3 Vent Stacks and Receptor Location Detail

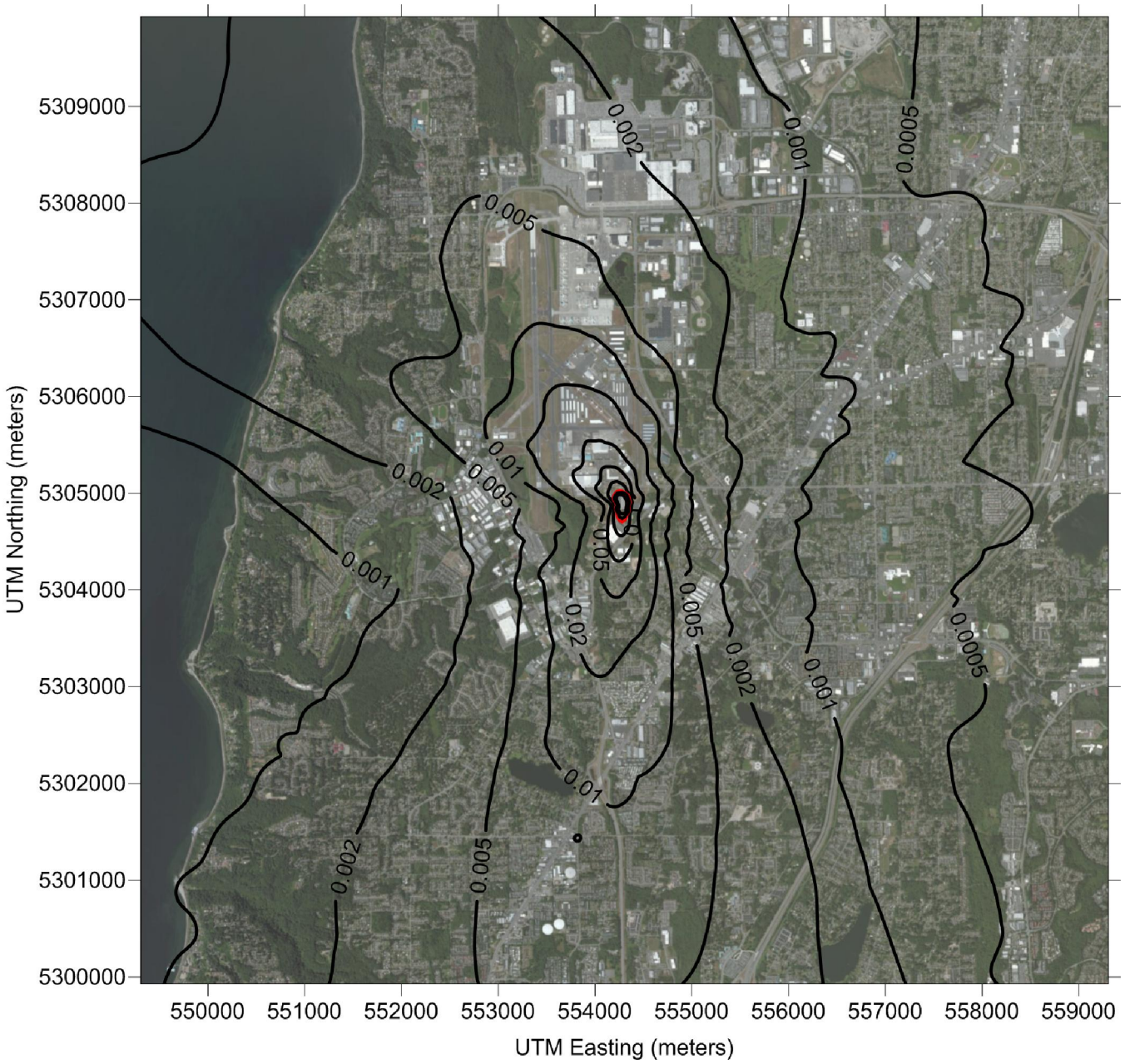

Figure 4-5: Maximum Predicted Annual Average Ethyl Benzene Concentrations (µg/m^3) – Entire Domain – Stacks #2 & #3
(0.4 µg/m^3 contour line, corresponding to the ASIL for Ethyl Benzene, is in red)

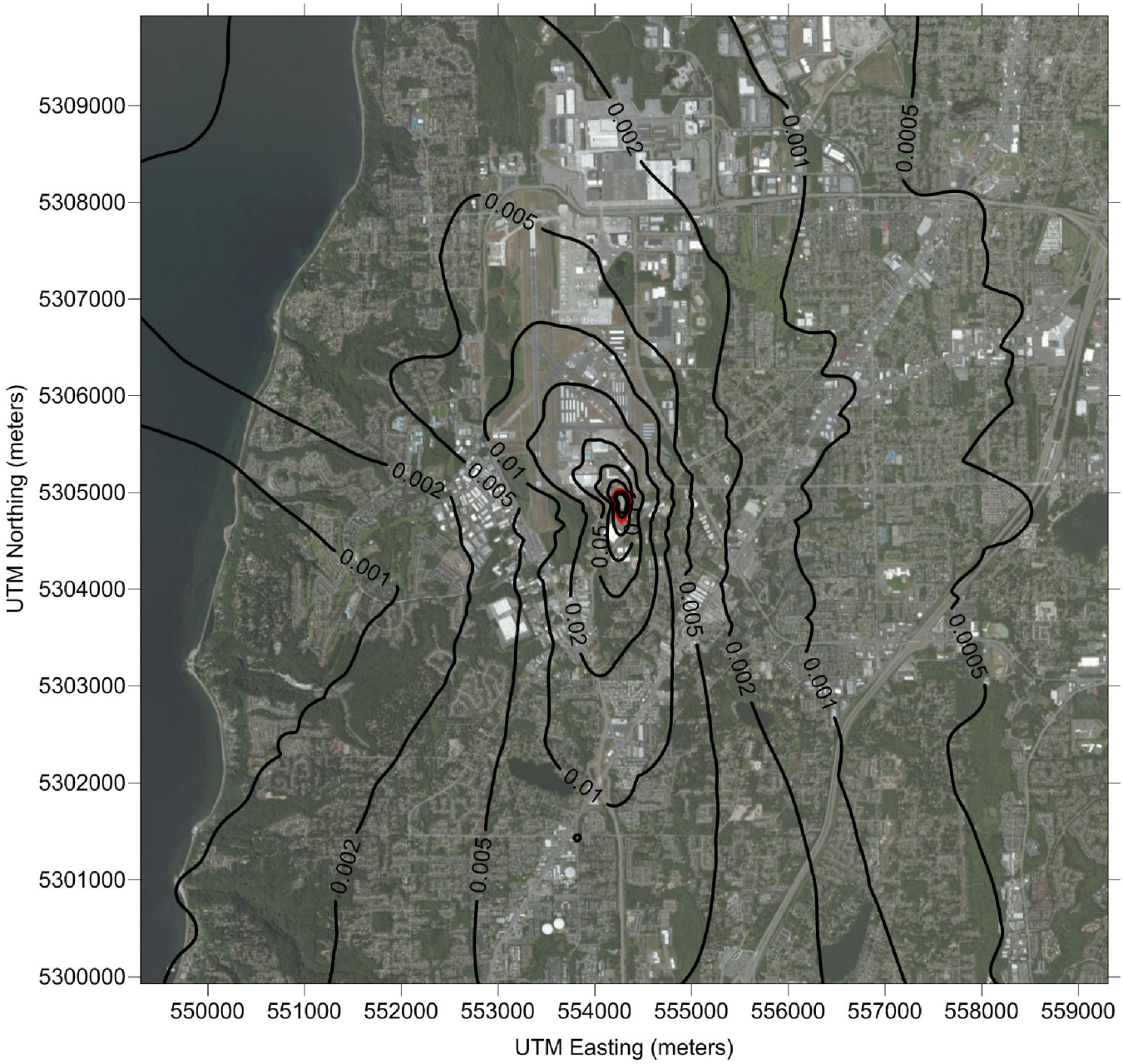

Figure 4-6: Maximum Predicted Annual Average Ethyl Benzene Concentrations (µg/m^3) – Entire Domain – Stack #2 Only
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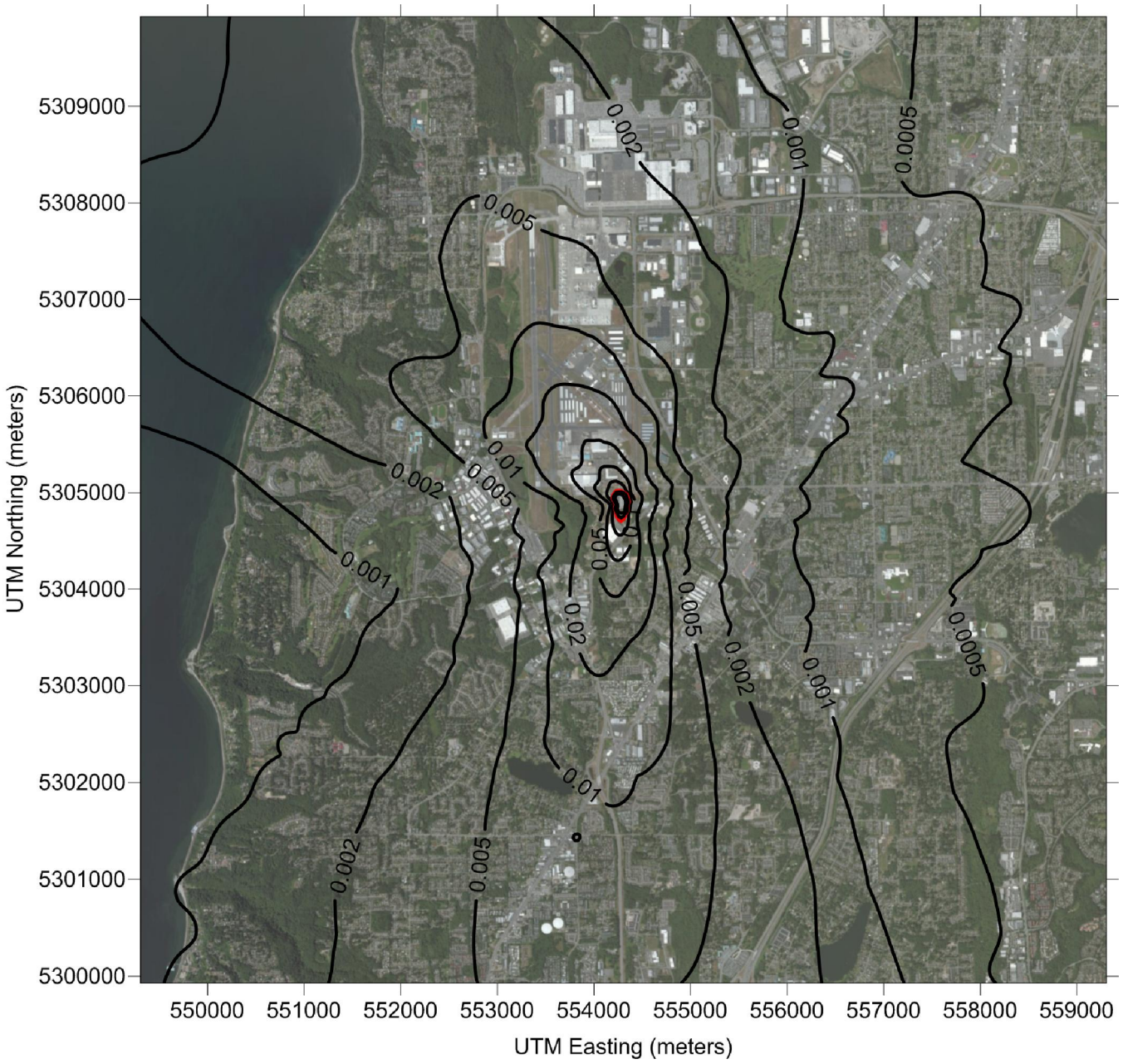


Figure 4-7: Maximum Predicted Annual Average Ethyl Benzene Concentrations (µg/m^3) – Entire Domain – Stack #3 Only
(0.4 µg/m^3 contour line, corresponding to the ASIL for Ethyl Benzene, is in red)

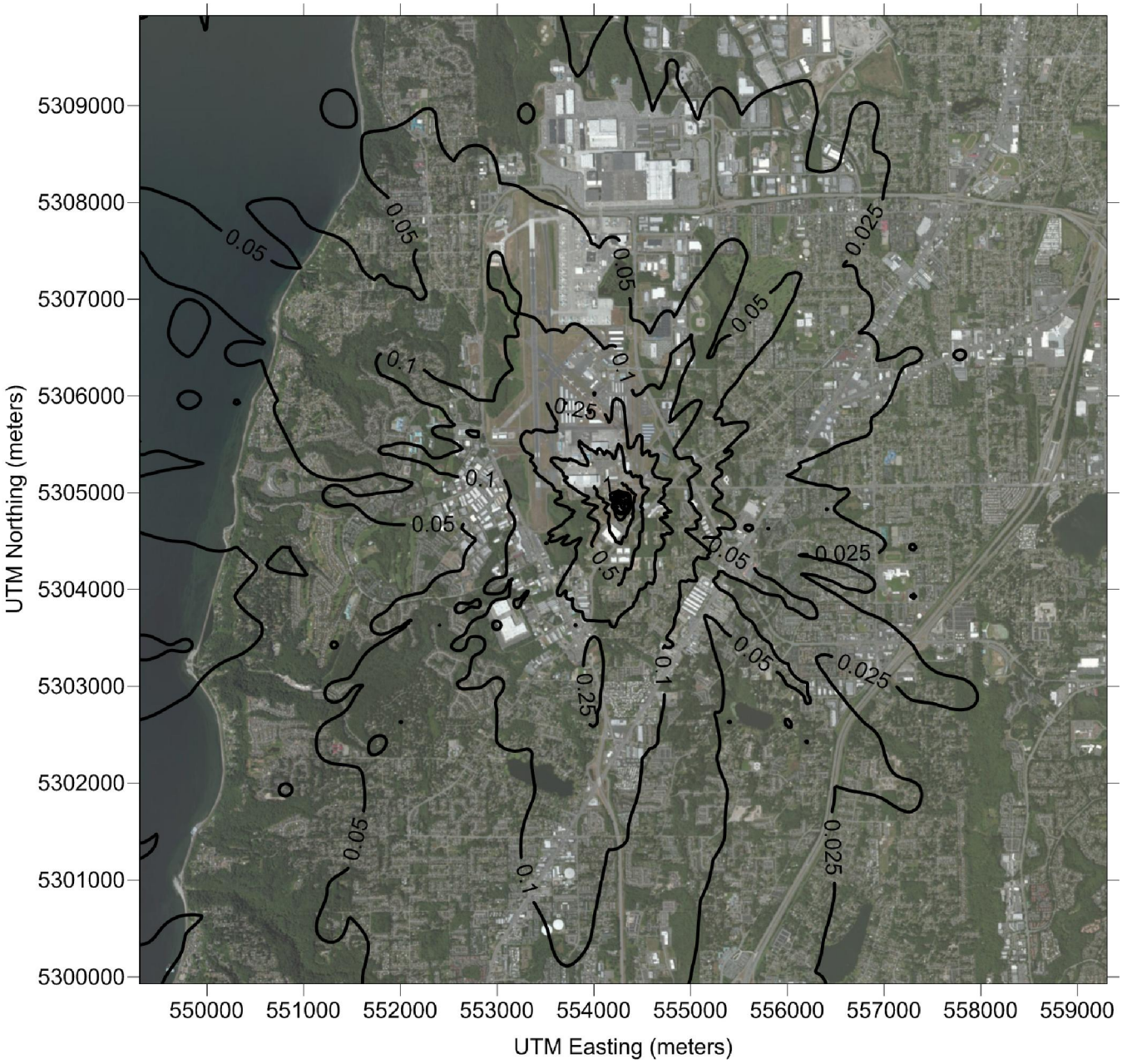


Figure 4-8: Maximum Predicted 24-Hour Average Ethyl Benzene Concentrations (µg/m^3) – Entire Domain – Stacks #2 & #3

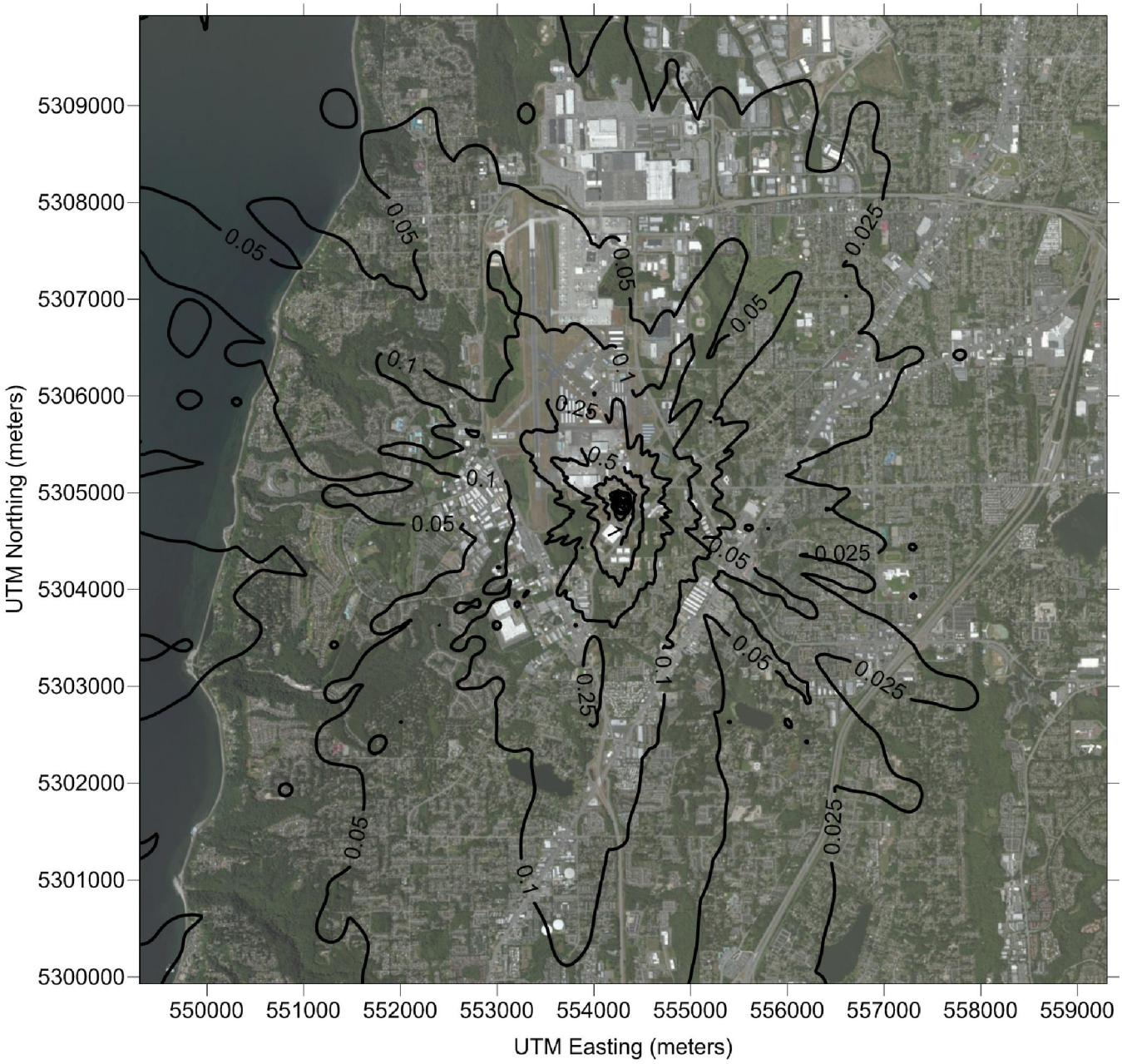


Figure 4-9: Maximum Predicted 24-Hour Average Ethyl Benzene Concentrations (µg/m^3) – Entire Domain – Stack #2 Only

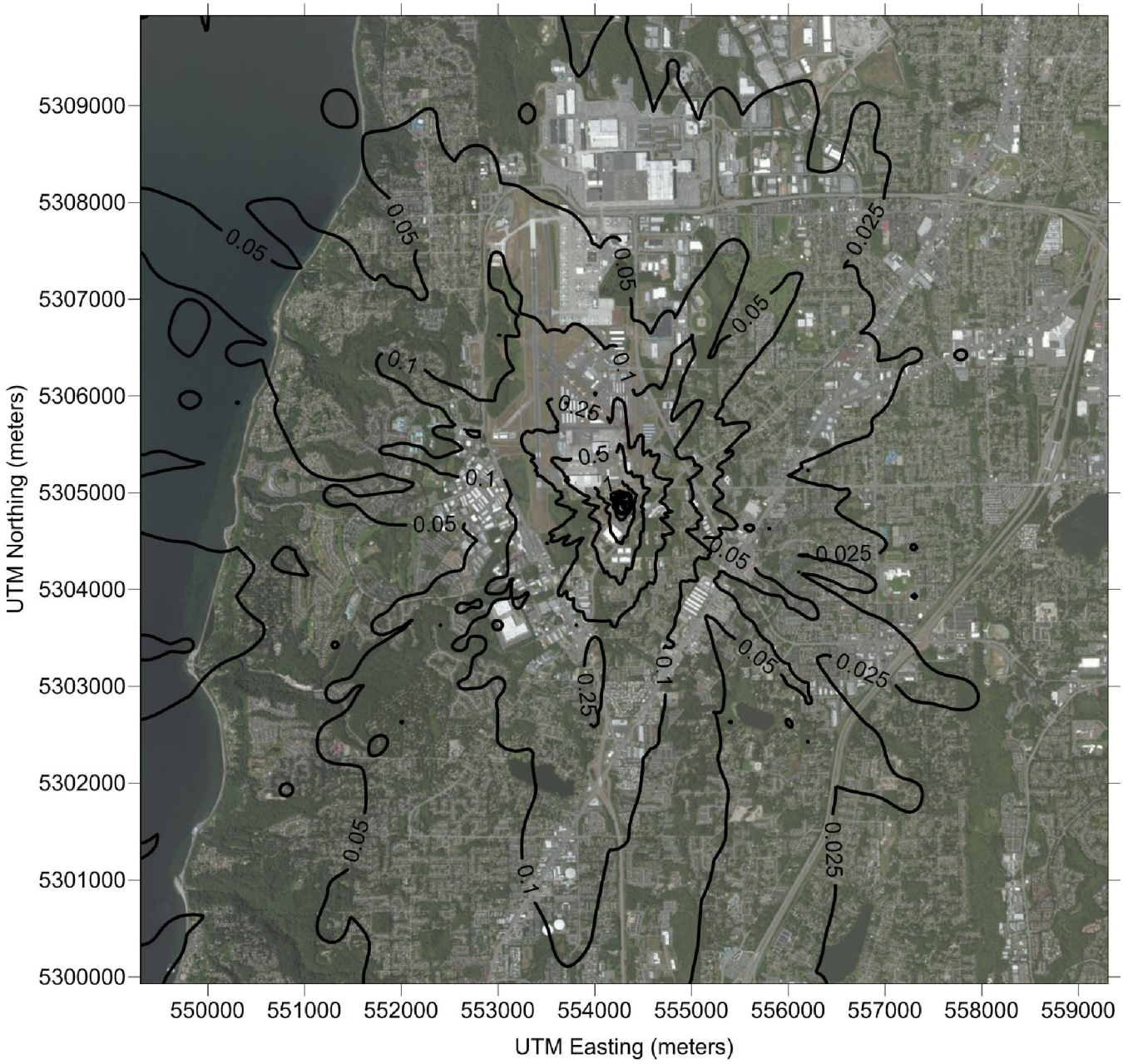


Figure 4-10: Maximum Predicted 24-Hour Average Ethyl Benzene Concentrations (µg/m^3) – Entire Domain – Stack #3 Only

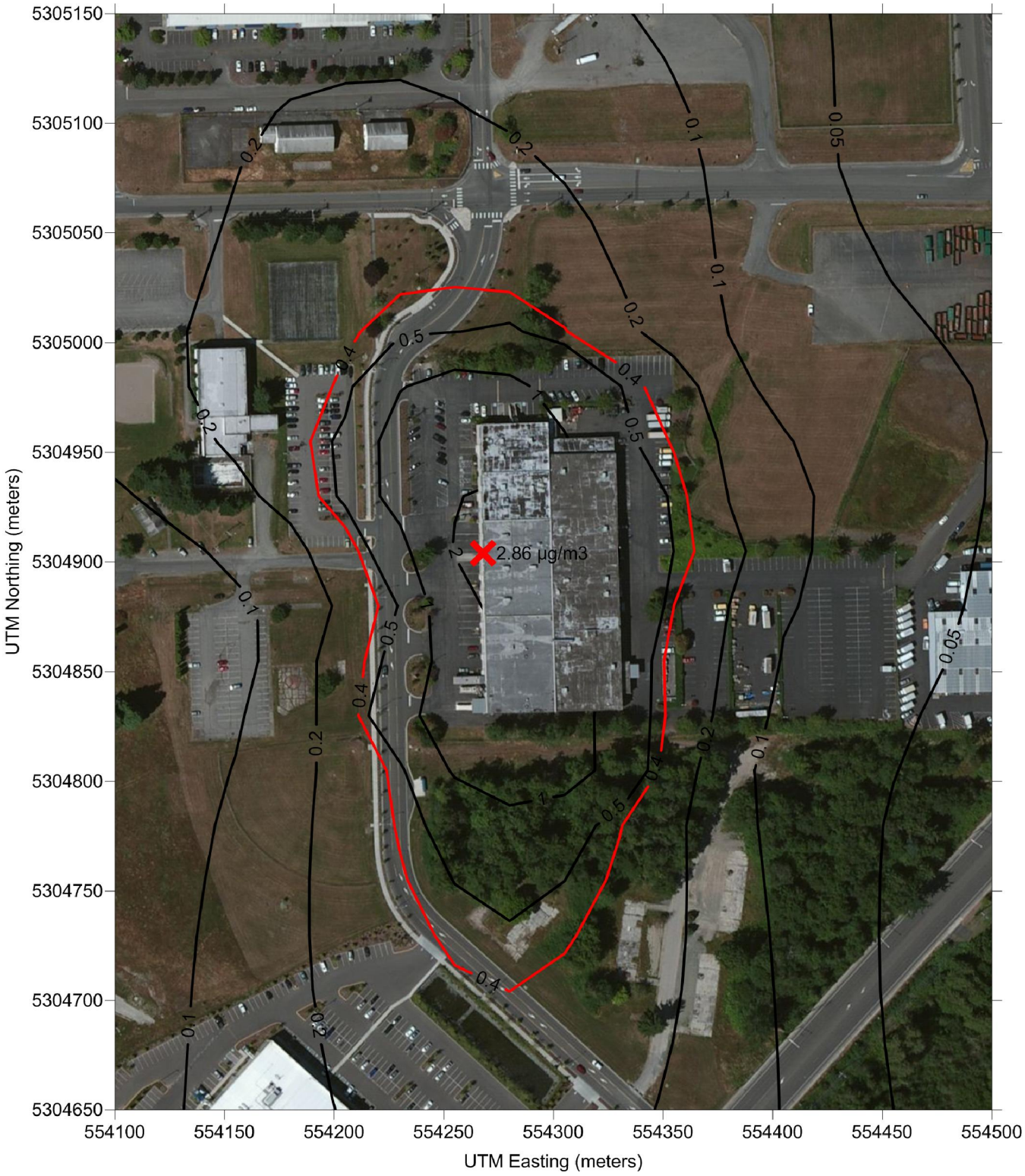


Figure 4-11: Maximum Predicted Annual Average Ethyl Benzene Concentrations (µg/m^3) – Near Facility – Stacks #2 & #3
(0.4 µg/m^3 contour line, corresponding to the ASIL for Ethyl Benzene, is in red)

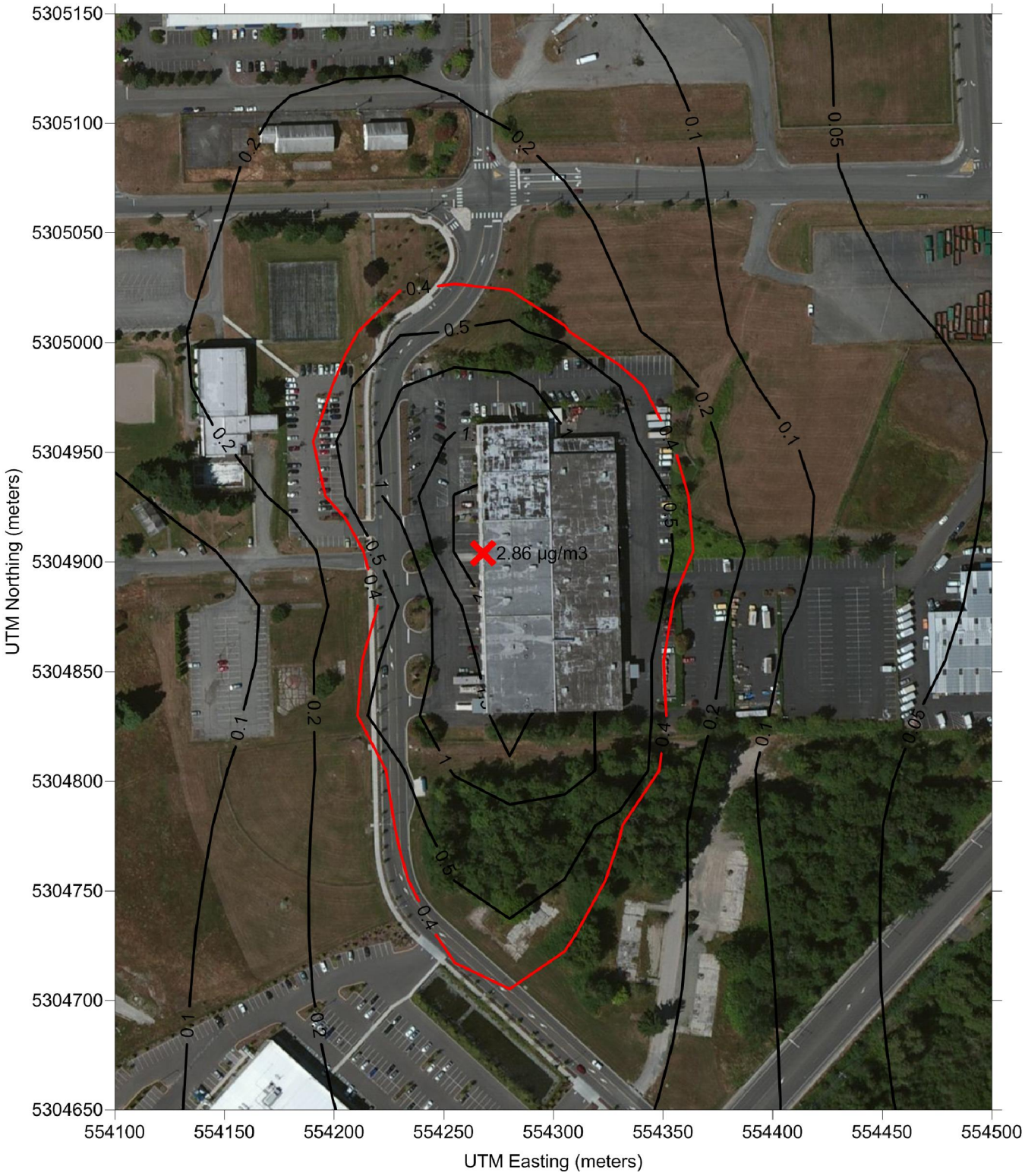


Figure 4-12: Maximum Predicted Annual Average Ethyl Benzene Concentrations (µg/m^3) – Near Facility – Stack #2 Only
(0.4 µg/m^3 contour line, corresponding to the ASIL for Ethyl Benzene, is in red)

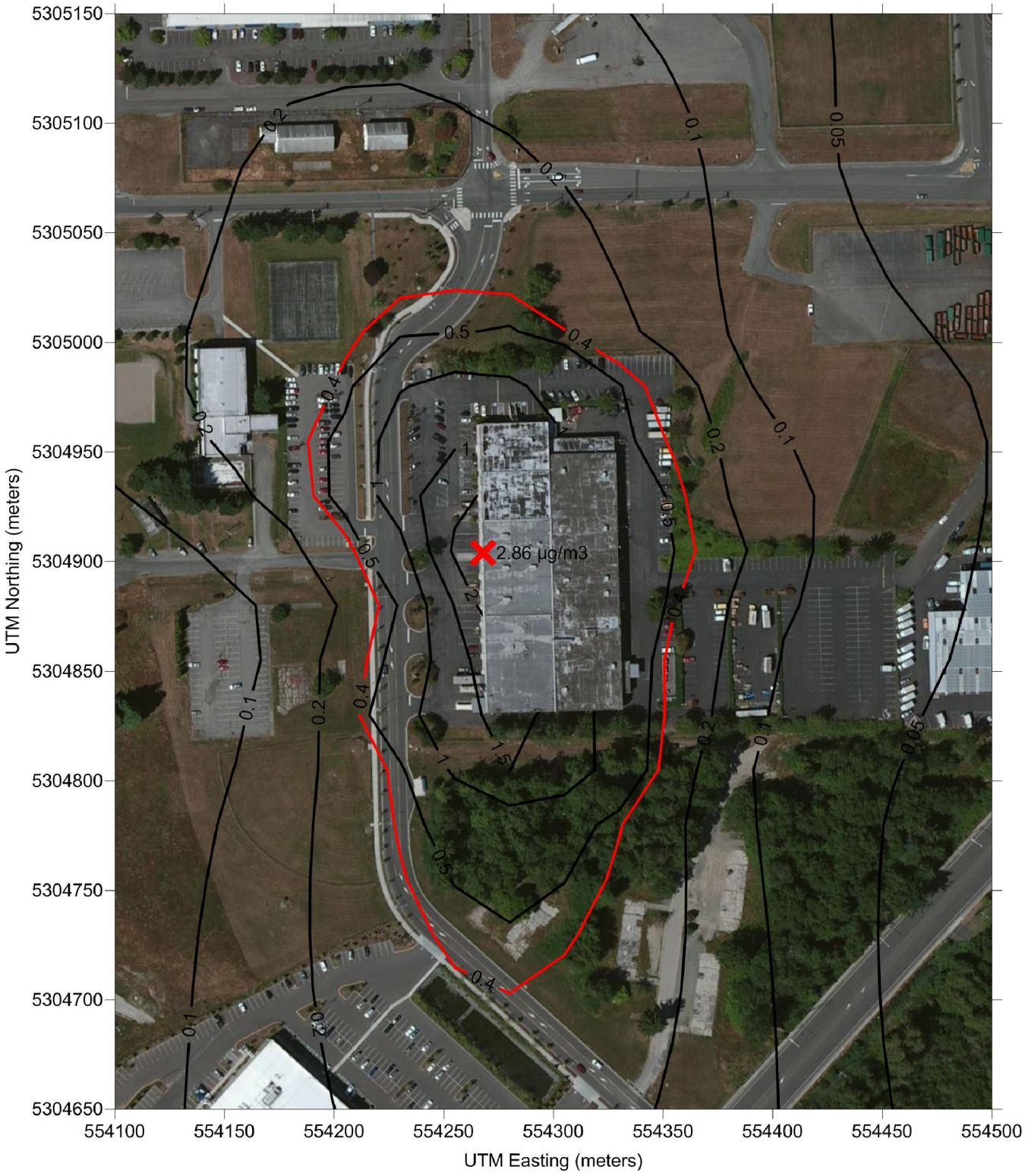


Figure 4-13: Maximum Predicted Annual Average Ethyl Benzene Concentrations (µg/m^3) – Near Facility – Stack #3 Only
(0.4 µg/m^3 contour line, corresponding to the ASIL for Ethyl Benzene, is in red)

Figure 4-14: Maximum Predicted 24-Hour Average Ethyl Benzene Concentrations (µg/m^3) – Near Facility – Stacks #2 & #3

Figure 4-15: Maximum Predicted 24-Hour Average Ethyl Benzene Concentrations (µg/m^3) – Near Facility – Stack #2 Only

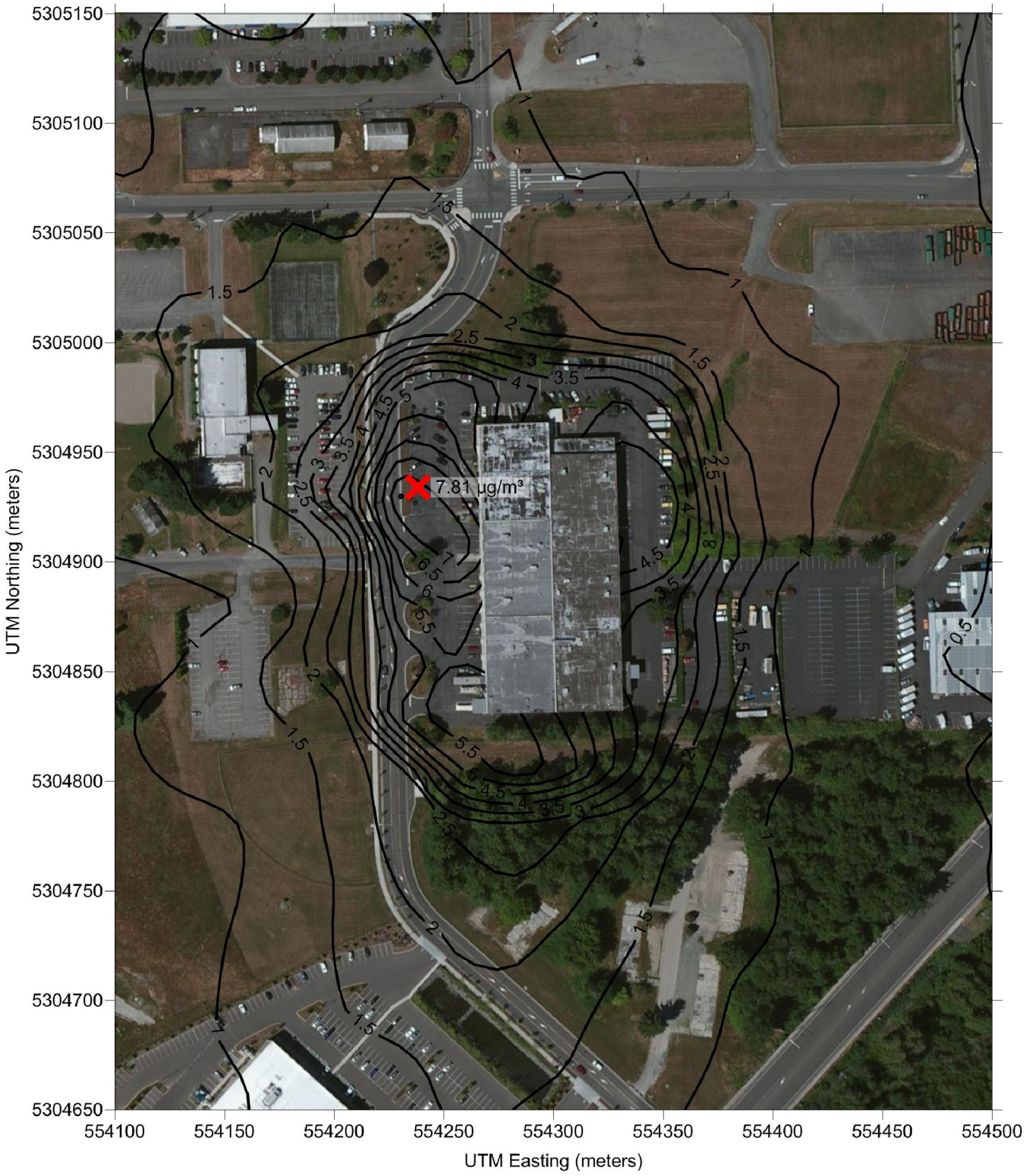


Figure 4-16: Maximum Predicted 24-Hour Average Ethyl Benzene Concentrations (µg/m^3) – Near Facility – Stack #3 Only

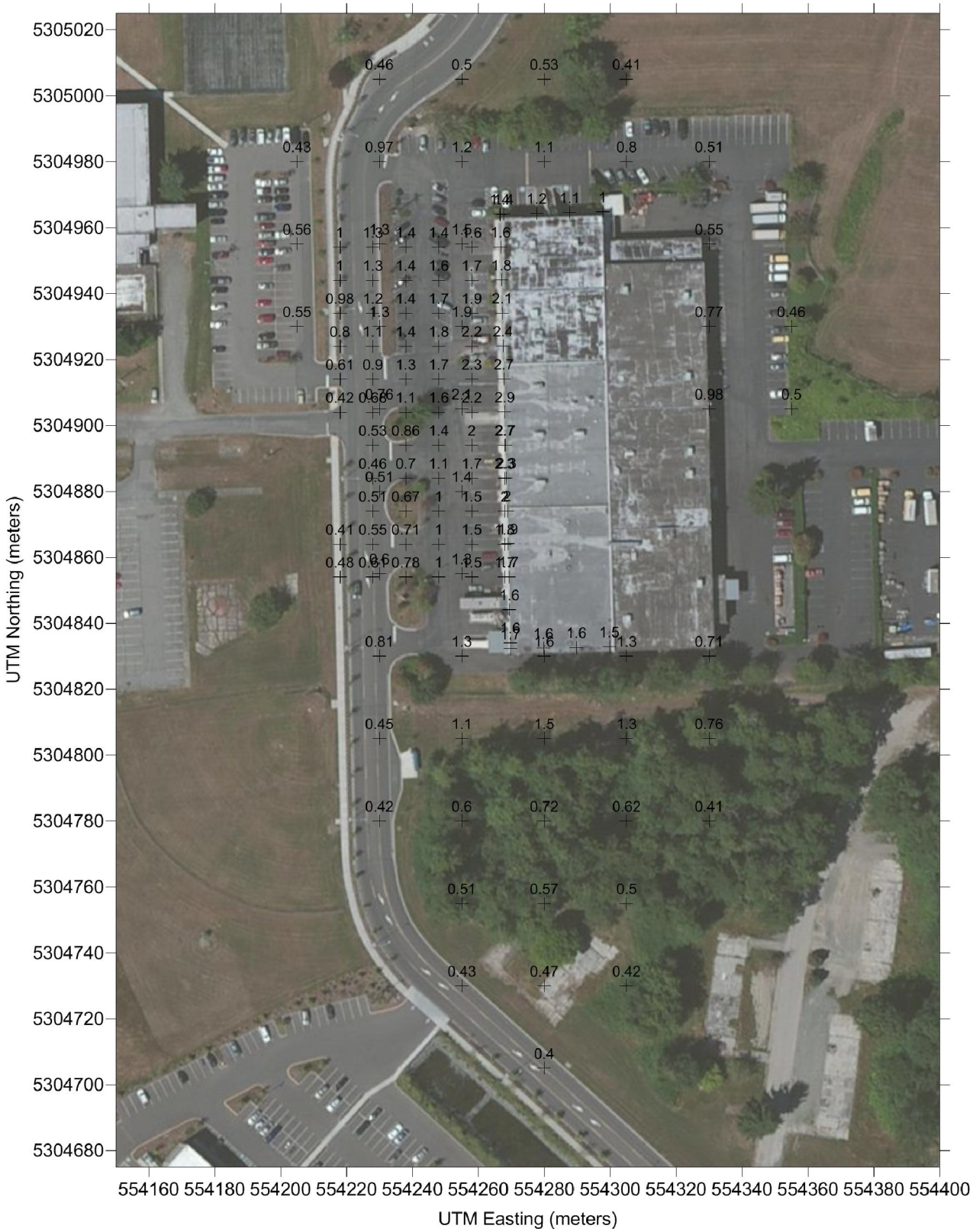


Figure 4-17: Receptors Predicted to Exceed Ethyl Benzene Acceptable Source Impact Level (0.4 µg/m^3), with Predicted Ethyl Benzene Concentrations (µg/m^3)

Figure 5-1: Locations of Sensitive Receptors Nearest to the Facility and Receptors of Concern

Appendix A

Material Safety Data Sheets for Coatings Used at Vaupell's Everett Facility

MATERIAL SAFETY DATA SHEET

H99XXA99-4383
00 01

DATE OF PREPARATION
Jan 18, 2013

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
H99XXA99-4383
PRODUCT NAME
POLANE* L Boeing Approval, BAC 70961 TYPE 2
MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
4	108-88-3	**Toluene**		
		ACGIH TLV	20 PPM	22 mm
		OSHA PEL	100 ppm (Skin)	
		OSHA PEL	150 ppm (Skin) STEL	
0.2	100-41-4	**Ethylbenzene**		
		ACGIH TLV	20 PPM	7.1 mm
		OSHA PEL	100 PPM	
		OSHA PEL	125 PPM STEL	
1	1330-20-7	**Xylene**		
		ACGIH TLV	100 PPM	5.9 mm
		ACGIH TLV	150 PPM STEL	
		OSHA PEL	100 PPM	
		OSHA PEL	150 PPM STEL	
3	67-63-0	**2-Propanol**		
		ACGIH TLV	200 PPM	33 mm
		ACGIH TLV	400 PPM STEL	
		OSHA PEL	400 PPM	
10	78-93-3	**Methyl Ethyl Ketone**		
		ACGIH TLV	200 PPM	90.6 mm
		ACGIH TLV	300 PPM STEL	
		OSHA PEL	200 PPM	
		OSHA PEL	300 PPM STEL	
10	108-94-1	**Cyclohexanone**		
		ACGIH TLV	25 ppm (Skin)	2 mm
		OSHA PEL	25 ppm (Skin)	
19	123-86-4	**n-Butyl Acetate**		
		ACGIH TLV	150 PPM	10 mm
		ACGIH TLV	200 PPM STEL	
		OSHA PEL	150 PPM	
		OSHA PEL	200 PPM STEL	
6	108-65-6	**1-Methoxy-2-Propanol Acetate**		
		ACGIH TLV	Not Available	1.8 mm
		OSHA PEL	Not Available	
6	14807-96-6	**Talc**		
		ACGIH TLV	2 mg/m3 as Resp. Dust	
		OSHA PEL	2 mg/m3 as Resp. Dust	
19	13463-67-7	**Titanium Dioxide**		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	
0.8	1333-86-4	**Carbon Black**		
		ACGIH TLV	3.5 MG/M3	
		OSHA PEL	3.5 MG/M3	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

HMIS Codes

Health	2*
Flammability	3
Reactivity	0

EFFECTS OF OVEREXPOSURE

EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.
Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:

- the liver
- the urinary system
- the hematopoietic (blood-forming) system
- the cardiovascular system
- the reproductive system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

May cause allergic respiratory and/or skin reaction in susceptible persons or sensitization. This effect may be delayed several hours after exposure.

Persons sensitive to isocyanates will experience increased allergic reaction on repeated exposure.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.

INHALATION: If any breathing problems occur during use, **LEAVE THE AREA** and get fresh air. If problems remain or occur later, **IMMEDIATELY** get medical attention.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
34 °F TCC	1.0	13.1	RED LABEL -- Flammable, Flash below 100 °F (38 °C)

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode when exposed to extreme heat.

Application to hot surfaces requires special precautions.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

DOL Storage Class IB

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Contents are FLAMMABLE. Keep away from heat, sparks, and open flame.

During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

Consult NFPA Code. Use approved Bonding and Grounding procedures.

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

NO PERSON SHOULD USE THIS PRODUCT, OR BE IN THE AREA WHERE IT IS BEING USED, IF THEY HAVE CHRONIC (LONG-TERM) LUNG OR BREATHING PROBLEMS OR IF THEY EVER HAD A REACTION TO ISOCYANATES.

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

Where overspray is present, a positive pressure air supplied respirator (TC19C NIOSH/MSHA approved) should be worn. If unavailable, a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2 may be effective. Follow respirator manufacturers directions for use. Wear the respirator for the whole time of spraying and until all vapors and mists are gone. **NO PERSONS SHOULD BE ALLOWED IN THE AREA WHERE THIS PRODUCT IS BEING USED UNLESS EQUIPPED WITH THE SAME RESPIRATOR PROTECTION RECOMMENDED FOR THE PAINTERS.**

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

To prevent skin contact, wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PROTECTIVE EQUIPMENT

Use barrier cream on exposed skin.

OTHER PRECAUTIONS

This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	10.12 lb/gal	1213 g/l
SPECIFIC GRAVITY	1.22	
BOILING POINT	174 - 320 °F	78 - 160 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	74%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	Not Available	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

5.42 lb/gal	650 g/l	Less Water and Federally Exempt Solvents
5.42 lb/gal	650 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

Methyl Ethyl Ketone may increase the nervous system effects of other solvents.

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

Ethylbenzene is classified by IARC as possibly carcinogenic to humans (2B) based on inadequate evidence in humans and sufficient evidence in laboratory animals. Lifetime inhalation exposure of rats and mice to high ethylbenzene concentrations resulted in increases in certain types of cancer, including kidney tumors in rats and lung and liver tumors in mice. These effects were not observed in animals exposed to lower concentrations. There is no evidence that ethylbenzene causes cancer in humans.

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

Carbon Black is classified by IARC as possibly carcinogenic to humans (group 2B) based on experimental animal data, however, there is insufficient evidence in humans for its carcinogenicity.

TOXICOLOGY DATA

CAS No.	Ingredient Name			
108-88-3	Toluene			
		LC50 RAT	4HR	4000 ppm
		LD50 RAT		5000 mg/kg
100-41-4	Ethylbenzene			
		LC50 RAT	4HR	Not Available
		LD50 RAT		3500 mg/kg
1330-20-7	Xylene			
		LC50 RAT	4HR	5000 ppm
		LD50 RAT		4300 mg/kg
67-63-0	2-Propanol			
		LC50 RAT	4HR	Not Available
		LD50 RAT		5045 mg/kg
78-93-3	Methyl Ethyl Ketone			
		LC50 RAT	4HR	Not Available
		LD50 RAT		2740 mg/kg
108-94-1	Cyclohexanone			
		LC50 RAT	4HR	8000 ppm
		LD50 RAT		1535 mg/kg
123-86-4	n-Butyl Acetate			
		LC50 RAT	4HR	2000 ppm
		LD50 RAT		13100 mg/kg
108-65-6	1-Methoxy-2-Propanol Acetate			
		LC50 RAT	4HR	Not Available
		LD50 RAT		8500 mg/kg
14807-96-6	Talc			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
13463-67-7	Titanium Dioxide			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
1333-86-4	Carbon Black			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

5 Liters (1.3 Gallons) and Less may be Classed as LTD. QTY. OR ORM-D
Larger Containers are Regulated as:
UN1263, PAINT, 3, PG II, (ERG#128)

DOT (Dept of Transportation) Hazardous Substances & Reportable Quantities

n-Butyl acetate 5000 lb RQ
Toluene 1000 lb RQ
Xylenes (isomers and mixture) 100 lb RQ

Bulk Containers may be Shipped as (check reportable quantities):

UN1263, PAINT, 3, PG II, (ERG#128)

Canada (TDG)

UN1263, PAINT, CLASS 3, PG II, (ERG#128)

IMO

5 Liters (1.3 Gallons) and Less may be Shipped as Limited Quantity.

UN1263, PAINT, CLASS 3, PG II, (1 C c.c.), EmS F-E, S-E, ADR (D/E)

IATA/ICAO

UN1263, PAINT, 3, PG II

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
108-88-3	Toluene	4	
100-41-4	Ethylbenzene	0.1	
1330-20-7	Xylene	1	

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	:	ALEXIT-FST-Topcoat 346-55 70TY mittelgrau FS 26270 seidenglänzend
Use of the Substance/Mixture	:	Industrial serial painting
Company	:	Mankiewicz Coatings L.L.C 415 Jessen Lane Charleston, South Carolina 29492 USA
Telephone	:	+1 (843) 6547755
Emergency Telephone	:	CHEMTREC +1 (800) 4249300 or +1 (703) 5273887

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Caution

Form: liquid, Color: according product name, Odor: characteristic

OSHA Hazards : MODERATE SKIN IRRITANT
MODERATE EYE IRRITANT

Potential Health Effects

Inhalation	:	No hazard in normal industrial use.
Skin	:	May cause skin irritation.
Eyes	:	May cause eye irritation.
Ingestion	:	May cause vomiting.
Symptoms of Overexposure	:	No information available.

Carcinogenicity:

IARC	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Mixture of synthetic resins, water and pigments

Hazardous ingredients

Component	CAS-No.	Weight %
N-METHYL-2-PYRROLIDONE	872-50-4	1.00 - 5.00
Polyacrylate		1.00 - 5.00
GLYCEROL	56-81-5	1.00 - 5.00

SECTION 4. FIRST AID MEASURES

First aid procedures

General advice : In all cases of doubt, or when sickness symptoms persist, seek medical attention.
Never give anything by mouth to an unconscious person.

Inhalation : Remove to fresh air, keep patient warm and at rest.
Irregular breathing/no breathing: artificial respiration.
If unconscious place in recovery position and seek medical advice.

Skin contact : Take off all contaminated clothing immediately.
Wash skin thoroughly with soap and water or use recognised skin cleanser.
Do NOT use solvents or thinners !

Eye contact : Remove contact lenses, irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart and seek medical advice.

Ingestion : Do NOT induce vomiting.
If accidentally swallowed obtain immediate medical attention.
Never give anything by mouth to an unconscious person.
Keep at rest.

Notes to physician

Symptoms : No information available.

Treatment : No information available.

SECTION 5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point : Remarks: not applicable

Ignition temperature	:	> 392 °F (> 200 °C)
Lower explosion limit	:	Remarks: no data available
Upper explosion limit	:	Remarks: no data available

Fire fighting

Suitable extinguishing media	:	Alcohol resistant foam, CO2, powders, water spray
Unsuitable extinguishing media	:	High volume water jet
Further information	:	Cool endangered containers with water in case of fire. DO NOT ALLOW RUN-OFF FROM FIRE FIGHTING TO ENTER DRAINS OR WATER COURSES!!

Protective equipment and precautions for firefighters

Specific hazards during fire fighting	:	Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard.
Special protective equipment for fire-fighters	:	As in any fire, wear self-contained breathing apparatus pressure - demand, MSHA / NIOSH (approved or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Exclude sources of ignition and ventilate the area. Do not inhale vapors. Refer to protective measures listed in sections 7 and 8.
Environmental precautions	:	Do not let product enter drains. If the product contaminates lakes, rivers or sewage, inform appropriate authorities in accordance with local regulations.
Methods for containment / Methods for cleaning up	:	Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see chapter 13). Clean preferably with a detergent; avoid use of solvents.

SECTION 7. HANDLING AND STORAGE

Handling

Handling	:	Comply with the health and safety at work laws. In addition, the product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Smoking, eating and drinking should be prohibited in the application area. Observe specific national regulations for handling and use of

paints.

Advice on protection against fire and explosion	:	Keep away from ignition sources and provide for good ventilation.

Storage

Requirements for storage areas and containers	:	Keep container tightly closed. Never use pressure to empty: container isnot a pressure vessel. No smoking. Prevent unauthorized access. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Further information on storage conditions	:	Always keep in containers of same material as the original one. See also instructions on the label. Avoid heating and direct sunlight. Keep container dry in a cool, well-ventilated place. Avoid cooling to under 32°F.
Advice on common storage	:	Keep away from oxidizing agents and strongly acid or alkaline materials.
Storage temperature	:	41 - 95 °F (5 - 35 °C)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Ingredients with workplace control parameters

Ingredients Source	Value	Control parameters
N-METHYL-2-PYRROLIDONE CAS-No.872-50-4		
US WEEL	TWA	10 ppm
GLYCEROL CAS-No.56-81-5		
OSHA P0	TWA	10 mg/m3
OSHA P0	TWA	5 mg/m3
ACGIH	TWA	10 mg/m3
OSHA P1	TWA	15 mg/m3
OSHA P1	TWA	5 mg/m3

Engineering measures

Engineering measures	:	Provide adequate ventilation. Where reasonably practicable this shoud be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and below the OEL (= Occupational Exposure Limit), suitable respiratory protection must be worn.

Personal protective equipment

Protective measures	:	Do not eat or drink during work - no smoking. Avoid product contact with skin, eyes and clothing. When operators, whether spraying or not, have to work inside the spray booth, ventilation is unlikely to be sufficient to control particulates and solvent vapor in all cases. In such circumstances they should wear a compressed air-fed respirator during the spraying process until such time as the particulates and solvent vapor concentration has fallen below the exposure limits.
Eye protection	:	Use safety glasses or face shield (ANSI Z87.1 or approved equivalent).
Hand protection	:	Glove permeation data does not exist for this material. The following glove(s) should be used for splash protection only: Appropriate material: nitrile
Skin and body protection	:	Personal should wear protective clothing as necessary to prevent skin contact. All parts of the body should be washed after contact.
Respiratory protection	:	If workers are exposed to concentrations above the exposure limit they must use appropriate, certified respirators: Use MSHA/NIOSH approved respirator if concentration exceeds recommended exposure levels. Dry grinding, torch cutting and/or welding however can produce hazardous dust and/or vapor. If possible, machine employing a wet medium. Where practicable, install exhaust hoods to improve capture of vapors and fumes and avoid exposition; otherwise wear respiratory protection equipment.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	:	liquid
Color	:	according product name
Odor	:	characteristic

Safety data

Flash point	:	Note: not applicable
Ignition temperature	:	> 392 °F (> 200 °C)
Lower explosion limit	:	Note: no data available
Upper explosion limit	:	Note: no data available

Boiling point/boiling range	:	ca. 212 °F (100 °C)
Vapor pressure	:	ca. 100 hPa (75 mmHg) at 122 °F (50 °C)
Density	:	13.4 lb/gal (1.6 g/cm3) at 68 °F (20 °C)
Water solubility	:	Note: completely miscible
Flow time	:	61 s 4 mm Method: DIN 53211

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	:	Remarks: Stable under recommended storage and handling conditions (See section 7).
Materials to avoid	:	Remarks: Keep away from oxidizing agents, strongly alkaline and strongly acid materials in order to avoid exothermic reactions.
Hazardous decomposition products	:	Note: When exposed to high temperatures may produce hazardous decomposition products such as carbon monoxide and dioxide, smoke, oxides of nitrogen.
Hazardous reactions	:	No dangerous reaction known under conditions of normal use. There are no data available on the preparation itself.

SECTION 11. TOXICOLOGICAL INFORMATION

Further information	:	Exposure of vapor concentration in excess of the stated OEL's may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on kidney, liver and central nervous system. Symptoms and signs include headache, dizziness, fatigue muscular weakness, drowsiness and in extrem cases, loss of consciousness. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin resulting in non-allergic contact dermatitis and absorption through the skin. The liquid splashed in the eyes may cause irritation and reversible damage.

SECTION 12. ECOLOGICAL INFORMATION

Biodegradability	:	Remarks: There are no data available on the preparation itself.
Bioaccumulation	:	Remarks:

There are no data available on the preparation itself.

Additional ecological information : There are no data available on the preparation itself.

The product should not be allowed to enter drains or water courses.

SECTION 13. DISPOSAL CONSIDERATIONS

Further information : Dispose of in accordance with local regulations.

SECTION 14. TRANSPORT INFORMATION

DOT
Not dangerous goods

IATA
Not dangerous goods

IMDG
Not dangerous goods

Other information : If transported within the user's premises: To be transported always in closed, upright and safe containers. Make sure that persons handling these containers are aware of the rules of conduct in case of incident or spillage.

Not classified as dangerous in the meaning of transport regulations.

SECTION 15. REGULATORY INFORMATION

OSHA Hazards : Moderate skin irritant, Moderate eye irritant

TSCA Status : y (positive listing)
All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.

SARA 311/312 Hazards : Acute Health Hazard

Clean Air Act
Ozone-Depletion Potential : This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Clean Water Act
The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:
ammonia solution 1336-21-6

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:
ammonia solution 1336-21-6

EPCRA - EMERGENCY PLANNING COMMUNITY RIGHT - TO - KNOW

SARA 302 Reportable Quantity : SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Ingredients : N-METHYL-2-PYRROLIDONE 872-50-4

US CAA HAP
The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61):

xylene	1330-20-7	0.0984 %
ethylbenzene	100-41-4	0.0328 %

CAA112(r)
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

CAA111
The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

xylene	1330-20-7	0.0984 %
ethylbenzene	100-41-4	0.0328 %

US State Regulations

Massachusetts Right To Know Ingredients : N-METHYL-2-PYRROLIDONE 872-50-4

GLYCEROL 56-81-5

Pennsylvania Right To Know Ingredients : N-METHYL-2-PYRROLIDONE 872-50-4

GLYCEROL 56-81-5

Xylene 1330-20-7

ethylbenzene 100-41-4

New Jersey Right To Know Ingredients : N-METHYL-2-PYRROLIDONE 872-50-4

GLYCEROL 56-81-5

California Prop. 65 Ingredients : WARNING! This product contains a chemical known in the State of California to cause cancer.

ethylbenzene 100-41-4
WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.

US Federal Regulations N-METHYL-2-PYRROLIDONE 872-50-4

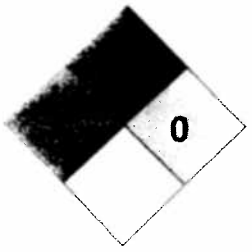
Volatile organic compounds (VOC) content	:	VOC content excluding water: 0.48 lb/gal (0.06 g/cm3)

SECTION 16. OTHER INFORMATION

Further information

HMIS Classification : Health Hazard: 2
Flammability: 1

NFPA Classification : Health Hazard: 1
Fire Hazard: 0
Reactivity Hazard: 0



Department issuing safety data sheet

UMCO Umwelt Consult GmbH
Georg-Wilhelm-Str. 183, D-21107 Hamburg
Telefon: +49 (0)40 / 79 02 36 300 Fax: +49 (0)40 / 79 02 36 357 e-mail: umco@umco.de

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	ALEXIT-FST-Klarlack 404-15/clearcoat farblos / transparent glänzend / high gloss
Use of the Substance/Mixture	:	Industrial serial painting
Company	:	Mankiewicz Coatings L.L.C 415 Jessen Lane Charleston, South Carolina 29492 USA
Telephone	:	+1 843 654-7755
Emergency telephone	:	CHEMTREC 800-424-9300 or 703-527-3887

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Warning

Form: liquid, Color: according product name, Odor: characteristic

OSHA Hazards	:	FLAMMABLE LIQUID CARCINOGEN TOXIC BY INHALATION. HARMFUL BY SKIN ABSORPTION. MODERATE SKIN IRRITANT MODERATE RESPIRATORY IRRITANT

Potential Health Effects

Inhalation	:	Harmful if inhaled. May cause respiratory tract irritation. Causes headache, drowsiness or other effects to the central nervous system.
Skin	:	May be harmful if absorbed through skin. May cause skin irritation. Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering.
Eyes	:	No information regarding eye irritation.
Ingestion	:	May cause vomiting.
Chronic Exposure	:	Suspect cancer hazard - contains material which may cause cancer.
Symptoms of Overexposure	:	No information available.

Carcinogenicity:

IARC	Group 2B: Possibly carcinogenic to humans ethylbenzene 100-41-4
OSHA	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure. ethylbenzene 100-41-4

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Mixture of synthetic resins and organic solvents

Hazardous ingredients

Component	CAS-No.	Weight %
xylene	1330-20-7	10.00 - 30.00
ethylbenzene	100-41-4	10.00 - 30.00
2-methoxy-1-methylethyl acetate	108-65-6	5.00 - 10.00
Butylacetate	123-86-4	5.00 - 10.00
Solvent naphtha (petroleum), light arom.	64742-95-6	1.00 - 5.00

SECTION 4. FIRST AID MEASURES

First aid procedures

General advice : In all cases of doubt, or when sickness symptoms persist, seek medical attention.
Never give anything by mouth to an unconscious person.

Inhalation : Remove to fresh air, keep patient warm and at rest.
Irregular breathing/no breathing: artificial respiration.
If unconscious place in recovery position and seek medical advice.

Skin contact : Take off all contaminated clothing immediately.
Wash skin thoroughly with soap and water or use recognised skin cleanser.
Do NOT use solvents or thinners !

Eye contact	:	Remove contact lenses, irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart and seek medical advice.
Ingestion	:	Do NOT induce vomiting. If accidentally swallowed obtain immediate medical attention. Never give anything by mouth to an unconscious person. Keep at rest.

Notes to physician

Symptoms	:	No information available.
Treatment	:	No information available.

SECTION 5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	:	82 °F (28 °C) Method: ISO 2719
Ignition temperature	:	> 752 °F (> 400 °C)
Lower explosion limit	:	1 %(V)
Upper explosion limit	:	10 %(V)

Fire fighting

Suitable extinguishing media	:	Alcohol resistant foam, CO2, powders, water spray
Unsuitable extinguishing media	:	High volume water jet
Further information	:	Cool endangered containers with water in case of fire. DO NOT ALLOW RUN-OFF FROM FIRE FIGHTING TO ENTER DRAINS OR WATER COURSES!!

Protective equipment and precautions for firefighters

Specific hazards during fire fighting	:	Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard.
Special protective equipment for fire-fighters	:	As in any fire, wear self-contained breathing apparatus pressure - demand, MSHA / NIOSH (approved or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Exclude sources of ignition and ventilate the area. Do not inhale vapors. Refer to protective measures listed in sections 7 and 8.

Environmental precautions	:	Do not let product enter drains. If the product contaminates lakes, rivers or sewage, inform appropriate authorities in accordance with local regulations.
Methods for containment / Methods for cleaning up	:	Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see chapter 13). Clean preferably with a detergent; avoid use of solvents.

SECTION 7. HANDLING AND STORAGE

Handling

Handling	:	Prevent the creation of flammable or explosive concentrations of vapor in air and avoid vapor concentrations higher than the occupational exposure limits. Comply with the health and safety at work laws. Smoking, eating and drinking should be prohibited in the application area. Observe specific national regulations for handling and use of paints.
Advice on protection against fire and explosion	:	The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Preparation may charge electrostatically: always use earthing leads whentransferring from one container to another. Operators should wear anti-static footwear and clothing. No sparking tools should be used. Vapors are heavier than air and may spread along floors. Vapors may form explosive mixtures with air.

Storage

Requirements for storage areas and containers	:	Electrical equipment should be protected to the appropriate standard. Floors should be of the conducting type. Keep container tightly closed. Never use pressure to empty: container isnot a pressure vessel. No smoking. Prevent unauthorized access. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Further information on storage conditions	:	Always keep in containers of same material as the original one. See also instructions on the label. Avoid heating and direct sunlight. Keep container dry in a cool, well-ventilated place.
Advice on common storage	:	Keep away from oxidizing agents and strongly acid or alkaline materials.
Storage temperature	:	40 - 100 °F (4 - 38 °C)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Ingredients with workplace control parameters

Ingredients Source	Value	Control parameters
xylene CAS-No.1330-20-7		
ACGIH	TWA	100 ppm
ACGIH	STEL	150 ppm
OSHA P1	TWA	100 ppm 435 mg/m3
OSHA P0	TWA	100 ppm 435 mg/m3
OSHA P0	STEL	150 ppm 655 mg/m3
ethylbenzene CAS-No.100-41-4		
ACGIH	TWA	100 ppm
ACGIH	STEL	125 ppm
OSHA P1	TWA	100 ppm 435 mg/m3
OSHA P0	TWA	100 ppm 435 mg/m3
OSHA P0	STEL	125 ppm 545 mg/m3
2-methoxy-1-methylethyl acetate CAS-No.108-65-6		
US WEEL	TWA	50 ppm
Butylacetate CAS-No.123-86-4		
ACGIH	TWA	150 ppm
ACGIH	STEL	200 ppm
OSHA P1	TWA	150 ppm 710 mg/m3
OSHA P0	TWA	150 ppm 710 mg/m3
OSHA P0	STEL	200 ppm 950 mg/m3

Immediately Dangerous to Life or Health Concentrations (IDLH)

Substance name	CAS-No.	Control parameters	Update
xylene	1330-20-7	Immediately Dangerous to Life or Health Concentration Value 900 parts per million	1995-03-01
ethylbenzene	100-41-4	Immediately Dangerous to Life or Health Concentration Value 800 parts per million	1995-03-01
Butylacetate	123-86-4	Immediately Dangerous to Life or Health Concentration Value 1700 parts per million	1995-03-01

Engineering measures

Engineering measures : Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain aerosol- and solvent vapors concentration below the OEL, suitable respiratory protection must be worn.

Personal protective equipment

Protective measures : Do not eat or drink during work - no smoking.
Avoid product contact with skin, eyes and clothing.
Avoid the inhalation of dust from sanding, particulates and spray mist arising from the application of this preparation.
When operators, whether spraying or not, have to work inside the spray booth, ventilation is unlikely to be sufficient to control particulates and solvent vapor in all cases. In such circumstances they should wear a compressed air-fed respirator during the spraying process until such time as the particulates and solvent vapor concentration has fallen below the exposure limits.

Eye protection : Use safety glasses or face shield (ANSI Z87.1 or approved equivalent).

Hand protection : Glove permeation data does not exist for this material.
The following glove(s) should be used for splash protection only:
Appropriate material: nitrile

Skin and body protection : Personal should wear protective clothing as necessary to prevent skin contact. All parts of the body should be washed after contact.

Respiratory protection : If workers are exposed to concentrations above the exposure limit they must use appropriate, certified respirators.
Use MSHA/NIOSH approved respirator if concentration exceeds recommended exposure levels.
Dry grinding, torch cutting and/or welding however can produce hazardous dust and/or vapor.
If possible, machine employing a wet medium.
Where practicable, install exhaust hoods to improve capture of vapors and fumes and avoid exposition; otherwise wear respiratory protection equipment.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form : liquid
Color : according product name

Odor	:	characteristic

Safety data

Flash point	:	82 °F (28 °C) Method: ISO 2719
Ignition temperature	:	> 752 °F (> 400 °C)
Lower explosion limit	:	1 %(V)
Upper explosion limit	:	10 %(V)
Boiling point/boiling range	:	ca. 248 °F (120 °C)
Vapor pressure	:	100 hPa (75 mmHg) at 122 °F (50 °C)
Density	:	9.2 lb/gal (1.1 g/cm3) at 68 °F (20 °C)
Water solubility	:	Note: insoluble
Flow time	:	< 59 s 4 mm Method: DIN 53211

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	:	Remarks: Stable under recommended storage and handling conditions (See section 7).
Materials to avoid	:	Remarks: Keep away from oxidizing agents, strongly alkaline and strongly acid materials in order to avoid exothermic reactions.
Hazardous decomposition products	:	Note: When exposed to high temperatures may produce hazardous decomposition products such as carbon monoxide and dioxide, smoke, oxides of nitrogen.
Hazardous reactions	:	No dangerous reaction known under conditions of normal use. There are no data available on the preparation itself.

SECTION 11. TOXICOLOGICAL INFORMATION

Further information	:	Exposure of vapor concentration in excess of the stated OEL's may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on kidney, liver and central nervous system. Symptoms and signs include headache, dizziness, fatigue muscular weakness, drowsiness and in extrem cases, loss of

consciousness.
Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin resulting in non-allergic contact dermatitis and absorption through the skin.
The liquid splashed in the eyes may cause irritation and reversible damage.

SECTION 12. ECOLOGICAL INFORMATION

Biodegradability	:	Remarks: There are no data available on the preparation itself.
Bioaccumulation	:	Remarks: There are no data available on the preparation itself.
Additional ecological information	:	There are no data available on the preparation itself. The product should not be allowed to enter drains or water courses.

SECTION 13. DISPOSAL CONSIDERATIONS

Further information	:	Dispose of in accordance with local regulations.

SECTION 14. TRANSPORT INFORMATION

DOT

UN number	:	1263
Description of the goods	:	PAINT
Class	:	3
Packing group	:	III
Labels	:	3
Environmentally hazardous	:	no

IATA

UN number	:	1263
Description of the goods	:	PAINT
Class	:	3
Packing group	:	III
Labels	:	3
Packing instruction (cargo aircraft)	:	366
Packing instruction (passenger aircraft)	:	355
Packing instruction (LQ)	:	Y344
Environmentally hazardous	:	no

IMDG

UN number	:	1263
Description of the goods	:	PAINT
Class	:	3

Packing group	:	III
Labels	:	3
EmS Number 1	:	F-E
EmS Number 2	:	S-E
Marine pollutant	:	no
Environmentally hazardous	:	no
Other information	:	If transported within the user's premises: To be transported always in closed, upright and safe containers. Make sure that persons handling these containers are aware of the rules of conduct in case of incident or spillage.

SECTION 15. REGULATORY INFORMATION

OSHA Hazards : Flammable Liquid, Carcinogen, Toxic by inhalation., Harmful by skin absorption., Moderate skin irritant, Moderate respiratory irritant

TSCA Status : y (positive listing)
All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

Clean Air Act Ozone-Depletion Potential : This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Clean Water Act
This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

EPCRA - EMERGENCY PLANNING COMMUNITY RIGHT - TO - KNOW

SARA 302 Reportable Quantity : SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Ingredients : Xylene 1330-20-7
ethylbenzene 100-41-4

US CAA HAP The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61):

xylene	1330-20-7	18.1445 %
ethylbenzene	100-41-4	14.667 %

CAA112(r) This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

CAA111

The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

xylene	1330-20-7	18.1445 %
ethylbenzene	100-41-4	14.667 %

US State Regulations

Massachusetts Right To Know Ingredients : Xylene 1330-20-7

ethylbenzene 100-41-4

butyl acetate 123-86-4

Pennsylvania Right To Know Ingredients : Xylene 1330-20-7

ethylbenzene 100-41-4

butyl acetate 123-86-4

2-methylpropan-1-ol 78-83-1

ETHYL ACETATE 141-78-6

butanone 78-93-3

New Jersey Right To Know Ingredients : Xylene 1330-20-7

ethylbenzene 100-41-4

butyl acetate 123-86-4

California Prop. 65 Ingredients : WARNING! This product contains a chemical known in the State of California to cause cancer.

ethylbenzene 100-41-4

WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.

ETHANOL 64-17-5

US Federal Regulations

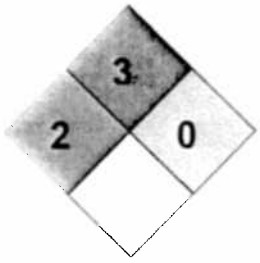
Volatile organic compounds (VOC) content : VOC content excluding water:
4.50 lb/gal (0.54 g/cm3)

SECTION 16. OTHER INFORMATION

Further information

HMIS Classification : Health Hazard: 2
Flammability: 3
Physical hazards: 0

NFPA Classification : Health Hazard: 2
Fire Hazard: 3
Reactivity Hazard: 0



Department issuing safety data sheet

UMCO Umwelt Consult GmbH
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Telefon: +49 (0)40 / 79 02 36 300 Fax: +49 (0)40 / 79 02 36 357 e-mail: umco@umco.de

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SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	ALEXIT-FST-Decor-Basecoat 404-55 A104 white gold satin
Use of the Substance/Mixture	:	Industrial serial painting
Company	:	Mankiewicz Coatings L.L.C 415 Jessen Lane Charleston, South Carolina 29492 USA
Telephone	:	+1 843 654-7755
Emergency telephone	:	CHEMTREC 800-424-9300 or 703-527-3887

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Warning

Form: liquid, Color: according product name, Odor: characteristic

OSHA Hazards : FLAMMABLE LIQUID
CARCINOGEN
TOXIC BY INHALATION.
HARMFUL BY SKIN ABSORPTION.
MODERATE SKIN IRRITANT

Potential Health Effects

Inhalation	:	Harmful if inhaled. Causes headache, drowsiness or other effects to the central nervous system.
Skin	:	May be harmful if absorbed through skin. May cause skin irritation. Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering.
Eyes	:	No information regarding eye irritation.
Ingestion	:	May cause vomiting.
Chronic Exposure	:	Suspect cancer hazard - contains material which may cause cancer.
Symptoms of Overexposure	:	No information available.

Carcinogenicity:

IARC	Group 2B: Possibly carcinogenic to humans	
ethylbenzene	100-41-4	

OSHA	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure. ethylbenzene 100-41-4

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Mixture of synthetic resins, organic solvents and pigments

Hazardous ingredients

Component	CAS-No.	Weight %
xylene	1330-20-7	10.00 - 30.00
2-methoxy-1-methylethyl acetate	108-65-6	10.00 - 30.00
ethylbenzene	100-41-4	10.00 - 30.00
Butylacetate	123-86-4	5.00 - 10.00

SECTION 4. FIRST AID MEASURES

First aid procedures

General advice : In all cases of doubt, or when sickness symptoms persist, seek medical attention.
Never give anything by mouth to an unconscious person.

Inhalation : Remove to fresh air, keep patient warm and at rest.
Irregular breathing/no breathing: artificial respiration.
If unconscious place in recovery position and seek medical advice.

Skin contact : Take off all contaminated clothing immediately.
Wash skin thoroughly with soap and water or use recognised skin cleanser.
Do NOT use solvents or thinners !

Eye contact : Remove contact lenses, irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart and seek medical advice.

Ingestion	:	Do NOT induce vomiting. If accidentally swallowed obtain immediate medical attention. Never give anything by mouth to an unconscious person. Keep at rest.

Notes to physician

Symptoms	:	No information available.
Treatment	:	No information available.

SECTION 5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	:	82 °F (28 °C) Method: ISO 2719
Ignition temperature	:	> 752 °F (> 400 °C)
Lower explosion limit	:	1 %(V)
Upper explosion limit	:	10 %(V)

Fire fighting

Suitable extinguishing media	:	Alcohol resistant foam, CO_2, powders, water spray
Unsuitable extinguishing media	:	High volume water jet
Further information	:	Cool endangered containers with water in case of fire. DO NOT ALLOW RUN-OFF FROM FIRE FIGHTING TO ENTER DRAINS OR WATER COURSES!!

Protective equipment and precautions for firefighters

Specific hazards during fire fighting	:	Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard.
Special protective equipment for fire-fighters	:	As in any fire, wear self-contained breathing apparatus pressure - demand, MSHA / NIOSH (approved or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Exclude sources of ignition and ventilate the area. Do not inhale vapors. Refer to protective measures listed in sections 7 and 8.
Environmental precautions	:	Do not let product enter drains. If the product contaminates lakes, rivers or sewage, inform appropriate authorities in accordance with local regulations.

Methods for containment / Methods for cleaning up	:	Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see chapter 13). Clean preferably with a detergent; avoid use of solvents.

SECTION 7. HANDLING AND STORAGE

Handling

Handling	:	Prevent the creation of flammable or explosive concentrations of vapor in air and avoid vapor concentrations higher than the occupational exposure limits. Comply with the health and safety at work laws. Smoking, eating and drinking should be prohibited in the application area. Observe specific national regulations for handling and use of paints.
Advice on protection against fire and explosion	:	The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Preparation may charge electrostatically: always use earthing leads whentransferring from one container to another. Operators should wear anti-static footwear and clothing. No sparking tools should be used. Vapors are heavier than air and may spread along floors. Vapors may form explosive mixtures with air.

Storage

Requirements for storage areas and containers	:	Electrical equipment should be protected to the appropriate standard. Floors should be of the conducting type. Keep container tightly closed. Never use pressure to empty: container isnot a pressure vessel. No smoking. Prevent unauthorized access. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Further information on storage conditions	:	Always keep in containers of same material as the original one. See also instructions on the label. Avoid heating and direct sunlight. Keep container dry in a cool, well-ventilated place.
Advice on common storage	:	Keep away from oxidizing agents and strongly acid or alkaline materials.
Storage temperature	:	40 - 100 °F (4 - 38 °C)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Ingredients with workplace control parameters

Ingredients Source	Value	Control parameters
xylene CAS-No.1330-20-7		
ACGIH	TWA	100 ppm
ACGIH	STEL	150 ppm
OSHA P1	TWA	100 ppm 435 mg/m3
OSHA P0	TWA	100 ppm 435 mg/m3
OSHA P0	STEL	150 ppm 655 mg/m3
2-methoxy-1-methylethyl acetate CAS-No.108-65-6		
US WEEL	TWA	50 ppm
ethylbenzene CAS-No.100-41-4		
ACGIH	TWA	100 ppm
ACGIH	STEL	125 ppm
OSHA P1	TWA	100 ppm 435 mg/m3
OSHA P0	TWA	100 ppm 435 mg/m3
OSHA P0	STEL	125 ppm 545 mg/m3
Butylacetate CAS-No.123-86-4		
ACGIH	TWA	150 ppm
ACGIH	STEL	200 ppm
OSHA P1	TWA	150 ppm 710 mg/m3
OSHA P0	TWA	150 ppm 710 mg/m3
OSHA P0	STEL	200 ppm 950 mg/m3

Immediately Dangerous to Life or Health Concentrations (IDLH)

Substance name	CAS-No.	Control parameters	Update
xylene	1330-20-7	Immediately Dangerous to Life or Health Concentration Value 900 parts per million	1995-03-01
ethylbenzene	100-41-4	Immediately Dangerous to Life or Health Concentration Value 800 parts per million	1995-03-01
Butylacetate	123-86-4	Immediately Dangerous to Life or Health Concentration Value 1700 parts per million	1995-03-01

Engineering measures

Engineering measures : Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to

maintain aerosol- and solvent vapors concentration below the OEL, suitable respiratory protection must be worn.

Personal protective equipment

Protective measures	:	Do not eat or drink during work - no smoking. Avoid product contact with skin, eyes and clothing. Avoid the inhalation of dust from sanding, particulates and spray mist arising from the application of this preparation. When operators, whether spraying or not, have to work inside the spray booth, ventilation is unlikely to be sufficient to control particulates and solvent vapor in all cases. In such circumstances they should wear a compressed air-fed respirator during the spraying process until such time as the particulates and solvent vapor concentration has fallen below the exposure limits.
Eye protection	:	Use safety glasses or face shield (ANSI Z87.1 or approved equivalent).
Hand protection	:	Glove permeation data does not exist for this material. The following glove(s) should be used for splash protection only: Appropriate material: nitrile
Skin and body protection	:	Personal should wear protective clothing as necessary to prevent skin contact. All parts of the body should be washed after contact.
Respiratory protection	:	If workers are exposed to concentrations above the exposure limit they must use appropriate, certified respirators. Use MSHA/NIOSH approved respirator if concentration exceeds recommended exposure levels. Dry grinding, torch cutting and/or welding however can produce hazardous dust and/or vapor. If possible, machine employing a wet medium. Where practicable, install exhaust hoods to improve capture of vapors and fumes and avoid exposition; otherwise wear respiratory protection equipment.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	:	liquid
Color	:	according product name
Odor	:	characteristic

Safety data

Flash point	:	82 °F (28 °C) Method: ISO 2719
Ignition temperature	:	> 752 °F (> 400 °C)
Lower explosion limit	:	1 %(V)
Upper explosion limit	:	10 %(V)
Boiling point/boiling range	:	ca. 248 °F (120 °C)
Vapor pressure	:	100 hPa (75 mmHg) at 122 °F (50 °C)
Density	:	8 lb/gal (1 g/cm3) at 68 °F (20 °C)
Water solubility	:	Note: insoluble
Flow time	:	61 - 90 s 4 mm Method: DIN 53211

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	:	Remarks: Stable under recommended storage and handling conditions (See section 7).
Materials to avoid	:	Remarks: Keep away from oxidizing agents, strongly alkaline and strongly acid materials in order to avoid exothermic reactions.
Hazardous decomposition products	:	Note: When exposed to high temperatures may produce hazardous decomposition products such as carbon monoxide and dioxide, smoke, oxides of nitrogen.
Hazardous reactions	:	No dangerous reaction known under conditions of normal use. There are no data available on the preparation itself.

SECTION 11. TOXICOLOGICAL INFORMATION

Further information	:	Exposure of vapor concentration in excess of the stated OEL's may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on kidney, liver and central nervous system. Symptoms and signs include headache, dizziness, fatigue muscular weakness, drowsiness and in extrem cases, loss of consciousness. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin resulting in non-allergic contact dermatitis and absorption through the skin. The liquid splashed in the eyes may cause irritation and reversible damage.

SECTION 12. ECOLOGICAL INFORMATION

Biodegradability	:	Remarks: There are no data available on the preparation itself.
Bioaccumulation	:	Remarks: There are no data available on the preparation itself.
Additional ecological information	:	There are no data available on the preparation itself. The product should not be allowed to enter drains or water courses.

SECTION 13. DISPOSAL CONSIDERATIONS

Further information	:	Dispose of in accordance with local regulations.

SECTION 14. TRANSPORT INFORMATION

DOT

UN number	:	1263
Description of the goods	:	PAINT
Class	:	3
Packing group	:	III
Labels	:	3
Environmentally hazardous	:	no

IATA

UN number	:	1263
Description of the goods	:	PAINT
Class	:	3
Packing group	:	III
Labels	:	3
Packing instruction (cargo aircraft)	:	366
Packing instruction (passenger aircraft)	:	355
Packing instruction (LQ)	:	Y344
Environmentally hazardous	:	no

IMDG

UN number	:	1263
Description of the goods	:	PAINT
Class	:	3
Packing group	:	III
Labels	:	3
EmS Number 1	:	F-E
EmS Number 2	:	S-E

Marine pollutant : no

Environmentally hazardous	:	no
Other information	:	If transported within the user's premises: To be transported always in closed, upright and safe containers. Make sure that persons handling these containers are aware of the rules of conduct in case of incident or spillage.

Receptacles with less than 30 litres capacity, are not subject to the regulations of IMDG chapters 4.1, 5.2 and 6.1 (see IMDG 2.3.2.5)

SECTION 15. REGULATORY INFORMATION

OSHA Hazards	:	Flammable Liquid, Carcinogen, Toxic by inhalation., Harmful by skin absorption., Moderate skin irritant
TSCA Status	:	y (positive listing) All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
SARA 311/312 Hazards	:	Fire Hazard Acute Health Hazard Chronic Health Hazard
Clean Air Act Ozone-Depletion Potential	:	This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Clean Water Act
This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

EPCRA - EMERGENCY PLANNING COMMUNITY RIGHT - TO - KNOW

SARA 302 Reportable Quantity	:	SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Ingredients	:	Xylene 1330-20-7 ethylbenzene 100-41-4
US CAA HAP		The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61): xylene 1330-20-7 16.8823 % ethylbenzene 100-41-4 12.8629 %
CAA112(r)		This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
CAA111		The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

xylene	1330-20-7	16.8823 %
ethylbenzene	100-41-4	12.8629 %

US State Regulations

Massachusetts Right To Know Ingredients	:	Xylene	1330-20-7
		ethylbenzene	100-41-4
		butyl acetate	123-86-4
Pennsylvania Right To Know Ingredients	:	Xylene	1330-20-7
		ethylbenzene	100-41-4
		butyl acetate	123-86-4
		2-methylpropan-1-ol	78-83-1
		ETHYL ACETATE	141-78-6
New Jersey Right To Know Ingredients	:	Xylene	1330-20-7
		ethylbenzene	100-41-4
		butyl acetate	123-86-4

California Prop. 65 Ingredients : WARNING! This product contains a chemical known in the State of California to cause cancer.

ethylbenzene 100-41-4
WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.

N-METHYL-2-PYRROLIDONE 872-50-4

US Federal Regulations

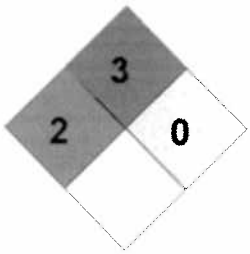
Volatile organic compounds (VOC) content : VOC content excluding water:
4.2 lb/gal (0.5 g/cm3)

SECTION 16. OTHER INFORMATION

Further information

HMIS Classification : Health Hazard: 2
Flammability: 3
Physical hazards: 0

NFPA Classification : Health Hazard: 2
Fire Hazard: 3
Reactivity Hazard: 0



Department issuing safety data sheet

UMCO Umwelt Consult GmbH
Georg-Wilhelm-Str. 183, D-21107 Hamburg
Telefon: +49 (0)40 / 79 02 36 300 Fax: +49 (0)40 / 79 02 36 357 e-mail: umco@umco.de

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	ALEXIT-Verdünner / Thinner 62
Use of the Substance/Mixture	:	Industrial serial painting
Company	:	Mankiewicz Coatings L.L.C 415 Jessen Lane Charleston, South Carolina 29492 USA
Telephone	:	+1 843 654-7755
Emergency telephone	:	CHEMTREC 800-424-9300 or 703-527-3887

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Warning

Form: liquid, Color: according product name, Odor: characteristic

OSHA Hazards	:	FLAMMABLE LIQUID CARCINOGEN TOXIC BY INHALATION. HARMFUL BY SKIN ABSORPTION. MODERATE SKIN IRRITANT

Potential Health Effects

Inhalation	:	Harmful if inhaled. Causes headache, drowsiness or other effects to the central nervous system.
Skin	:	May be harmful if absorbed through skin. May cause skin irritation. Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering.
Eyes	:	No information regarding eye irritation.
Ingestion	:	May cause vomiting.
Chronic Exposure	:	Suspect cancer hazard - contains material which may cause cancer.
Symptoms of Overexposure	:	No information available.

Carcinogenicity:

IARC		Group 2B: Possibly carcinogenic to humans
		ethylbenzene 100-41-4

OSHA	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure. ethylbenzene 100-41-4

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Mixture of organic solvents, halogen-free

Hazardous ingredients

Component	CAS-No.	Weight %
Butylacetate	123-86-4	60.00 - 100.00
xylene	1330-20-7	5.00 - 10.00
ethylbenzene	100-41-4	1.00 - 5.00

SECTION 4. FIRST AID MEASURES

First aid procedures

General advice : In all cases of doubt, or when sickness symptoms persist, seek medical attention.
Never give anything by mouth to an unconscious person.

Inhalation : Remove to fresh air, keep patient warm and at rest.
Irregular breathing/no breathing: artificial respiration.
If unconscious place in recovery position and seek medical advice.

Skin contact : Take off all contaminated clothing immediately.
Wash skin thoroughly with soap and water or use recognised skin cleanser.
Do NOT use solvents or thinners !

Eye contact : Remove contact lenses, irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart and seek medical advice.

Ingestion : Do NOT induce vomiting.
If accidentally swallowed obtain immediate medical attention.

Never give anything by mouth to an unconscious person.
Keep at rest.

Notes to physician

Symptoms	:	No information available.
Treatment	:	No information available.

SECTION 5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	:	79 °F (26 °C) Method: ISO 2719
Ignition temperature	:	> 752 °F (> 400 °C)
Lower explosion limit	:	1.0 %(V)
Upper explosion limit	:	10.0 %(V)

Fire fighting

Suitable extinguishing media	:	Alcohol resistant foam, CO2, powders, water spray
Unsuitable extinguishing media	:	High volume water jet
Further information	:	Cool endangered containers with water in case of fire. DO NOT ALLOW RUN-OFF FROM FIRE FIGHTING TO ENTER DRAINS OR WATER COURSES!!

Protective equipment and precautions for firefighters

Specific hazards during fire fighting	:	Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard.
Special protective equipment for fire-fighters	:	As in any fire, wear self-contained breathing apparatus pressure - demand, MSHA / NIOSH (approved or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Exclude sources of ignition and ventilate the area. Do not inhale vapors. Refer to protective measures listed in sections 7 and 8.
Environmental precautions	:	Do not let product enter drains. If the product contaminates lakes, rivers or sewage, inform appropriate authorities in accordance with local regulations.
Methods for containment /	:	Contain and collect spillage with non-combustible absorbent

Methods for cleaning up	materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see chapter 13). Clean preferably with a detergent; avoid use of solvents.

SECTION 7. HANDLING AND STORAGE

Handling

Handling	:	Prevent the creation of flammable or explosive concentrations of vapor in air and avoid vapor concentrations higher than the occupational exposure limits. Comply with the health and safety at work laws. Smoking, eating and drinking should be prohibited in the application area. Observe specific national regulations for handling and use of paints.
Advice on protection against fire and explosion	:	The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Preparation may charge electrostatically: always use earthing leads whentransferring from one container to another. Operators should wear anti-static footwear and clothing. No sparking tools should be used. Vapors are heavier than air and may spread along floors. Vapors may form explosive mixtures with air.

Storage

Requirements for storage areas and containers	:	Electrical equipment should be protected to the appropriate standard. Floors should be of the conducting type. Keep container tightly closed. Never use pressure to empty: container isnot a pressure vessel. No smoking. Prevent unauthorized access. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Further information on storage conditions	:	Always keep in containers of same material as the original one. See also instructions on the label. Avoid heating and direct sunlight. Keep container dry in a cool, well-ventilated place.
Advice on common storage	:	Keep away from oxidizing agents and strongly acid or alkaline materials.
Storage temperature	:	40 - 100 °F (4 - 38 °C)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Ingredients with workplace control parameters

Ingredients Source	Value	Control parameters
Butylacetate CAS-No.123-86-4		
ACGIH	TWA	150 ppm
ACGIH	STEL	200 ppm
OSHA P1	TWA	150 ppm 710 mg/m3
OSHA P0	TWA	150 ppm 710 mg/m3
OSHA P0	STEL	200 ppm 950 mg/m3
xylene CAS-No.1330-20-7		
ACGIH	TWA	100 ppm
ACGIH	STEL	150 ppm
OSHA P1	TWA	100 ppm 435 mg/m3
OSHA P0	TWA	100 ppm 435 mg/m3
OSHA P0	STEL	150 ppm 655 mg/m3
ethylbenzene CAS-No.100-41-4		
ACGIH	TWA	100 ppm
ACGIH	STEL	125 ppm
OSHA P1	TWA	100 ppm 435 mg/m3
OSHA P0	TWA	100 ppm 435 mg/m3
OSHA P0	STEL	125 ppm 545 mg/m3

Immediately Dangerous to Life or Health Concentrations (IDLH)

Substance name	CAS-No.	Control parameters	Update
Butylacetate	123-86-4	Immediately Dangerous to Life or Health Concentration Value 1700 parts per million	1995-03-01
xylene	1330-20-7	Immediately Dangerous to Life or Health Concentration Value 900 parts per million	1995-03-01
ethylbenzene	100-41-4	Immediately Dangerous to Life or Health Concentration Value 800 parts per million	1995-03-01

Engineering measures

Engineering measures : Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain aerosol- and solvent vapors concentration below the OEL, suitable respiratory protection must be worn.

Personal protective equipment

Protective measures	:	Do not eat or drink during work - no smoking. Avoid product contact with skin, eyes and clothing. Avoid the inhalation of dust from sanding, particulates and spray mist arising from the application of this preparation. When operators, whether spraying or not, have to work inside the spray booth, ventilation is unlikely to be sufficient to control particulates and solvent vapor in all cases. In such circumstances they should wear a compressed air-fed respirator during the spraying process until such time as the particulates and solvent vapor concentration has fallen below the exposure limits.
Eye protection	:	Use safety glasses or face shield (ANSI Z87.1 or approved equivalent).
Hand protection	:	Glove permeation data does not exist for this material. The following glove(s) should be used for splash protection only: Appropriate material: nitrile
Skin and body protection	:	Personal should wear protective clothing as necessary to prevent skin contact. All parts of the body should be washed after contact.
Respiratory protection	:	If workers are exposed to concentrations above the exposure limit they must use appropriate, certified respirators. Use MSHA/NIOSH approved respirator if concentration exceeds recommended exposure levels.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	:	liquid
Color	:	according product name
Odor	:	characteristic

Safety data

Flash point	:	79 °F (26 °C) Method: ISO 2719
Ignition temperature	:	> 752 °F (> 400 °C)
Lower explosion limit	:	1 %(V)

Upper explosion limit	:	10.0 %(V)
Boiling point/boiling range	:	ca. 248 °F (120 °C)
Vapor pressure	:	ca. 100 hPa (75 mmHg) at 122 °F (50 °C)
Density	:	7.34 lb/gal (0.88 g/cm3) at 68 °F (20 °C)
Water solubility	:	Note: insoluble
Flow time	:	< 12 s 4 mm Method: DIN 53211

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	:	Remarks: Stable under recommended storage and handling conditions (See section 7).
Materials to avoid	:	Remarks: Keep away from oxidizing agents, strongly alkaline and strongly acid materials in order to avoid exothermic reactions.
Hazardous decomposition products	:	Note: When exposed to high temperatures may produce hazardous decomposition products such as carbon monoxide and dioxide, smoke, oxides of nitrogen.
Hazardous reactions	:	No dangerous reaction known under conditions of normal use. There are no data available on the preparation itself.

SECTION 11. TOXICOLOGICAL INFORMATION

Further information	:	Exposure of vapor concentration in excess of the stated OEL's may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on kidney, liver and central nervous system. Symptoms and signs include headache, dizziness, fatigue muscular weakness, drowsiness and in extrem cases, loss of consciousness. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin resulting in non-allergic contact dermatitis and absorption through the skin. The liquid splashed in the eyes may cause irritation and reversible damage.

SECTION 12. ECOLOGICAL INFORMATION

Biodegradability	:	Remarks: There are no data available on the preparation itself.

Bioaccumulation	:	Remarks: There are no data available on the preparation itself.
Additional ecological information	:	There are no data available on the preparation itself. The product should not be allowed to enter drains or water courses.

SECTION 13. DISPOSAL CONSIDERATIONS

Further information	:	Dispose of in accordance with local regulations.

SECTION 14. TRANSPORT INFORMATION

DOT

UN number	:	1263
Description of the goods	:	PAINT RELATED MATERIAL
Class	:	3
Packing group	:	III
Labels	:	3
Environmentally hazardous	:	no

IATA

UN number	:	1263
Description of the goods	:	PAINT RELATED MATERIAL
Class	:	3
Packing group	:	III
Labels	:	3
Packing instruction (cargo aircraft)	:	366
Packing instruction (passenger aircraft)	:	355
Packing instruction (LQ)	:	Y344
Environmentally hazardous	:	no

IMDG

UN number	:	1263
Description of the goods	:	PAINT RELATED MATERIAL
Class	:	3
Packing group	:	III
Labels	:	3
EmS Number 1	:	F-E
EmS Number 2	:	S-E

Marine pollutant	:	no
Environmentally hazardous	:	no

Other information	:	If transported within the user's premises: To be transported always in closed, upright and safe containers. Make sure that persons handling these containers are aware of the rules of conduct in case of incident or spillage.

SECTION 15. REGULATORY INFORMATION

OSHA Hazards : Flammable Liquid, Carcinogen, Toxic by inhalation., Harmful by skin absorption., Moderate skin irritant

TSCA Status : y (positive listing)
All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

Clean Air Act Ozone-Depletion Potential : This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Clean Water Act
This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

EPCRA - EMERGENCY PLANNING COMMUNITY RIGHT - TO - KNOW

SARA 302 Reportable Quantity : SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Ingredients : Xylene 1330-20-7
ethylbenzene 100-41-4

US CAA HAP The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61):

xylene	1330-20-7	9 %
ethylbenzene	100-41-4	3 %

CAA112(r) This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

CAA111 The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

xylene	1330-20-7	9 %
ethylbenzene	100-41-4	3 %

US State Regulations

Massachusetts Right To Know Ingredients : butyl acetate 123-86-4

Xylene 1330-20-7

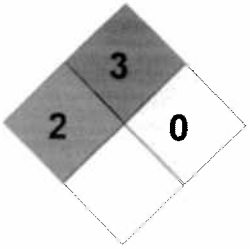
		ethylbenzene	100-41-4
Pennsylvania Right To Know Ingredients	:	butyl acetate	123-86-4
		Xylene	1330-20-7
		ethylbenzene	100-41-4
New Jersey Right To Know Ingredients	:	butyl acetate	123-86-4
		Xylene	1330-20-7
		ethylbenzene	100-41-4
California Prop. 65 Ingredients	:	WARNING! This product contains a chemical known in the State of California to cause cancer.	
		ethylbenzene	100-41-4
US Federal Regulations			
Volatile organic compounds (VOC) content	:	VOC content excluding water: 7 lb/gal (0.88 g/cm3)	

SECTION 16. OTHER INFORMATION

Further information

HMIS Classification : Health Hazard: 2
Flammability: 3
Physical hazards: 0

NFPA Classification : Health Hazard: 2
Fire Hazard: 3
Reactivity Hazard: 0



Department issuing safety data sheet

UMCO Umwelt Consult GmbH
Georg-Wilhelm-Str. 183, D-21107 Hamburg
Telefon: +49 (0)40 / 79 02 36 300 Fax: +49 (0)40 / 79 02 36 357 e-mail: umco@umco.de

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material used in combination with any other materials or in any process, unless specified in the text.

MATERIAL SAFETY DATA SHEET

E61WC40
16 00

DATE OF PREPARATION
Jul 24, 2012

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
E61WC40
PRODUCT NAME
POLANE® Primer (Part A), White
MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	www.oem.sherwin-williams.com
Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
0.2	100-41-4	**Ethylbenzene**		
		ACGIH TLV	20 PPM	7.1 mm
		OSHA PEL	100 PPM	
		OSHA PEL	125 PPM STEL	
4	108-94-1	**Cyclohexanone**		
		ACGIH TLV	25 ppm (Skin)	2 mm
		OSHA PEL	25 ppm (Skin)	
41	123-86-4	**n-Butyl Acetate**		
		ACGIH TLV	150 PPM	10 mm
		ACGIH TLV	200 PPM STEL	
		OSHA PEL	150 PPM	
		OSHA PEL	200 PPM STEL	
19	14807-96-6	**Talc**		
		ACGIH TLV	2 mg/m3 as Resp. Dust	
		OSHA PEL	2 mg/m3 as Resp. Dust	
7	471-34-1	**Calcium Carbonate**		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	15 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	
8	13463-67-7	**Titanium Dioxide**		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	15 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.
EFFECTS OF OVEREXPOSURE
EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

HMIS Codes

Health	2*
Flammability	3
Reactivity	0

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.
Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:
- the liver

- the urinary system
- the hematopoietic (blood-forming) system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

May cause allergic respiratory and/or skin reaction in susceptible persons or sensitization. This effect may be delayed several hours after exposure.
Persons sensitive to isocyanates will experience increased allergic reaction on repeated exposure.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
INHALATION: If any breathing problems occur during use, **LEAVE THE AREA** and get fresh air. If problems remain or occur later, **IMMEDIATELY** get medical attention.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
77 °F PMCC	1.1	8.1	RED LABEL -- Flammable, Flash below 100 °F (38 °C)

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode when exposed to extreme heat.
Application to hot surfaces requires special precautions.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

DOL Storage Class IC

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Contents are FLAMMABLE. Keep away from heat, sparks, and open flame.
During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.
Consult NFPA Code. Use approved Bonding and Grounding procedures.
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

NO PERSON SHOULD USE THIS PRODUCT, OR BE IN THE AREA WHERE IT IS BEING USED, IF THEY HAVE CHRONIC (LONG-TERM) LUNG OR BREATHING PROBLEMS OR IF THEY EVER HAD A REACTION TO ISOCYANATES.
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

Where overspray is present, a positive pressure air supplied respirator (TC19C NIOSH/MSHA approved) should be worn. If unavailable, a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2 may be effective. Follow respirator manufacturers directions for use. Wear the respirator for the whole time of spraying and until all vapors and mists are gone. **NO PERSONS SHOULD BE ALLOWED IN THE AREA WHERE THIS PRODUCT IS BEING USED UNLESS EQUIPPED WITH THE SAME RESPIRATOR PROTECTION RECOMMENDED FOR THE PAINTERS.**

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

To prevent skin contact, wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PROTECTIVE EQUIPMENT

Use barrier cream on exposed skin.

OTHER PRECAUTIONS

This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	10.35 lb/gal	1239 g/l
SPECIFIC GRAVITY	1.24	
BOILING POINT	255 - 320 °F	123 - 160 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	64%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

4.74 lb/gal	568 g/l	Less Water and Federally Exempt Solvents
4.74 lb/gal	568 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

Ethylbenzene is classified by IARC as possibly carcinogenic to humans (2B) based on inadequate evidence in humans and sufficient evidence in laboratory animals. Lifetime inhalation exposure of rats and mice to high ethylbenzene concentrations resulted in increases in certain types of cancer, including kidney tumors in rats and lung and liver tumors in mice. These effects were not observed in animals exposed to lower concentrations. There is no evidence that ethylbenzene causes cancer in humans.

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
100-41-4	Ethylbenzene			
		LC50 RAT	4HR	Not Available
		LD50 RAT		3500 mg/kg
108-94-1	Cyclohexanone			
		LC50 RAT	4HR	8000 ppm
		LD50 RAT		1535 mg/kg
123-86-4	n-Butyl Acetate			
		LC50 RAT	4HR	2000 ppm
		LD50 RAT		13100 mg/kg
14807-96-6	Talc			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
471-34-1	Calcium Carbonate			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
13463-67-7	Titanium Dioxide			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

5 Liters (1.3 Gallons) and Less may be Classed as LTD. QTY. OR ORM-D
Larger Containers are Regulated as:
UN1263, PAINT, 3, PG III, (ERG#128)

DOT (Dept of Transportation) Hazardous Substances & Reportable Quantities

n-Butyl acetate 5000 lb RQ
Xylenes (isomers and mixture) 100 lb RQ

Bulk Containers may be Shipped as (check reportable quantities):

UN1263, PAINT, 3, PG III, (ERG#128)

Canada (TDG)

UN1263, PAINT, CLASS 3, PG III, LIMITED QUANTITY, (ERG#128)

IMO

5 Liters (1.3 Gallons) and Less may be Shipped as Limited Quantity.
UN1263, PAINT, CLASS 3, PG III, (25 C c.c.), EmS F-E, S-E, ADR (D/E)

IATA/ICAO

UN1263, PAINT, 3, PG III

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
100-41-4	Ethylbenzene	0.1	

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.