Table 4-1

Auer Land Use Classification Scheme

Type	Description	
	Use and structures	Vegetation
I1	Heavy industrial Major chemical, steel and fabrication industries; generally 3-5 story buildings, flat roofs	Grass and tree growth extremely rare; <5% vegetation
I2	Light-moderate industrial Rail yards, truck depots, warehouses, industrial parks, minor fabrications; generally 1-3 story buildings, flat roofs	Very limited grass, trees almost total absent; <5% vegetation
C1	Commercial Office and apartment buildings, hotels; >10 story heights, flat roofs	Limited grass and trees; <15% vegetation
R1	Common residential Single family dwelling with normal easements; generally one story, pitched roof structures; frequent driveways	Abundant grass lawns and light-moderately wooded; >30% vegetation
R2	Compact residential Single, some multiple, family dwelling with close spacing; generally <2 story, pitched roof structures; garages (via alley), no driveways	Limited lawn sizes and shade trees; <30% vegetation
R3	Compact residential Old multi-family dwellings with close (<2 m) lateral separation; generally 2 story, flat roof structures; garages (via alley) and ashpits, no driveways	Limited lawn sizes, old established shade trees; <35% vegetation
R4	Estate residential Expansive family dwelling on multi-acre tracts	Abundant grass lawns and lightly wooded; >80% vegetation
A1	Metropolitan natural Major municipal, state, or federal parks, golf courses, cemeteries, campuses; occasional single story structures	Nearly total grass and lightly wooded; >95% vegetation
A2	Agricultural rural	Local crops (e.g., corn, soybean); >95% vegetation
A3	Undeveloped Uncultivated; wasteland	Mostly wild grasses and weeds, lightly wooded; >90% vegetation
A4	Undeveloped rural	Heavily wooded; >95% vegetation
A5	Water surfaces Rivers, lakes	

Table 4-1a
ESTIMATION OF SURFACE ROUGHNESS HEIGHT FOLLOWING U.S. EPA REGION VI GUIDANCE ESSROC MATERIALS, INC., LOGANSPORT

Sector ID	Land Use Types Within Sector	Predominant Land Use	Wind Direction Frequency
1	Strip mine, river, wetland, grassland, woods	Mix	4.4
2	Strip mine, river, wetland, grassland, woods	Mix	4.6
3	Cultivated, river, grassland, woods	Mix	4.5
4	Cultivated, wetland, grassland, hospital complex, woods	Mix	3.5
5	Cultivated, grassland, woods	Cultivated	5.0
6	Cultivated, grassland, woods	Cultivated	5.9
7	Cultivated, grassland, woods, tank farm	Cultivated	5.0
8	Cultivated, grassland, woods	Cultivated	6.9
9	Cultivated, grassland, woods, industrial complex	Cultivated	7.6
10	Cultivated, grassland, woods	Cultivated	11.4
11	Cultivated, grassland, woods	Cultivated	9.5
12	Cultivated, grassland, woods	Cultivated	6.1
13	Cultivated, grassland, woods	Cultivated	6.0
14	Cultivated, grassland, woods, river	Cultivated	6.2
15	Cultivated, grassland, woods	Cultivated	5.4
16	Cultivated, grassland, woods, strip mine	Mix	5.1
			97.1

Notes:

[1] Wind frequency distribution for Indianapolis (1987-1991).

[2] Calm winds comprise 2.9% of the total wind direction wind frequency.

Table 4-2
Discrete Receptors Used in the Air Quality Impact Analysis
ESSROC
Logansport, Indiana

Receptor Number	Receptor Description	UTM Coordinate (m) Easting	Northing	Surface Area-Weighted Dytwp (86)	Dytwp (87)	Dytwp (88)	Dytwp (89)	Dytwp (90)	Dytwp (Avg)
1336	Clinton	548370	4508080	0.0049	0.00243	0.00544	0.00929	0.0026	0.004932
1337	Longcliff Hospital	550820	4510050	0.00075	0.00098	0.00142	0.00128	0.00291	0.001468
1338	St. Bridget's School	552410	4511440	0.00279	0.00193	0.00156	0.00126	0.00258	0.002024
1339	Fairview Park School	552600	4509800	0.00081	0.00064	0.00092	0.00115	0.00152	0.001008
1340	Riley School	552730	4511650	0.0026	0.00177	0.00148	0.00118	0.00236	0.001878
1341	Columbia School	553070	4512310	0.00197	0.00171	0.00143	0.00104	0.00206	0.001642
1342	St. Joseph's School	553270	4511300	0.00091	0.00095	0.00081	0.00057	0.00161	0.00097
1343	McKinley School	554070	4512860	0.00164	0.00137	0.00123	0.00089	0.00168	0.001362
1344	Tipton School	555070	4511100	0.00025	0.00033	0.00052	0.00059	0.00097	0.000532
1345	Webster School	555800	4511820	0.00028	0.00035	0.00042	0.00031	0.00075	0.000422
1346	High School	556310	4511040	0.00024	0.00034	0.00054	0.0006	0.00092	0.000528
1347	Jr. High School	556700	4511330	0.00021	0.00029	0.00048	0.00053	0.00081	0.000464
1348	House	548780	4508950	0.01012	0.00383	0.00249	0.0106	0.00595	0.006598
1349	House	549210	4509940	0.01089	0.01007	0.00584	0.00493	0.01083	0.008512
1350	Trailer Housing Along River	549300	4510760	0.00479	0.0027	0.00373	0.00571	0.00434	0.004254
1351	Trailer Housing Along River	549320	4510770	0.00463	0.0027	0.0037	0.00567	0.00428	0.004196
1352	Trailer Housing Along River	549270	4510750	0.00507	0.00269	0.00377	0.00574	0.00447	0.004348
1353	Trailer Housing Along River	549160	4510870	0.00598	0.00251	0.00368	0.00376	0.00566	0.004318
1354	House	546110	4510600	0.00237	0.00188	0.00136	0.00462	0.00504	0.003054

Table 4-3
Mass-weighted and Surface Area-weighted Particle Size Distribution,
Particle Density and Scavenging Rate Coefficients
Utilized in the Dispersion Model Simulations

Average Diameter[1] (µm)	Average Mass Weighted Distribution (%)	Average Surface Area Weighted Distribution (%)	Particle Density (g/cm^3)	Scavenging Rate Coefficient Liquid $(s\text{-}mm/hr)^{-1}$	Scavenging Rate Coefficient Liquid $(s\text{-}mm/hr)^{-1}$
10.10	3.97	0.43	1.0	6.6 E-04	2.2 E-04
6.33	19.00	3.29	1.0	4.4 E-04	1.47 E-04
4.31	9.93	2.53	1.0	2.95 E-04	0.98 E-04
2.96	12.13	4.49	1.0	2.2 E-04	0.73 E-04
1.92	8.50	4.86	1.0	1.4 E-04	0.47 E-04
0.99	18.73	20.72	1.0	0.45 E-04	0.15 E-04
0.63	16.97	29.33	1.0	0.45 E-04	0.15 E-04
0.49	6.00	13.50	1.0	0.5 E-04	0.17 E-04
0.25	4.70	20.86	1.0	1.05 E-04	0.35 E-04
	99.93	100.0			

[1] Particle size distribution based on trial burn stack test results - Phase 3A/Kiln 1 (average of three passess).

Table 4-4
Summary of ISC3 Air Model Parameter Values
ESSROC

	Air Modeling Scaling Factors Used to Evaluate Land-based Exposures		Maximum Exposure Area
Cyv	unitized yearly average air concentration from vapor phase (ug-s/g-m^3)		0.0062
Cyp	unitized yearly average air concentration from particle phase (ug-s/g-m^3)	surface area weighted mass weighted	0.0062 0.00608
Dywv	unitized yearly average wet deposition from vapor phase (s/m^2-yr)		0.00389
Dydp	unitized yearly average dry deposition from particle phase (s/m^2-yr)	surface area weighted mass weighted	0.00019 0.00092
Dywp	unitized yearly average wet deposition from particle phase (s/m^2-yr)	surface area weighted mass weighted	0.00224 0.00374
Dytwp	unitized yearly average total (wet and dry) deposition from particle phase (s/m^2-yr)	surface area weighted mass weighted	0.00247 0.00467

Table 4-4
Summary of ISC3 Air Model Parameter Values
ESSROC

Air Modeling Scaling Factors Used to Evaluate Watershed Exposure Pathways			France Park	Wabash and Eel Rivers
Cyv	unitized yearly average air concentration from vapor phase (ug-s/g-m^3)		0.00415	0.0035
Cyp	unitized yearly average air concentration from particle phase (ug-s/g-m^3)	surface area weighted mass weighted	0.00415 0.00412	0.00355 0.00346
Dywv	unitized yearly average wet deposition from vapor phase (s/m^2-yr)		0.00386	0.00027
Dydp	unitized yearly average dry deposition from particle phase (s/m^2-yr)	surface area weighted mass weighted	0.00008 0.00035	0.00007 0.00033
Dywp	unitized yearly average wet deposition from particle phase (s/m^2-yr)	surface area weighted mass weighted	0.00216 0.00367	0.00018 0.000247
Dytwp	unitized yearly average total (wet and dry) deposition from particle phase (s/m^2-yr)	surface area weighted mass weighted	0.00223 0.00403	0.00026 0.00058

Table 4-5

Modeled Air Concentrations and Deposition Fluxes for LWDF and CKD Waste Pile Fugitive Emissions

ESSROC

Logansport, Indiana

Chemical	CKD Fugitive Emissions lbs/yr	CKD Fugitive Emissions g/sec	CKD Fugitive Emissions g/sec/m2	CKD Pile Impact (Total Dep.) g/m2	CKD Pile Impact (Wet Dep.) g/m2	CKD Pile Impact (Dry Dep.) g/m2	LWDF Long Term Emissions lb/yr	LWDF Long Term Emissions g/sec	LWDF Impact (Concentration) µg/m3
Metals									
Antimony	0.077	1.108E-06	1.863E-11	3.76239E-07	2.20145E-08	3.54225E-07			
Arsenic	0.044	6.329E-07	1.064E-11	2.14994E-07	1.25797E-08	2.02414E-07			
Barium	1.734	2.494E-05	4.195E-10	8.47271E-06	4.95755E-07	7.97696E-06			
Beryllium	0.01	1.438E-07	2.419E-12	4.88622E-08	2.85902E-09	4.60032E-08			
Cadmium	0.108	1.553E-06	2.613E-11	5.27712E-07	3.08775E-08	4.96835E-07			
Chromium (VI)									
Chromium, total	0.385	5.538E-06	9.314E-11	1.8812E-06	1.10072E-07	1.77112E-06			
Lead	3.942	0.0000567	9.536E-10	1.92615E-05	1.12703E-06	1.81345E-05			
Mercury	0.014	2.014E-07	3.387E-12	6.84071E-08	4.00263E-09	6.44045E-08			
Nickel	0.248	3.567E-06	5.999E-11	1.21178E-06	7.09038E-08	1.14088E-06			
Selenium	0.105	1.51E-06	2.54E-11	5.13054E-07	3.00198E-08	4.83034E-07			
Silver	0.078	1.122E-06	1.887E-11	3.81126E-07	2.23004E-08	3.58825E-07			
Thallium	0.105	1.51E-06	2.54E-11	5.13054E-07	3.00198E-08	4.83034E-07			
Volatile Organic Compounds									
Acetone							7608	0.109430137	0.062650894
Acrylonitrile								0	0
Allyl Chloride								0	0
Benzene							49	0.000704795	0.000403509
Bromodichloromethane								0	0
Bromomethane								0	0
Bromoform								0	0
1,3-Butadiene								0	0
2-Butanone							3127	0.044977397	0.02575044

Table 4-5
Modeled Air Concentrations and Deposition Fluxes for LWDF and CKD Waste Pile Fugitive Emissions
ESSROC
Logansport, Indiana

Chemical	CKD Fugitive Emissions lbs/yr	CKD Fugitive Emissions g/sec	CKD Fugitive Emissions g/sec/m2	CKD Pile Impact (Total Dep.) g/m2	CKD Pile Impact (Wet Dep.) g/m2	CKD Pile Impact (Dry Dep.) g/m2	LWDF Long Term Emissions lb/yr	LWDF Long Term Emissions g/sec	LWDF Impact (Concentration) µg/m3
Carbon disulfide								0	0
Carbon tetrachloride								0	0
Chlorobenzene							97	0.001395205	0.000798782
Chloroethane								0	0
Chloroform							66	0.000949315	0.000543501
Chloromethane								0	0
Cumene (isopropylbenzene)							0	0	0
1,2-Dichloropropane								0	0
Dimethyl disulfide								0	0
Dibromochloromethane								0	0
Dibromomethane								0	0
1,2-Dibromomethane								0	0
1,2-Dichlorobenzene							0	0	0
1,3-Dichlorobenzene								0	0
1,4-Dichlorobenzene								0	0
1,1-Dichloroethane								0	0
1,2-Dichloroethane								0	0
1,1-Dichloroethene								0	0
cis 1,2-Dichloroethene								0	0
trans 1,2-Dichloroethene								0	0
1,2-Dichloropropane								0	0
cis 1,3-Dichloropropene								0	0
trans 1,3-Dichloropropene							155	0.002229452	0.001276405
trans-1,4-Dichloro-2-butene								0	0
Dichlorodifluoromethane								0	0
Ethyl Acetate							1132	0.016282192	0.009321873
Ethyl Acrylate							4	5.75342E-05	3.29395E-05
Ethylbenzene							203	0.002919863	0.001671679

Table 4-5

Modeled Air Concentrations and Deposition Fluxes for LWDF and CKD Waste Pile Fugitive Emissions

ESSROC

Logansport, Indiana

Chemical	CKD Fugitive Emissions lbs/yr	CKD Fugitive Emissions g/sec	CKD Fugitive Emissions g/sec/m2	CKD Pile Impact (Total Dep.) g/m2	CKD Pile Impact (Wet Dep.) g/m2	CKD Pile Impact (Dry Dep.) g/m2	LWDF Long Term Emissions lb/yr	LWDF Long Term Emissions g/sec	LWDF Impact (Concentration) µg/m3
Iodomethane								0	0
Isobutyl Alcohol							75	0.001078767	0.000617615
Isopropyl Acetate							40	0.000575342	0.000329395
Isopropyl Alcohol							102	0.001467123	0.000839957
Methyl Alcohol							4516	0.064956164	0.037188675
Methyl chloroform							248	0.003567123	0.002042248
Methyl Isobutyl Ketone							332	0.004775342	0.002733977
n-Butyl Acetate							1579	0.022711644	0.01300286
n-Butyl Alcohol							9	0.000129452	7.41138E-05
Propyl Acetate							88	0.001265753	0.000724669
Methylene Chloride							9403	0.13524863	0.077432486
4-Methyl-2-Pentanone								0	0
n-Hexane							53	0.000762329	0.000436448
P-Cymene								0	0
Styrene							31	0.00044589	0.000255281
1,1,2,2-Tetrachloroethane								0	0
Tetrachloroethylene							177	0.00254589	0.001457572
1,1,1-Trichloroethane								0	0
1,1,2-Trichloroethane							9	0.000129452	7.41138E-05
Trichloroethene							168	0.002416438	0.001383458
Trichlorofluoromethane							1831	0.026336301	0.015078048
Toluene							3163	0.045495205	0.026046895
Xylene (m/p)							1000	0.014383562	0.00823487
o-Xylene								0	0
Vinyl acetate							40	0.000575342	0.000329395
Vinyl chloride								0	0