APPENDIX J

Estimation of Air Emissions and Exposure Point Concentrations

APPENDIX J

Estimation of Exposure Point Concentrations in Air

A. Introduction

The following approaches were used to estimate the exposure point concentrations in air resulting from the emission of dust and volatile chemicals. ENVIRON recognizes that the models described below do not represent the most refined emissions models available; however, the models applied in this assessment are intended to be conservative. If estimated exposures through the inhalation pathway pose a significant risk, the use of refined models will be evaluated.

B. Estimation of Fugitive Dust Emissions

Fugitive dust emissions are estimated using the particulate emission factor (PEF) approach presented by USEPA (2001). A PEF value relates the concentration of a contaminant in soil to the concentration of a contaminant in dust particles in the air. All of the variables used in the following analyses are listed along with site-specific and default assumptions and references in Table J-1, and the results of the following PEF calculations are presented in Table J-2.

1. Fugitive Dust Emissions During WRF Construction – WRF Construction Worker

WRF construction workers are assumed to be exposed to contaminants associated with fugitive dusts generated during the WRF expansion project. Almost all of the WRF construction worker activities will be conducted in the southern exposure area (SEA). The primary activities in the northern exposure area (NEA) will be grading and staging of equipment; whereas, in the SEA, extensive excavation, earth moving, and construction will be performed. Thus, significantly greater exposure will occur to an individual in the SEA than in the NEA. For the purposes of this assessment, the WRF construction worker scenario represents only the exposure that occurs in the SEA but includes the sources in both the SEA and NEA. The limited exposure occurring in the NEA is assumed to be encompassed by the WRF construction worker in the SEA.

The sources of dust emissions to which a WRF construction worker in the SEA will be exposed include the following:

- Truck traffic on unpaved roads in the SEA;
- Construction activities (excavation and dozing) in the SEA;
- Wind erosion in the SEA;
- Grading in the NEA;
- Equipment staging (i.e., traffic on unpaved roads/lots) in the NEA; and
- Wind erosion in the NEA.

The modeling of each of these fugitive dust emission sources during the WRF construction is presented in the following sections. Because this risk assessment focuses only on WRF construction workers in the SEA, fugitive dust emissions generated in the SEA are considered local (i.e., on-site) sources; whereas, fugitive emissions generated in the NEA are consider off-site sources. As such, emissions from each area of the site must be modeled differently according to the procedures set forth by USEPA (2001) with respect to estimating WRF construction worker exposure.

a. WRF Construction Worker Exposure to Fugitive Dusts Generated in the SEA

<u>Fugitive Dust Emissions from Unpaved Road Traffic</u>

In the SEA, traffic on unpaved roads will be construction related (i.e., delivery of materials and general movement across the site). The site-specific formula for estimation of the PEF for unpaved road traffic in the SEA is as follows:

Equation J - 1

$$PEF_{road,SEA} = Q/C_{sr} \times \frac{1}{F_D} \times \frac{T \times A_R}{\frac{2.6 \times (s/12)^{0.8} (W/3)^{0.4}}{(M_{dry}/0.2)^{0.3}} \times \left[\frac{365-p}{365}\right] \times 281.9 \times \Sigma VKT}$$

where,

PEF_{road}	=	particulate emission factor for unpaved road traffic (m^3/kg);
Q/C_{sr}	=	inverse of 1-hour air concentration along a straight road segment bisecting a square site (g/m^2-s per kg/m^3) (Equation J-2);
F_D	=	dispersion correction factor (unitless), 0.185;
T	=	total time over which construction occurs (s), 21,600,000;
A_R	=	Surface area of the contaminated road segment (m^2), 2,400;

s	=	road surface silt content (%), 17.1;
ΣVKT	=	sum of fleet vehicle kilometers traveled during the exposure duration (km), 5,600;
W	=	mean vehicle weight (tons), 4.6;
M_{dry}	=	road surface material moisture content under dry, uncontrolled conditions (%), 0.2; and
p	=	number of days per year with at least 0.01 inches of precipitation (days), 30.

The values applied in Equation J-1 are summarized in Table J-1 and discussed below.

The total time over which construction occurs (T) was calculated as follows:

$$T = 8 \text{ hr/day} \times 3{,}600 \text{ sec/hr} \times 250 \text{ day/yr} \times 3 \text{ yr} = 21{,}600{,}000 \text{ sec}$$

Consistent with USEPA (2001) guidance, the surface area of contaminated road segment (A_R) was calculated assuming that a 6-meter wide road segment divides the SEA evenly, resulting in a roadway of approximately 0.4 kilometers. Therefore:

$$A_R = 400\text{m} \times 6\text{m} = 2{,}400\text{m}^2$$

The road surface silt content (s) was calculated from the site-specific data collected in the May 2001 site characterization program within the SEA. The silt content value of 17.1% of was calculated as the average of the fraction of soil that passed though a number 200 sieve for soil samples collected from the 0-1 foot interval, as presented in Appendix D.

The sum of vehicle kilometers traveled in the SEA was calculated based on the following assumptions:

For dump trucks

- Black and Veatch estimate that approximately 20,000 m^3 of raw materials (e.g., concrete) will be delivered to the site
- 10 m^3 per load
- 0.4 km on-site travel (see derivation of A_R above)
- (20,000 m^3) × (0.4 km/load) / (10 m^3/load) = <u>800 km</u>

For light trucks

- 16 cross-site trips per day
- 0.4 km per trip
- 750 days (3 years, 250 days per year) construction duration
- (16 trips/day) × (0.4 km/trip) × (750 days) = 4,800 km

Thus, the ΣVKT in the SEA is 5,600 km.

The mean vehicle weight (W) was calculated as a weighted average of dump trucks (20 tons) and light trucks (2 tons), based on vehicle kilometers traveled in each area of the site. In the SEA, dump trucks and light trucks travel 800 and 4,800 kilometers, respectively (see derivation above). The weighted average vehicle weight is, therefore, calculated as:

$$W = \frac{800}{5{,}600} \times 20 \text{ tons} + \frac{4{,}800}{5{,}600} \times 2 \text{ tons}$$

$$W = 4.6 \text{ tons}$$

The road surface moisture content under dry, uncontrolled conditions (M_{dry}) was set to the USEPA (2001) recommended default value of 0.2%. The number of days per year with at least 0.01 inches of precipitation (p) was estimated using Exhibit E-1 in USEPA 2001.

The Q/C_{sr} value of 13.886 for on-site exposure to emissions generated by unpaved road traffic is calculated according to the following equation:

Equation J - 2

$$Q/C_{sr} = A \times \exp\left[\frac{(\ln A_s - B)^2}{C}\right]$$

where,

Q/C_{sr}	=	inverse of the 1-hour average air concentration along a straight road segment bisecting a square site (g/m^2-s per kg/m^3);
A	=	constant, 12.9351 (default, USEPA 2001);
B	=	constant, 5.7383 (default, USEPA 2001);
C	=	constant, 71.7711 (default, USEPA 2001); and
A_s	=	areal extent of surface contamination (acres), 42.5.

The Q/C value derived above is based on modeling conducted by USEPA (2001) that estimates one-hour average air concentrations. USEPA (2001) guidance provides a conversion factor, F_D, of 0.185 to convert the one-hour average concentrations to annual average air concentrations appropriate for the purposes of this assessment.

The resulting WRF construction worker PEF for unpaved traffic in the SEA is 6.45×10^5 m^3/kg.

Fugitive Dust Emissions from Other Construction Activities and Wind Erosion

In addition to unpaved road traffic, other construction activities planned for the SEA, including excavation and dozing, will generate fugitive dust emissions. Wind erosion of bare soil will also result in dust emissions. Since these sources may occur concurrently and over different durations, the total mass emitted from each construction operation is averaged over the entire area of contamination (172,000 m^2) and duration of construction (21,600,000 seconds), as recommended by USEPA (2001).

Excavation

The total mass emitted from excavation operations associated with WRF construction in the SEA is estimated according to the following equation:

Equation J - 3

$$M_{excav} = 0.35 \times 0.0016 \times \frac{\left(\frac{U_m}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \times \rho_{soil} \times V_{excav} \times N_A \times 10^3\, g/kg$$

where,

M_{excav}	=	unit mass emitted from excavation (g);
0.35	=	PM_{10} particle size multiplier (unitless);
U_m	=	mean wind speed during construction (m/s), 4.11;
M	=	gravimetric soil moisture content (%), 9.5;
ρ_{soil}	=	in-situ soil density (includes water) (Mg/m^3), 1.79;
V_{excav}	=	volume of excavation (m^3), 75,000; and
N_A	=	number of times soil is dumped (unitless), 1.

The mean wind speed (U_m) is based on 36 years of wind speed data collected by the National Oceanic and Atmospheric Administration (NOAA) (1985). The gravimetric soil moisture content (M) is based on data collected from all depths during the May 2001 site characterization program (Appendix D).

The in-situ soil density differs from the measured bulk density of soil at the site because it includes water and is calculated according to the following formula:

Equation J - 4

$$\rho_{soil} = (1 - \theta_{total}) \times \rho_{particle} + \theta_{water}$$

where,

θ_{total} = site-specific total porosity (unitless), 0.39;

$\rho_{particle}$ = soil particle density (Mg/m^3), 2.65 (assumed); and

θ_{water} = site-specific water-filled porosity (unitless), 0.17.

The total porosity (θ_{total}) and the water-filled porosity (θ_{water}) are based on data collected from all depths during the May 2001 site characterization program.

The excavation volume is taken from construction documents prepared by Black and Veatch for the WRF expansion project. The number of times that soil is dumped (N_A) assumes that excavated soil is dumped once, on average, prior to dozing (dozing calculations are described later in this appendix).

The result of the above analysis is 19,124 g PM_{10} emitted from excavation activities in the SEA

Dozing

The total mass emitted from dozing operations in the SEA is calculated according to the following:

Equation J - 5

$$M_{doz} = 0.75 \times \frac{0.45(s)^{1.5}}{(M)^{1.4}} \times \frac{\Sigma VKT}{S} \times 10^3 \, g/kg$$

where,

M_{doz} = unit mass emitted from dozing operations (g);

0.75 = PM_{10} scaling factor (unitless)

s	=	soil silt content (%), 18.6;
M	=	gravimetric soil moisture content (%), 9.5;
ΣVKT	=	sum of dozing kilometers traveled (km), 11,100; and
S	=	average dozing speed (kph), 11.4 (default, USEPA 2001).

The soil silt content (s) and gravimetric soil moisture content (M) were derived from data collected during the May 2001 site characterization program (Appendix D). The sum of dozing kilometers traveled is calculated assuming that all 75,000 m^3 of excavated soil will require dozing. Based on information provided in Means (2002), the operational efficiency of a dozing operation is approximately 77 m^3/hr. Consistent with USEPA (2001) recommended default values, a dozing speed of 11.4 kph was applied to this model. Therefore, the sum of dozing kilometers traveled is calculated as follows:

$$\Sigma VKT = \frac{75{,}000 m^3}{77 m^3 / hr} \times 11.4 \text{ km/hr}$$
$$\Sigma VKT = 11{,}100 \text{ km}$$

The result of the above analysis is 1,127,582 g PM_{10} emitted from dozing operations in the SEA.

Wind Erosion

The total mass of wind-blown dust emitted was estimated based on the approach recommended by USEPA (2001). This approach is derived from a previous USEPA methodology (USEPA 1985) developed by Cowherd et al., summarized as follows:

Equation J - 6

$$M_{wind} = 0.036 \times (1 - V) \times \left(\frac{U_m}{U_t} \right)^3 \times F(x) \times A_{surf} \times ED \times 8{,}760 hr / yr$$

where,

M_{wind}	=	unit mass emitted from wind erosion (g);
V	=	fraction of vegetative cover (unitless), 0;
U_m	=	mean annual wind speed (m/s), 4.11;
U_t	=	threshold value of wind speed at 7 meters (m/s), 11.32;

$F(x)$	=	function dependent on U_t/U_m (unitless);
A_{surf}	=	areal extent of surface soil contamination (m^2), 172,000; and
ED	=	exposure duration (yr), 3.

The fraction of vegetative cover was assumed to be zero during construction activities, the annual wind speed was derived from 36 years of wind speed data as published by NOAA (1985), a threshold wind speed at 7 meters of 11.32 m/s is provided by USEPA (2001), and F(x) was calculated from the following equation cited by USEPA (1985):

Equation J - 7

$$F(x) = (0.18)(8x^3 + 12x)\exp(-x^2)$$

where,

Equation J - 8

$$x = 0.886\left(\frac{U_t}{U_m}\right)$$

The result of the above analysis is 529,561 g PM_{10} emitted via wind erosion in the SEA.

For each of the above unit mass estimates (M_i) for other construction activities and wind erosion, an emission flux is estimated according to the following equation:

Equation J - 9

$$\langle J'_T \rangle_i^{SEA} = \frac{M_i}{A_c \times T}$$

where,

$\langle J'_T \rangle_i^{SEA}$	=	total time-averaged PM_{10} unit emission flux for emission source i in the SEA (i = excavation, dozing, or wind erosion) (g/m^2-s);
A_c	=	areal extent of site soil contamination (m^2); 172,000; and
T	=	duration of construction (s), 21,600,000.

For WRF construction workers, the PEF value associated with construction activities and wind erosion in the SEA is calculated using a Q/C value calculated for the center of a square area according to the following equation:

Equation J - 10

$$Q/C_{sa} = A \times \exp\left[\frac{(\ln A_s - B)^2}{C}\right]$$

where,

Q/C_{sa}	=	inverse of the 1-hour average air concentration at the center of a square emission source (g/m^2-s per kg/m^3), 6.7358;
A	=	constant, 2.4538 (default, USEPA 2001);
B	=	constant, 17.5660 (default, USEPA 2001);
C	=	constant, 189.0426 (default, USEPA 2001); and
A_s	=	areal extent of surface contamination (acres), 42.5.

In addition, the WRF construction worker PEF includes a dispersion correction factor (F_D). For construction duration periods of one year or longer, F_D equals 0.185. The PEF for a WRF construction worker associated with construction activities other than unpaved road traffic in the SEA is calculated as follows:

Equation J - 11

$$PEF_i = Q/C \times \frac{1}{F_D} \times \frac{1}{\langle J'_T \rangle_i^{SEA}}$$

The mass emitted, emission flux, Q/C, and resulting PEF values associated with each of the above-mentioned emissions sources are presented in Table J-2.

b. WRF Construction Worker Exposure to Fugitive Dusts Generated in the NEA

For dust generated in the NEA and transported by wind to the SEA, the mass of dust emitted due to each source (truck traffic, grading, and wind erosion) is calculated as described below.

Fugitive Dust Emissions from Unpaved Road Traffic

The NEA will be used for equipment storage within a designated staging area. Thus, some limited traffic in this area will occur. The site-specific formula for estimation of the mass of fugitive dust emitted as a result of unpaved road traffic is as follows:

Equation J - 12

$$M_{road} = \frac{2.6 \times (s/12)^{0.8} \times (W/3)^{0.4}}{(M_{dry}/0.2)^{0.3}} \times \left(\frac{365-p}{365}\right) \times 281.9 \times \Sigma VKT$$

where,

s	=	road surface silt content (%), 18;
ΣVKT	=	sum of fleet vehicle kilometers traveled during the exposure duration (km), 750;
W	=	mean vehicle weight (tons), 2;
M_{dry}	=	road surface material moisture content under dry, uncontrolled conditions (%), 0.2; and
p	=	number of days per year with at least 0.01 inches of precipitation (days), 30.

The values applied in Equation J-12 are analogous to those applied in Equation J-1 and are summarized in Table J-1. The NEA-specific values for these variables are discussed below.

The road surface silt content (s) was calculated from the site-specific data collected in May 2001 within the NEA. The value assigned to this variable (18%) was calculated as the average of the fraction of soil that passed through a number 200 sieve for samples collected from the 0-5 foot interval, as presented in Appendix D.

The mean vehicle weight in the NEA was set at 2 tons, since it is assumed that vehicle traffic in the NEA will be limited to light trucks and small equipment being staged.

The road surface moisture content under dry, uncontrolled conditions (M_{dry}) was set to the USEPA recommended default value of 0.2%. The number of days per year with at least 0.01 inches of precipitation (p) was estimated using Exhibit E-1 in USEPA 2001.

Finally, to calculate the sum of vehicle kilometers traveled in the NEA, it was assumed that vehicle traffic is limited to light trucks and that there is a total of one kilometer of vehicle traffic in the staging area for each of the 750 days of construction (i.e., 750 km total vehicular traffic in the NEA)[1]. Thus, the mass of fugitive dust emitted from truck traffic in the NEA during construction is 593,360 g

Grading

The total mass of dust emitted as a result of grading operations in the NEA is calculated according to the following:

Equation J - 13

$$M_{grade} = 0.60 \times 0.0056(S)^{2.0} \times \Sigma VKT \times 10^3 \, g/kg$$

where,

M_{grade}	=	unit mass emitted from grading operations (g)
0.60	=	PM_{10} scaling factor (unitless)
S	=	average grading speed (kph), 11.4 (default, USEPA 2001)
ΣVKT	=	sum of grading kilometers traveled (km), 129;

The ΣVKT value was estimated assuming a 3.7-meter (12 foot) blade, a 50% overlap for grading passes, and an area to be graded of 238,000 m^2, i.e.,

[1] This is based on an estimated 10 pieces of equipment being staged, each transported 100 meters across the NEA

$$\Sigma VKT = \frac{238{,}000m^2}{3.7m \times 50\%}$$
$$\Sigma VKT = 129km$$

The result of the above analysis is 56,330 g of PM_{10} emitted as a result of grading operations in the NEA

Wind Erosion

As described previously, the mass of dust emitted due to wind erosion was calculated as follows:

Equation J - 14

$$M_{wind} = 0.036 \times (1 - V) \times \left(\frac{U_m}{U_t}\right)^3 \times F(x) \times A_{surf} \times ED \times 8{,}760hr/yr$$

where,

M_{wind}	=	unit mass emitted from wind erosion (g);
V	=	fraction of vegetative cover (unitless), 0;
U_m	=	mean annual wind speed (m/s), 4.11;
U_t	=	threshold value of wind speed at 7 meters (m/s), 11.32;
F(x)	=	function dependent on U_t/U_m (unitless);
A_{surf}	=	areal extent of surface soil contamination (m^2), 238,000; and
ED	=	exposure duration (yr), 3.

The fraction of vegetative cover was assumed to be zero during construction activities, the annual wind speed was derived from 36 years of wind data as published by NOAA (1985), a threshold wind speed at 7 meters of 11.32 m/s is provided by USEPA (2001), and F(x) was calculated from the following equation cited by USEPA (1985):

Equation J - 15

$$F(x) = (0.18)(8x^3 + 12x)\exp(-x^2)$$

where,

Equation J - 16

$$x = 0.886\left(\frac{U_t}{U_m}\right)$$

The result of the above analysis is 732,765 g PM_{10} emitted via wind erosion in the NEA.

For each of the he unit mass estimates for other construction activities and wind erosion in the NEA, the time-averaged PM_{10} flux is calculated according to the following equation:

Equation J - 17

$$\langle J'_T \rangle_i^{NEA} = \frac{M_i}{A_c \times T}$$

where,

$\langle J'_T \rangle_i^{NEA}$	=	time-averaged PM_{10} unit emission flux for emission source i in the NEA (i = grading or wind erosion) (g/m^2-s);
A_c	=	areal extent of site soil contamination (m^2); 238,000; and
T	=	duration of construction (s), 21,600,000.

WRF construction worker exposure is being evaluated for an individual located in the SEA; thus, an off-site Q/C value is appropriate when estimating the dust emissions generated in the NEA and transported to the SEA. Therefore, for activities in the NEA, the Q/C value for a WRF construction worker's exposure to fugitive dust emissions generated in the NEA is calculated according to the following equation:

Equation J - 18

$$Q / C_{off} = A \times \exp\left[\frac{(\ln A_s - B)^2}{C}\right]$$

where,

Q/C_{off}	=	inverse of the mean air concentration at the site boundary (g/m^2-s per kg/m^3);
A	=	constant, 12.1784 (Las Vegas, NV);
B	=	constant, 24.5606 (Las Vegas, NV);
C	=	constant, 296.4751 (Las Vegas, NV); and
A_s	=	areal extent of surface contamination (acres), 58.8.

These values are combined to calculated activity-specific PEF values for a WRF construction worker associated with construction activities in the NEA:

Equation J - 19

$$PEF_i = Q / C_{off} \times \frac{1}{\langle J'_T \rangle_i^{NEA}}$$

The mass emitted, emission flux, Q/C, and resulting PEF values associated with each of the above-mentioned emissions sources are presented in Table J-2.

2. Fugitive Dust Emissions During WRF Construction – Off-site Resident and Off-site Worker

The off-site resident and off-site worker (collectively, the off-site populations) are assumed to be exposed to the same emissions sources as the WRF construction worker; however, the relevant exposure point for the off-site population is at the boundary of the site.

With the exception of dust emitted from unpaved road traffic, the equations used to estimate the unit mass emitted are analogous to those previously presented in this appendix (Equations J-3 through J-8), and are not repeated in this section. For the off-site populations, the unit mass emitted from unpaved road traffic is estimated separately for the SEA and NEA, as follows:

Equation J - 20

$$M_{road} = \frac{2.6 \times (s/12)^{0.8} \times (W/3)^{0.4}}{(M_{dry}/0.2)^{0.3}} \times \left(\frac{365-p}{365}\right) \times 281.9 \times \Sigma VKT$$

where,

s	=	road surface silt content (%), 17.1 in the SEA and 18 in the NEA;
ΣVKT	=	sum of fleet vehicle kilometers traveled during the exposure duration (km), 5,600 in the SEA and 750 in the NEA;
W	=	mean vehicle weight (tons), 4.6 in the SEA and 2 in the NEA;
M_{dry}	=	road surface material moisture content under dry, uncontrolled conditions (%), 0.2 in both the SEA and NEA; and
p	=	number of days per year with at least 0.01 inches of precipitation (days), 30 in both the SEA and NEA.

The derivation of the values presented above is discussed previously in this appendix (Section B.1.a for the SEA and B.1.b for the NEA). All site-specific and default assumptions and references for off-site fugitive dust emissions are presented in Table J-1.

The time-averaged unit emission flux for the off-site population is calculated independently for each emission source within both the SEA and NEA according to the following generic equation:

Equation J - 21

$$\langle J_T^{off} \rangle_i = \frac{M_i}{A_{site} \times ED \times 31{,}536{,}000 s/yr}$$

In the above equation, M_i is used to represent the total mass of dust emitted from emission source i in either the SEA or NEA. For example, if calculating the time-averaged unit emissions from the SEA for the off-site population, M_i would represent each of the following: emissions associated with unpaved road traffic (Equation J-20), excavation (Equation J-3), dozing (Equation J-5), and wind erosion (Equation J-6). For the NEA, M_i represents the unit emissions associated with each of the following: unpaved road traffic (Equation J-20), grading (Equation (J-13), and wind erosion (Equation J-14). The results of this analysis for each emission source in both the SEA and NEA are presented in Table J-2

As mentioned previously, it is assumed that the off-site populations are exposed at the site boundary. As such, a site-specific off-site Q/C value for the off-site populations was determined according to the following:

Equation J - 22

$$Q/C_{off} = A \times \exp\left[\frac{(\ln A_s - B)^2}{C}\right]$$

where,

Q/C_{off}	=	inverse of the mean air concentration at the site boundary (g/m^2-s per kg/m^3);
A	=	constant, 12.1784 (Las Vegas, NV);
B	=	constant, 24.5606 (Las Vegas, NV);
C	=	constant, 296.4751 (Las Vegas, NV); and
A_s	=	areal extent of surface contamination (acres), 42.5 in the SEA and 58.8 in the NEA.

The site-specific values for the constants A, B, and C were found in Exhibit E-3 in USEPA 2001; the Las Vegas, NV meteorological station was used. The resulting Q/C values for the SEA and NEA are 52.4836 and 50.1631g/m^2-sec per kg/m^3, respectively.

The PEF for off-site populations is calculated independently for each emission source in both the SEA and NEA as follows:

Equation J - 23

$$PEF_i = Q/C_{off} \times \frac{1}{\langle J_T^{off} \rangle_i}$$

The estimated PEF for off-site populations is summarized in Table J-2.

3. Future Fugitive Dust Emissions (Post WRF Construction)

After the completion of the WRF expansion project, fugitive dust emissions from the WRF site are assumed to be limited to wind erosion in the NEA, which may remain undeveloped. Potentially exposed populations include maintenance workers in the NEA and SEA, a child trespassing on the NEA, a default construction worker in the NEA, and off-site residents and workers.[2] The methodology used to estimate the exposure to airborne COPCs associated with fugitive dust in the future (i.e., after the completion of the WRF expansion project) is analogous to that previously described in the Sections B.1 and B.2 of this appendix, as summarized in Table J-3.

In the estimation of the unit mass and emission rate of fugitive dust emitted from wind erosion in the NEA (Equation J-14 through J-17), the exposure duration (ED) is required. The relevant exposure duration for each population of concern and associated assumptions are discussed in Chapter V of this risk assessment and are summarized below:

Trespassing Child in the NEA:	6 years
Maintenance Worker in the NEA:	25 years
Maintenance Worker in the SEA	25 years
Off-site Resident:	30 years
Off-site Worker:	25 years
Default Construction Worker:	1 year

Because the characteristics of future construction activities (if any) are unknown, the default construction worker exposures are conservatively assumed to be the same as those for the WRF construction worker and the PEF values applicable to the WRF construction worker are assumed for the default NEA construction worker.

For the remaining future populations exposed while within the NEA (i.e., NEA maintenance worker and a trespassing child) an on-site Q/C value (Q/C_{wind}) is required; the remaining variables required for the post WRF construction analysis are described previously in this appendix (Table J-1). It is assumed that these additional NEA populations are exposed at the center point of the NEA and the applicable Q/C value is calculated as follows:

Equation J - 24

$$Q/C_{wind} = A \times \exp\left[\frac{(\ln A_s - B)^2}{C}\right]$$

[2] If the NEA were completely developed, dust emissions from the site would be virtually nonexistent; thus, for the purposes of this assessment, it was assumed that 50% remained undeveloped. This assumption is applied for the NEA maintenance worker scenarios only. As a worst case, it is assumed that the NEA remains undeveloped for the SEA maintenance worker, trespassing child, and off-site exposure scenarios.

where,

Q/C_{wind}	=	inverse of the mean air concentration at the center of a square emission source (g/m^2-s per kg/m^3), 39.1819;
A	=	constant, 13.3093 (Las Vegas, NV);
B	=	constant, 19.8387 (Las Vegas, NV);
C	=	constant, 230.1652 (Las Vegas, NV); and
A_s	=	areal extent of surface contamination (acres), 58.8.

The values for the constants A, B, and C in Equation J-24 are found in Exhibit D-2 of USEPA 2001. The variable inputs and site-specific and default assumptions used in this analysis are presented in Table J-1. The results are presented in Table J-2.

4. Fugitive Dust Emissions Control

Clark County, Nevada is currently classified by USEPA as a "serious" nonattainment area for particulate matter (PM_{10}). As such, the County has been required to develop measures to significantly curtail the amount of fugitive dust emissions within the area, including the preparation and implementation of a PM_{10} State Implementation Plan (SIP) and County Air Quality Regulations for the control of dust. Analyses conducted for the June 2001 PM_{10} SIP indicate that more than 80 percent of the airborne PM_{10} in the Las Vegas Valley is due to fugitive dust sources, primarily including construction-related activities, wind-blown dust, disturbed vacant land, and on-road sources. The promulgation of the County Air Quality Regulations and the requirements of the SIP are expected to result in significant County oversight of the WRF expansion project, with possible greater involvement at the site due to the project's large size, high visibility, and government ownership.

The fugitive dust sources associated with the proposed and possible future uses of the WRF expansion site are addressed in the SIP and County Air Quality Regulations, including:

- Construction activities (including both active areas, inactive areas, and haul roads), which will be associated with the WRF expansion and possible future construction activity in the northern exposure area;
- Wind-blown dust, which could occur from the northern and southern exposure areas during and after WRF construction; and

- Disturbed vacant land, which may be present in the northern exposure area after WRF construction is complete.

The County Air Quality Regulations provide for numerous control requirements on these types of sources, as detailed in Table J-4:

As discussed in the previous portions of this appendix, estimates of dust emissions were developed for the purposes of this risk assessment for a variety of sources, including wind-blown dust emissions and construction-related emissions (fugitive emissions from haul roads and specific construction activities – grading, excavating, dozing, etc.). Based on USEPA approaches, ENVIRON developed estimates of uncontrolled emissions from these sources. However, because of the importance of fugitive dust emissions in the Clark County area, the estimates developed by ENVIRON will significantly over-predict actual emissions, because the USEPA model does not directly account for dust controls. Clark County, in preparing the SIP, estimates that the implementation of the control measures identified in Table J-4 will result in of reduction of fugitive dust emissions from the identified sources of approximately 90 percent. This level of reduction is consistent with other sources of information on the effectiveness of fugitive dust emissions control measures:

- The U.S. Department of the Interior, Bureau of Mines (1987) has estimated that fugitive dust emissions from unpaved haul roads can be controlled by 95 percent through the application of dust suppressants.

- The Mojave Desert Air Quality Management District in California (MDAQMD 1997) estimates the effectiveness of water application as a control measure for roads based on the following equation:

  $$\% \text{ control} = 100 - (0.0012 \times A \times D \times T/I)$$

  which includes the quantity of water applied (I), traffic rate (D), evaporation rate (A), and period between applications (T). Using this equation, ninety percent control could be achieved at the WRF site under the following reasonable assumptions:

  - An annual class A pan evaporation rate of 130 inches (USEPA 1995);

  - 4 trucks per hour;

  - 4 hours between water application; and

- A water application rate of 0.25 gal/yd^3.

- USEPA (1995) also indicates that 90 percent reduction in dust emissions is achievable through application of petroleum-resin dust suppressants.[3]

- Manufacturer information indicates that application of commercial dust suppressants reduce emissions up to 98 percent.

Thus, for the purposes of this assessment, it was assumed that fugitive dust emissions from the various sources associated with the WRF site (both during and after construction of the WRF)[4] would be controlled by 90 percent to comply with Clark County Air Quality Regulations. The resulting air concentrations for the exposure scenarios evaluated in this assessment are presented as "controlled" air concentrations in Tables J-9 though J-28.

5. Contaminant Air Concentrations Resulting from Fugitive Dust Emissions

Because each population is exposed to an air concentration that is a composite of air concentrations associated with several fugitive dust emissions sources and the dust concentrations in air are dependent upon the soil EPC applicable for each emission source, the composite air concentrations for each exposed population must be calculated as follows:

Equation J - 25

$$C_{\text{air dust,COPC}} = 0.1 \times \sum_i \frac{EPC_{\text{soil,COPC}}}{PEF_i}$$

where,

$C_{\text{air dust, COPC}}$	=	Exposure point concentration of a given COPC associated with fugitive dust in air for a given population (µg/m^3);
0.1	=	control measure factor (unitless);

[3] Assumes application of 0.25 gal/yd^3 every two weeks.
[4] This is consistent with Clark County Air Quality Regulations that require dust emissions control for construction sites and undeveloped land (e.g., NEA after WRF construction).

$EPC_{soil, COPC}$ = Applicable COPC exposure point concentration in soil for each emission source (μg/kg)[5]; and

PEF_i = PEF value associated with each contributing emission source m^3/kg (Equation J-1 and J-11 for emission sources in the SEA during construction, Equation J-19 for emission sources in the NEA during construction, and J-23 for both SEA and NEA post construction emissions sources).

It is important to note that $C_{air\ dust,COPC}$ reflects the contribution of sources in both the SEA and the NEA and must be calculated separately for emissions sources in the SEA and NEA. For example, if calculating the exposure point concentration of an individual chemical in air for a WRF construction worker during WRF construction, one would use the following:

$$C_{air\ dust,COPC} = 0.1 \times \left(\frac{EPC_{unpaved\ road\ traffic,SEA}}{PEF_{unpaved\ road\ traffic,SEA}} + \frac{EPC_{excavation,SEA}}{PEF_{excavation,SEA}} + \frac{EPC_{dozing,SEA}}{PEF_{dozing,SEA}} + \frac{EPC_{wind,SEA}}{PEF_{wind,SEA}} \right)$$
$$+0.1 \times \left(\frac{EPC_{unpaved\ road\ traffic,NEA}}{PEF_{unpaved\ road\ traffic,NEA}} + \frac{EPC_{grading,NEA}}{PEF_{grading,NEA}} + \frac{EPC_{wind,NEA}}{PEF_{wind,NEA}} \right)$$

The results of the above analysis are presented in Table J-9 through J-28. The "Contributing Sources" columns reflect the contribution of each area (i.e., SEA or NEA) to the overall exposure point concentration.[6] These tables are subdivided by time period (i.e., during or post WRF construction) and exposure population. The composite exposure point concentration in air is presented in the final column of each table. It is this value that, for each individual COPC, is carried through to estimate the inhalation dose of an individual exposure population.

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[5] For a discussion on the determination of the applicable exposure point concentration for each emission source, see Chapter V.B of this report. A summary of the applicable exposure point concentration for each activity discussed in the appendix is presented in Tables J-5a and J-5b.

[6] The "Contributing Sources" columns were included in the table to provide additional information on areas of the site that contribute the greatest to the exposure point concentration in air.

C. Estimation of Exposure Point Concentrations in Air Resulting from Volatile Emissions from Ground Water

1. Exposure Point Concentrations in Air Resulting from Volatile Emissions from Ground Water During WRF Construction – WRF Construction Worker

The WRF construction worker is assumed to be exposed to volatile emissions from ground water in both the SEA and NEA during on-site construction activities. The analysis of volatile emissions from ground water is different from the analyses discussed above for fugitive dusts because it does not use a PEF or analogous approach. Volatile emissions from ground water were estimated using the following relationship, which is based on Fick's Law and assumes a concentration in soil gas at the capillary fringe based on Henry's Law:

Equation J - 26

$$J_{LT} = D_e \frac{C_a}{L} \times 10^4 \, cm^2 / m^2$$

and,

Equation J - 27

$$C_a = \frac{EPC_{GW} \times H'}{1{,}000 \, cm^3 / L \times 10^6 \, \mu g/g}$$

and,

Equation J - 28

$$D_e = D_a \frac{\theta_{air}^{10/3}}{\theta_{total}^2}$$

where,

J_{LT}	=	long-term chemical flux, g/sec-m^2;
C_a	=	chemical concentration in soil gas, g/cm^3;
L	=	diffusion distance, cm;
D_e	=	effective diffusivity, cm^2/sec;
H'	=	dimensionless Henry's constant (unitless); and

EPC_{GW}=		chemical-specific exposure point concentration in ground water (µg/L)
D_a	=	diffusion coefficient in air, cm^2/sec
θ_{air}	=	air-filled porosity of soil, unitless
θ_{total}	=	total porosity of soil, unitless

Based on observations made during the May 2001 site characterization field program, the diffusion distance in the NEA and SEA were assumed to be 427 cm and 585.5 cm, respectively[7]. The air-filled and total porosity were estimated to be 0.26 and 0.38, respectively, for the NEA and 0.27 and 0.40, respectively, for the SEA. These values are based the results of physical soil analyses performed on dry[8] samples collected during the May 2001 site characterization field program. The chemical-specific input parameter values and the calculated model-specific emission rates are presented in Tables J-6 through J-7.

To estimate the airborne concentration of volatile COPCs resulting from passive volatilization from ground water in the SEA, the long-term chemical flux value discussed above is combined with the square emissions source dispersion factor (Equation J-10) discussed in Section A.1.a of this appendix according to the following:

Equation J - 29

$$C_{air,COPC} = \frac{J_{LT}}{Q/C_{sa}} \times 10^9 \mu g/kg$$

WRF construction worker exposure is being evaluated for an individual located in the SEA. Thus, volatile emissions from ground water in the NEA are modeled as an off-site source and an off-site Q/C value (Equation J-18) is appropriate. To estimate the airborne concentration of volatile COPCs resulting from passive volatilization from ground water in the NEA, the long-term chemical flux value discussed above is combined with the Q/C_{off} value from Equation J-18 according to the following:

[7] These values represent estimated average depth to water across each area of the site. A sensitivity analysis was conducted to evaluate the potential increase in volatile emissions associated with a future rise in the ground water beneath the site. This analysis is discussed in the uncertainties section (Chapter IX, Section A.3) within the main body of this report.

[8] Soil samples described as "WET" in the borings logs (attached herein as Appendix B) were not used to evaluate the water and air filled porosities at the site.

Equation J - 30

$$C_{air,COPC} = \frac{J_{LT}}{Q / C_{off}} \times 10^{9} \mu g / kg$$

The Q/C values used to calculate the exposure point concentration in air for the WRF construction worker are 6.7358 and 50.1631 for Q/C_{sa} and Q/C_{off}, respectively. The results of this analysis are presented along with the results of the fugitive dust analysis described above in Tables J-9 through J-28.

2. Exposure Point Concentrations in Air Resulting from Volatile Emissions from Ground Water During WRF Construction – Off-site Resident and Off-site Worker

Like the WRF construction worker, the off-site resident and off-site worker (collectively, the off-site population) are exposed to volatile emissions from ground water during WRF construction activities; however, the exposure point concentration for the off-site population is assumed to be at the site boundary. The long-term flux of a COPC through the subsurface is calculated according the equation presented in Section C.1 of this appendix (Equation J-26). In estimating the airborne concentration of each COPC at the site boundary, the off-site dispersion factors described in Section B.2 of this appendix (Q/C_{off}, 52.4836 and 50.1631 g/m^2-sec per kg/m^3 in the SEA and NEA, respectively) (Equation J-22) were used in Equation J-30. The results of this analysis are presented in Tables J-9 through J-17.

3. Exposure Point Concentrations in Air Resulting from Future (Post WRF Construction) Volatile Emissions from Ground Water

After the completion of the WRF expansion project, volatile emissions from the WRF site are assumed to be limited to the NEA, which may remain undeveloped; in the SEA, structures and asphalt-covered areas will limit volatile emissions from reaching the atmosphere. Potentially exposed populations include maintenance workers in the NEA and SEA, a child trespassing in the NEA, a default construction worker in the NEA, and off-site residents and workers. The methodology used to estimate the exposure to airborne COPCs associated with volatile emissions from the site in the future (i.e., after the completion of the WRF expansion project) is analogous to that previously described in Section C of this appendix (Equations J-26 through J-30).

Because the characteristics of future construction activities (if any) and future subsurface conditions in the NEA are unknown, the default construction worker exposure to volatile emissions from ground water was estimated from that previously calculated for the WRF construction worker in the SEA. This was done by scaling the ground water emissions flux in the SEA to reflect the ground water exposure point concentration in the NEA, i.e.,

$$J_{LT,NEA} = J_{LT,SEA} \times \frac{EPC_{GW,NEA}}{EPC_{GW,SEA}}$$

A comparison of the results derived from this methodology as compared to that using equations J-26, J-27, and J-28 shows that the "scaling method" used in this risk assessment does not introduce significant error into the calculation of the air concentrations in the NEA. The values for $J_{LT,SEA}$ and the applicable ground water exposure point concentrations ($EPC_{GW,NEA}$ and $EPC_{GW,SEA}$) are tabulated in Table J-7.

A NEA-specific Q/C_{sa} was calculated according to Equation J-10 with an areal extent of surface contamination in the NEA of 58.8 acres. The result is a Q/C_{sa} value of 6.4272 g/m^2-sec per kg/m^3 for the NEA. The exposure point concentration in air for a default construction worker in the NEA was calculated according to Equation J-29 with this NEA-specific Q/C_{sa} value.

For the remaining future populations exposed while within the NEA (i.e., NEA maintenance worker and a trespassing child) an on-site Q/C value (Q/C_{vol}) is required. It is assumed that these additional NEA populations are exposed at the center point of the NEA and the applicable Q/C value is calculated as follows:

Equation J - 31

$$Q/C_{vol} = A \times \exp\left[\frac{(\ln A_s - B)^2}{C}\right]$$

where,

Q/C_{vol}	=	inverse of the mean air concentration at the center of a square emission source (g/m^2-s per kg/m^3), 39.1819;
A	=	constant, 13.3093 (Las Vegas, NV);
B	=	constant, 19.8387 (Las Vegas, NV);
C	=	constant, 230.1652 (Las Vegas, NV); and
A_s	=	areal extent of surface contamination (acres), 58.8.

The values for the constants A, B, and C in Equation J-31 are found in Exhibit D-3 of USEPA 2001. The estimated Q/C_{vol} value is 39.1819 g/m^2-sec per kg/m^3.

For the off-site populations (residents and workers) and a maintenance worker in the SEA, the use of a Q/C_{off} value is required. Thus, the value calculated in Equation J-18 (50.1631 g/m^2-sec per kg/m^3) was applied to Equation J-30 to estimate the exposure point concentrations in air for these exposed populations.

In addition to the above-mentioned populations, two additional populations, indoor workers in the SEA and NEA, may be exposed to future volatile emissions from the WRF expansion site. Soil sampling data collected during the site characterization program do not indicate that significant migration of chemicals from ground water upward through the soil column is occurring. To be conservative, however, indoor air concentrations of volatile compounds in ground water that may infiltrate overlying buildings to be constructed at the site were estimated using a model developed by Johnson and Ettinger (1991), as recommended in USEPA's *Soil Screening Guidance: Technical Background Document* (USEPA 1996). USEPA has made available on its website[9] several spreadsheets for calculating indoor air concentrations based on the Johnson & Ettinger model, including a screening model and a refined model. USEPA's computer-based model was originally developed in September 1998 and was revised in March 2001 and republished.[10] As a preliminary step, the screening model was applied. Input parameters for the model were derived from site-specific data or USEPA-recommended default values, as summarized in Table J-8. The parameter values in Table J-8 were derived from data collected from the vadose zone during the site characterization program and were selected to be conservative.

Ground water sampling results from the May 2001 site characterization program were used in the screening model. Specifically, the maximum concentrations detected beneath a given exposure area were used to calculate indoor air concentrations in a hypothetical building. Because the USEPA screening model was developed for residential purposes, the risks estimated by the USEPA model are not applicable; however, the model provides the estimated indoor air concentration on the "Intercalcs" worksheet. For each VOC in ground water, the indoor air concentration was calculated using the USEPA screening model and is summarized in Tables J-18 and J-19 for the SEA and NEA, respectively.

9 (http://www.epa.gov/superfund/programs/risk/airmodel/johnson_ettinger.htm)
10 In this risk assessment, ENVIRON used GW-Screen, Version 2.3, 03/01.

D. References

National Oceanic and Atmospheric Administration. 1985. *Comparative Climatic Data for the United State*. Asheville, N.C. April.

R.S. Means Company. 2002. *Site Work & Landscape Cost Data*. R.S. Means Company, Englewood, Colorado.

U.S. Department of the Interior. 1987. *Fugitive Dust Control for Haulage Roads and Tailing Basins*. Bureau of Mines.

U.S. Environmental Protection Agency (USEPA). 1985. *Rapid Assessment of Exposure to Particulate Emissions from Surface Contaminated Sites*. Office of Health and Environmental Assessment, Washington, D.C. EPA/600/8-85/002. February.

U.S. Environmental Protection Agency (USEPA). 1996. *Soil Screening Guidance: Technical Background Document*. Office of Solid Waste and Emergency Response, Washington, D.C. EPA/540/R-95/128. May.

U.S. Environmental Protection Agency (USEPA). 2001. *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*. OSWER 9355.4-24. Peer Review Draft. Office of Solid Waste and Emergency Response, Washington, D.C. March.

TABLE J-1
Input Variables for Fugitive Dust Particulate Emissions Factors

Population	Fugitive Emission Source	Variable	Default Value	Site-specific Value	Notes
DURING WRF CONSTRUCTION					
WRF Construction Worker	**Unpaved Road Traffic in SEA**	Straight Road Dispersion Factor, Q/Csr (g/m^2-s per kg/m^3)	–	13.668	Eqn. E-19 Area = 42.5 acres A = 12.9351 (EPA Default) B = 5.7383 (EPA Default) C = 71.7711 (EPA Default)
		Dispersion Correction Factor, FD (unitless)	–	0.185	Construction duration > 1 year
		Time over which construction occurs, T (s)	–	21,600,000	3 years, 250 days/year, 8 hours/day
		Area of Road Segment, AR (m^2)	–	2,400	Assumes road is 400 m long and 6 m wide
		Average Silt Content, s (%)	8.5	17.1	Using site data for 0-1' sample interval; Appendix D
		Mean vehicle weight, W (ton)	–	4.6	14.3% heavy truck traffic; 85.7% light truck traffic (0.143)(20 tons)+(0.857)*(2 tons) = 4.6 tons
		Road Surface Moisture Content under Dry Uncontrolled Conditions, Mdry (%)	0.2	0.2	Assumes no controls
		Number of Days <0.01" precipitation, p	–	30	Exhibit 5-2 (USEPA 2001)
		Sum of Fleet Vehicle Kilometers Traveled During the Entire Construction Duration, ΣVKT, (km)	–	5600	Heavy: (20,000 m^3)(1 truck/10 m^3)(0.4 km/truck) = 800 km Light: (16 trips/day)(0.4 km/trip)(750 days) = 4,800 km
	Wind Erosion from the SEA	Square Emissions Source Dispersion Factor, Q/Csa (g/m^2-s per kg/m^3)	–	6.7358	Eqn. 5-15 Area = 42.5 acres A = 2.4538 (EPA Default) B = 17.5660 (EPA Default) C = 189.0426 (EPA Default)
		Dispersion Correction Factor, FD (unitless)	–	0.185	Construction duration > 1 year
		Fraction of Vegetative Cover, V (unitless)	0	0	
		Mean wind speed, Um (m/s)	4.69	4.11	NOAA (1985)
		Equivalent Threshold Value of Wind speed at 7m, Ut (m/s)	11.32	11.32	USEPA default
		F(x) (unitless)	0.194	0.068	Calculated (USEPA 1985)
		Site surface area, Asite (m^2)	–	172,000	
		Exposure Duration, ED (years)	–	3	
		Time over which construction occurs, T (s)	–	21,600,000	3 years, 250 days/year, 8 hours/day

TABLE J-1
Input Variables for Fugitive Dust Particulate Emissions Factors

Population	Fugitive Emission Source	Variable	Default Value	Site-specific Value	Notes
WRF Construction Worker	**Excavation in the SEA**	Dispersion Factor, Q/Csa (g/m²-s per kg/m³)	–	6.7358	Eqn. 5-15 Area = 42.5 acres A = 2.4538 (EPA Default) B = 17.5660 (EPA Default) C = 189.0426 (EPA Default)
		Dispersion Correction Factor, FD (unitless)	–	0.185	Construction duration > 1 year
		Mean wind speed, Um (m/s)	4.69	4.11	NOAA (1985)
		Gravimetric Soil Moisture Content, M (%)	12	9.5	Using SEA data for all sample intervals; Appendix D
		Volume of Excavation, V (m³)	–	75,000	Black and Veatch
		Number of times Soil is Dumped, N_A (unitless)	2	1	Followed by dozing
		In-situ soil Density (includes water), rsoil (Mg/m³)	1.68	1.79	Calculated by: $\rho_{soil} = (1-\theta_{total}) \times \rho_{particle} + \theta_{water}$ θ_{total} = 0.39 (site-specific data, all samples) $\rho_{particle}$ = 2.65 (default assumption) θ_{water} = 0.17 (site-specific data, all samples)
		Site surface area, Asite (m²)	–	172,000	
		Time over which construction occurs, T (s)	–	21,600,000	3 years, 250 days/year, 8 hours/day
	Dozing in the SEA	Dispersion Factor, Q/Csa (g/m²-s per kg/m³)	–	6.7358	Eqn. 5-15 Area = 42.5 acres A = 2.4538 (EPA Default) B = 17.5660 (EPA Default) C = 189.0426 (EPA Default)
		Dispersion Correction Factor, FD (unitless)	–	0.185	Construction duration > 1 year
		Average Grading Speed S, (kph)	11.4	11.4	USEPA Default
		Sum of Fleet Vehicle Kilometers Traveled During the Entire Construction Duration, ΣVKT, (km)	–	11,100	Assumes that 75,000 m³ are moved an average of 300 feet (approximately 77 m³ of soil can be moved in one hour (Means [2002]) and an average speed of 11.4 kph (75000 m³)/(77 m³/hr)*(11.4 km/hr)
		Average Silt Content, s (%)	8.5	18.6	Using SEA data for all sample intervals; Appendix D
		Gravimetric Soil Moisture Content, M (%)	12	9.50	Using SEA data for all sample intervals; Appendix D
		Site surface area, Asite (m²)	–	172,000	
		Time over which construction occurs, T (s)	–	21,600,000	3 years, 250 days/year, 8 hours/day

TABLE J-1
Input Variables for Fugitive Dust Particulate Emissions Factors

Population	Fugitive Emission Source	Variable	Default Value	Site-specific Value	Notes
WRF Construction Worker	**Unpaved Road Traffic in NEA**	Off-site Dispersion Factor, Q/Coff (g/m^2-s per kg/m^3)	–	50.1631	Eqn. E-30 Area = 58.8 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Time over which construction occurs, T (s)	–	21,600,000	3 years, 250 days/year, 8 hours/day
		Area of Road Segment, AR (m^2)	–	600	Assumes road in 100 m long and 6 m wide
		Average Silt Content, s (%)	8.5	18	Using site data for 0-5' sample interval; Appendix D
		Mean vehicle weight, W (ton)	–	2	Traffic limited to light trucks (2 tons)
		Road Surface Moisture Content under Dry Uncontrolled Conditions, Mdry (%)	0.2	0.2	Assumes no controls
		Number of Days <0.01" precipitation, p	–	30	Exhibit 5-2 (USEPA 2001)
		Sum of Fleet Vehicle Kilometers Traveled During the Entire Construction Duration, ΣVKT, (km)	–	750	
	Wind Erosion from the NEA	Off-site Dispersion Factor, Q/Coff (g/m^2-s per kg/m^3)	–	50.1631	Eqn. E-30 Area = 58.8 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Fraction of Vegetative Cover, V (unitless)	0	0	
		Mean wind speed, Um (m/s)	4.69	4.11	NOAA (1985)
		Equivalent Threshold Value of Wind speed at 7m, Ut (m/s)	11.32	11.32	USEPA default
		F(x) (unitless)	0.194	0.068	Calculated (USEPA 1985)
		Site surface area, Asite (m^2)	–	238,000	
		Exposure Duration, ED (years)	–	3	
		Time over which construction occurs, T (s)	–	21,600,000	3 years, 250 days/year, 8 hours/day
	Grading in the NEA	Off-site Dispersion Factor, Q/Coff (g/m^2-s per kg/m^3)	–	50.1631	Eqn. E-30 Area = 58.8 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Average Grading Speed S, (kph)	11.4	11.4	USEPA Default
		Sum of Fleet Vehicle Kilometers Traveled During the Entire Construction Duration, ΣVKT, (km)	–	129	Assumes a 3.7m (12') blade, 50% overlap for grading passes, and a graded area of 238,000 m^2
		Site surface area, Asite (m^2)	–	238,000	
		Time over which construction occurs, T (s)	–	21,600,000	3 years, 250 days/year, 8 hours/day

TABLE J-1
Input Variables for Fugitive Dust Particulate Emissions Factors

Population	Fugitive Emission Source	Variable	Default Value	Site-specific Value	Notes
Off-site Resident/Worker (During WRF Construction	**Unpaved Road Traffic in SEA**	Off-site Dispersion Factor, Q/Coff (g/m²-s per kg/m³)	–	52.4836	Eqn. E-30 Area = 42.5 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Exposure Duration, ED (years)	–	3	
		Average Silt Content, s (%)	8.5	17.1	Using site data for 0-1' sample interval; Appendix D
		Mean vehicle weight, W (ton)	–	4.6	14.3% heavy truck traffic; 85.7% light truck traffic (0.143)(20 tons)+(0.857)*(2 tons) = 4.6 tons
		Road Surface Moisture Content under Dry Uncontrolled Conditions, Mdry (%)	0.2	0.2	Assumes no controls
		Number of Days <0.01" precipitation	–	30	Exhibit 5-2 (USEPA 2001)
		Sum of Fleet Vehicle Kilometers Traveled During the Entire Construction Duration, ΣVKT, (km)	–	5600	Heavy: (20,000 m³)(1 truck/10 m³)(0.4 km/truck) = 800 km Light: (16 trips/day)(0.4 km/trip)(750 days) = 4,800 km
		Areal Extent of Site, Asite (m²)	–	172,000	
Off-site Resident/Worker (During WRF Construction	**Unpaved Road Traffic in NEA**	Off-site Dispersion Factor, Q/Coff (g/m²-s per kg/m³)	–	50.1631	Eqn. E-30 Area = 58.8 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Exposure Duration, ED (years)	–	3	
		Average Silt Content, s (%)	8.5	18	Using site data for 0-5' sample interval; Appendix D
		Mean vehicle weight, W (ton)	–	2	Traffic limited to light trucks
		Road Surface Moisture Content under Dry Uncontrolled Conditions, Mdry (%)	0.2	0.2	Assumes no controls
		Number of Days <0.01" precipitation	–	30	Exhibit 5-2 (USEPA 2001)
		Sum of Fleet Vehicle Kilometers Traveled During the Entire Construction Duration, ΣVKT, (km)	–	750	
		Areal Extent of Site, Asite (m²)	–	238,000	
	Wind Erosion from the SEA	Off-site Dispersion Factor, Q/Coff (g/m²-s per kg/m³)	–	52.4836	Eqn. E-30 Area = 42.5 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Fraction of Vegetative Cover, V (unitless)	0	0	
		Mean wind speed, Um (m/s)	4.69	4.11	NOAA (1985)
		Equivalent Threshold Value of Wind speed at 7m, Ut (m/s)	11.32	11.32	USEPA default
		F(x) (unitless)	0.194	0.068	Calculated (USEPA 1985)
		Site surface area, Asite (m²)	–	172,000	
		Exposure Duration, ED (years)	–	3	

TABLE J-1
Input Variables for Fugitive Dust Particulate Emissions Factors

Population	Fugitive Emission Source	Variable	Default Value	Site-specific Value	Notes
Off-site Resident/Worker (During WRF Construction	**Wind Erosion from the NEA**	Off-site Dispersion Factor, Q/Coff (g/m²-s per kg/m³)	–	50.1631	Eqn. E-30 Area = 58.8 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Fraction of Vegetative Cover, V (unitless)	0	0	
		Mean wind speed, Um (m/s)	4.69	4.11	NOAA (1985)
		Equivalent Threshold Value of Wind speed at 7m, Ut (m/s)	11.32	11.32	USEPA Default
		F(x) (unitless)	0.194	0.068	Calculated (USEPA 1985)
		Site surface area, Asite (m²)	–	238,000	
		Exposure Duration, ED (years)	–	3	
	Excavation in the SEA	Off-site Dispersion Factor, Q/Coff (g/m²-s per kg/m³)	–	52.4836	Eqn. E-30 Area = 42.5 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Mean wind speed, Um (m/s)	4.69	4.11	NOAA (1985)
		Gravimetric Soil Moisture Content, M (%)	12	9.5	Using SEA data for all sample intervals; Appendix D
		Volume of Excavation, V (m³)	–	75,000	
		Number of times Soil is Dumped, N_A (unitless)	2	1	Followed by dozing
		In-situ soil Density (includes water), rsoil (Mg/m³)	1.68	1.79	Calculated by: $\rho_{soil} = (1-\theta_{total}) \times \rho_{particle} + \theta_{water}$ θ_{total} = 0.39 (site-specific data, all samples) $\rho_{particle}$ = 2.65 (default assumption) θ_{water} = 0.17 (site-specific data, all samples)
		Site surface area, Asite (m²)	–	172,000	
		Exposure Duration, ED (years)	–	3	

TABLE J-1
Input Variables for Fugitive Dust Particulate Emissions Factors

Population	Fugitive Emission Source	Variable	Default Value	Site-specific Value	Notes
Off-site Resident/Worker (During WRF Construction	**Grading in the NEA**	Off-site Dispersion Factor, Q/Coff (g/m^2-s per kg/m^3)	–	50.1631	Eqn. E-30 Area = 58.8 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Average Grading Speed S, (kph)	11.4	11.4	USEPA Default
		Sum of Fleet Vehicle Kilometers Traveled During the Entire Construction Duration, ΣVKT, (km)	–	129	Assumes a 3.7m (12') blade, 50% overlap for grading passes, and a graded area of 238,000 m^2
		Site surface area, Asite (m^2)	–	238,000	
		Exposure Duration, ED (years)	–	3	
	Dozing in the SEA	Off-site Dispersion Factor, Q/Coff (g/m^2-s per kg/m^3)	–	52.4836	Eqn. E-30 Area = 42.5 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Average Grading Speed S, (kph)	11.4	11.4	USEPA Default
		Sum of Fleet Vehicle Kilometers Traveled During the Entire Construction Duration, ΣVKT, (km)	–	11,100	Assumes that 75,000 m^3 are moved an average of 300 feet (approximately 77 m^3 of soil can be moved in one hour (Means [2002]) and an average speed of 11.4 kph (75000 m^3)/(77 m^3/hr)*(11.4 km/hr)
		Average Silt Content, s (%)	8.5	18.6	Using SEA data for all sample intervals; Appendix D
		Gravimetric Soil Moisture Content, M (%)	12	9.50	Site-specific data excluding "WET" samples as described in the boring logs
		Site surface area, Asite (m^2)	–	172,000	
		Exposure Duration, ED (years)	–	3	

TABLE J-1
Input Variables for Fugitive Dust Particulate Emissions Factors

Population	Fugitive Emission Source	Variable	Default Value	Site-specific Value	Notes
FUTURE (POST WRF CONSTRUCTION)					
Trespassing Child on the NEA	**Wind Erosion from the NEA**	Square Emissions Source Dispersion Factor, Q/C_{wind} (g/m²-s per kg/m³)	–	39.1819	Exhibit D-2 Area = 58.8 acres A = 13.3093 (Las Vegas, NV) B = 19.8387 (Las Vegas, NV) C = 230.1652 (Las Vegas, NV)
		Fraction of Vegetative Cover, V (unitless)	0	0	Conservative estimate; assumes no development in the NEA
		Mean wind speed, Um (m/s)	4.69	4.11	NOAA (1985)
		Equivalent Threshold Value of Wind speed at 7m, Ut (m/s)	11.32	11.32	USEPA Default
		F(x) (unitless)	0.194	0.068	Calculated (USEPA 1985)
		Site surface area, Asite (m²)	–	238,000	
		Exposure Duration, ED (years)	–	6	
NEA Maintenance Worker	**Wind Erosion from the NEA**	Square Emissions Source Dispersion Factor, Q/C_{wind} (g/m²-s per kg/m³)	–	39.1819	Exhibit D-2 Area = 58.8 acres A = 13.3093 (Las Vegas, NV) B = 19.8387 (Las Vegas, NV) C = 230.1652 (Las Vegas, NV)
		Fraction of Vegetative Cover, V (unitless)	0	0.5	Conservative estimate
		Mean wind speed, Um (m/s)	4.69	4.11	NOAA (1985)
		Equivalent Threshold Value of Wind speed at 7m, Ut (m/s)	11.32	11.32	USEPA Default
		F(x) (unitless)	0.194	0.068	Calculated (USEPA 1985)
		Site surface area, Asite (m²)	–	238,000	
		Exposure Duration, ED (years)	–	25	
SEA Maintenance Worker	**Wind Erosion from the NEA**	Off-site Dispersion Factor, Q/Coff (g/m²-s per kg/m³)	–	50.1631	Eqn. E-30 Area = 58.8 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Fraction of Vegetative Cover, V (unitless)	0	0	Conservative estimate; assumes no development in the NEA
		Mean wind speed, Um (m/s)	4.69	4.11	NOAA (1985)
		Equivalent Threshold Value of Wind speed at 7m, Ut (m/s)	11.32	11.32	USEPA Default
		F(x) (unitless)	0.194	0.068	Calculated (USEPA 1985)
		Site surface area, Asite (m²)	–	238,000	
		Exposure Duration, ED (years)	–	25	

TABLE J-1
Input Variables for Fugitive Dust Particulate Emissions Factors

Population	Fugitive Emission Source	Variable	Default Value	Site-specific Value	Notes
Off-site Resident	**Wind Erosion from the NEA**	Off-site Dispersion Factor, Q/Coff (g/m²-s per kg/m³)	–	50.1631	Eqn. E-30 Area = 58.8 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Fraction of Vegetative Cover, V (unitless)	0	0	Conservative estimate; assumes no development in the NEA
		Mean wind speed, Um (m/s)	4.69	4.11	NOAA (1985)
		Equivalent Threshold Value of Wind speed at 7m, Ut (m/s)	11.32	11.32	USEPA Default
		F(x) (unitless)	0.194	0.068	Calculated (USEPA 1985)
		Site surface area, Asite (m²)	–	238,000	
		Exposure Duration, ED (years)	–	30	
Off-site Worker	**Wind Erosion from the NEA**	Off-site Dispersion Factor, Q/Coff (g/m²-s per kg/m³)	–	50.1631	Eqn. E-30 Area = 58.8 acres A = 12.1784 (Las Vegas, NV) B = 24.5606 (Las Vegas, NV) C = 296.4751 (Las Vegas, NV)
		Fraction of Vegetative Cover, V (unitless)	0	0	Conservative estimate; assumes no development in the NEA
		Mean wind speed, Um (m/s)	4.69	4.11	NOAA (1985)
		Equivalent Threshold Value of Wind speed at 7m, Ut (m/s)	11.32	11.32	USEPA Default
		F(x) (unitless)	0.194	0.068	Calculated (USEPA 1985)
		Site surface area, Asite (m²)	–	238,000	
		Exposure Duration, ED (years)	–	25	
Default Construction Worker in the NEA	Because the characteristics future construction activities (if any) are unknown, the default construction worker exposures are, conservatively, assumed to be the same as those for the WRF construction worker and the PEF values applicable to the WRF construction worker are assumed for the default construction worker.				

TABLE J-2
Results of Uncontrolled PEF Calculations for Exposed Populations
During and Post WRF Construction

Population	Emission Source	Mass Emitted (g)	$\langle J'_T \rangle$ (g/m²-s)	F_D	Q/C (g/m²-s per kg/m³)	PEF (m³/kg)
During WRF Construction						
WRF Construction Worker	Unpaved Road Traffic in the SEA	NA	NA	0.185	13.668	6.45×10^{5}
	Excavation in the SEA	19,123	5.15×10^{-9}	0.185	6.7358	7.07×10^{9}
	Dozing in the SEA	1,127,582	3.04×10^{-7}	0.185	6.7358	1.20×10^{8}
	Wind Erosion in the SEA	529,561	1.43×10^{-7}	0.185	6.7358	2.55×10^{8}
	Unpaved Road Traffic in the NEA	593,360	1.15×10^{-7}	NA	50.1631	4.35×10^{8}
	Grading in the NEA	56,330	1.10×10^{-8}	NA	50.1631	4.58×10^{9}
	Wind Erosion in the NEA	732,765	1.43×10^{-7}	NA	50.1631	3.51×10^{8}
Off-site Resident	Unpaved Road Traffic in the SEA	5,933,554	3.65×10^{-7}	NA	52.4836	1.44×10^{8}
	Excavation in the SEA	19,123	1.18×10^{-9}	NA	52.4836	4.47×10^{10}
	Dozing in the SEA	1,127,582	6.93×10^{-8}	NA	52.4836	7.57×10^{8}
	Wind Erosion in the SEA	529,561	3.25×10^{-8}	NA	52.4836	1.61×10^{9}
	Unpaved Road Traffic in the NEA	593,360	2.64×10^{-8}	NA	50.1631	1.90×10^{9}
	Grading in the NEA	56,330	2.50×10^{-9}	NA	50.1631	2.01×10^{10}
	Wind Erosion in the NEA	732,765	3.25×10^{-8}	NA	50.1631	1.54×10^{9}
Off-site Worker	Unpaved Road Traffic in the SEA	5,933,554	3.65×10^{-7}	NA	52.4836	1.44×10^{8}
	Excavation in the SEA	19,123	1.18×10^{-9}	NA	52.4836	4.47×10^{10}
	Dozing in the SEA	1,127,582	6.93×10^{-8}	NA	52.4836	7.57×10^{8}
	Wind Erosion in the SEA	529,561	3.25×10^{-8}	NA	52.4836	1.61×10^{9}
	Unpaved Road Traffic in the NEA	593,360	2.64×10^{-8}	NA	50.1631	1.90×10^{9}
	Grading in the NEA	56,330	2.50×10^{-9}	NA	50.1631	2.01×10^{10}
	Wind Erosion in the NEA	732,765	3.25×10^{-8}	NA	50.1631	1.54×10^{9}

TABLE J-2
Results of Uncontrolled PEF Calculations for Exposed Populations During and Post WRF Construction

Population	Emission Source	Mass Emitted (g)	$\langle J'_T \rangle$ (g/m^2-s)	F_D	Q/C (g/m^2-s per kg/m^3)	PEF (m^3/kg)
Future (Post WRF Construction)						
Trespassing Child in the NEA	Wind Erosion in the NEA	1,465,373	3.25×10^{-8}	NA	39.1819	1.21×10^{9}
Maintenance Worker in the NEA	Wind Erosion in the NEA	3,052,860	1.63×10^{-8}	NA	39.1819	2.40×10^{9}
Maintenance Worker in the SEA	Wind Erosion in the NEA	6,105,720*	3.25×10^{-8}	NA	50.1631	1.54×10^{9}
Off-site Resident	Wind Erosion in the NEA	7,326,864*	3.25×10^{-8}	NA	50.1631	1.54×10^{9}
Off-site Worker	Wind Erosion in the NEA	6,105,720*	3.25×10^{-8}	NA	50.1631	1.54×10^{9}
Default Construction Worker in the NEA	Unpaved Road Traffic in the NEA	Because the characteristics of future construction activities (if any) are unknown, the default construction worker exposures are conservatively assumed to be the same as those for the WRF construction worker, and the PEF values applicable to the WRF construction worker are assumed for the default NEA construction worker.				6.45×10^{5}
	Excavation in the NEA					7.07×10^{9}
	Dozing in the NEA					1.20×10^{8}
	Wind Erosion in the NEA					2.55×10^{8}

Notes:

* This value is higher than the value for the maintenance worker in the NEA because it assumes the worst-case condition that the NEA is not developed.

TABLE J-3
Summary of Future (Post WRF Construction) Populations and Fugitive Dust Emission Formulas

Population	Source of Fugitive Dust Emissions	Relevant Equations
Trespassing Child in the NEA	Wind erosion in the NEA	M_{wind} (Equation J-6 through J-9) Q/C_{wind} (Equation J-24) PEF (Equation J-19)[1]
Maintenance Worker in the NEA	Wind erosion in the NEA	M_{wind} (Equation J-6 through J-9)[2] Q/C_{wind} (Equation J-24) PEF (Equation J-19)[1]
Maintenance Worker in the SEA	Wind erosion in the NEA	M_{wind} (Equation J-6 through J-9) Q/C_{off} (Equation J-18) PEF (Equation J-19)
Off-site Populations (Residents and Workers)	Wind erosion in the NEA	M_{wind} (Equation J-6 through J-9) Q/C_{off} (Equation J-18) PEF (Equation J-19)
Default Construction Worker in the NEA	Traffic on unpaved roads in the NEA Construction activities in the NEA Wind Erosion in the NEA	Because the characteristics of future construction activities (if any) are unknown, the default construction worker exposures are conservatively assumed to be the same as those for the WRF construction worker and the Q/C values applicable to the WRF construction worker are assumed for the default construction worker.

Notes:
1 – Q/C_{off} is Equation J-19 is replaced with Q/C_{wind}
2 – The value for vegetative cover (v) was set to 0.5 to account for a portion of the NEA being developed.

TABLE J-4
Requirements and Control Measures for Fugitive Dust Emission Sources in Clark County, Nevada

Potential Source of Fugitive Dust	Applicable Requirements and Control Measures[1]
Construction Activities (including earth-moving, haul roads, and wind erosion at construction sites)	• Apply dust suppressant/palliatives throughout site. • Obtain a dust control permit for sites larger than one-quarter acre. • Prepare a site-specific dust mitigation plan for sites larger than 10 acres. • Employ Best Management Practices (BMP), as specified by the County in the permit and control plan.[2] • Provide a dust control coordinator for sites larger than 50 acres. • Maintain controls during non-construction periods (e.g., nights, weekends, and downtime).
Wind-blown Dust	• Apply dust suppressant/palliatives throughout site. • Employ Best Management Practices (BMP), as specified by the County in the permit and control plan. • Prepare a site-specific dust mitigation plan for sites larger than 10 acres.
Disturbed Vacant Land	• Prevent vehicle access; • Stabilize surface with dust palliatives, gravel, or paving • Apply controls prior to weed control

Notes:
1 – Identified in Clark County PM_{10} SIP and Air Quality Regulations. The requirements associated with construction are too numerous to list, but include those identified in the table.
2 – Specific construction activities covered by the regulations and evaluated in the SIP include backfilling, blasting, clearing, grubbing, crushing, grading, demolition, excavation, landscaping, paving, screening, soil staging/stockpiling, hauling on unpaved roads, and loading of trucks. For each type of activity, the SIP identifies BMP, which most cases includes soil wetting and use of dust palliative/suppressants.

TABLE J-5a
Summary of Exposure Point Concentrations in Soil (µg/kg)
Used to Calculated Exposure Point Dust Concentrations in Air
During WRF Construction

COPC	SEA*				NEA*		
	Unpaved Road Traffic (0-1', 0-12' Samples)	Excavation (0-12', All Samples)	Dozing (0-12', All Samples)	Wind Erosion (0-1', 0-12' Samples)	Unpaved Road Traffic (0-1', 0-5' Samples)	Grading (0-1', 0-5' Samples)	Wind Erosion (0-1', 0-5' Samples)
Aluminum	1.23×10^{7}	1.23×10^{7}	1.23×10^{7}	1.23×10^{7}	1.37×10^{7}	1.37×10^{7}	1.37×10^{7}
Antimony	8.36×10^{1}	8.56×10^{1}	8.56×10^{1}	8.36×10^{1}	8.36×10^{1}	8.36×10^{1}	8.36×10^{1}
Arsenic	3.76×10^{3}	5.19×10^{3}	5.19×10^{3}	3.76×10^{3}	4.05×10^{3}	4.05×10^{3}	4.05×10^{3}
Barium	2.45×10^{5}	2.27×10^{5}	2.27×10^{5}	2.45×10^{5}	2.90×10^{5}	2.90×10^{5}	2.90×10^{5}
Beryllium	6.43×10^{2}	5.98×10^{2}	5.98×10^{2}	6.43×10^{2}	6.36×10^{2}	6.36×10^{2}	6.36×10^{2}
Cadmium	1.27×10^{2}	1.14×10^{2}	1.14×10^{2}	1.27×10^{2}	1.03×10^{2}	1.03×10^{2}	1.03×10^{2}
Chromium (total)	8.37×10^{3}	9.31×10^{3}	9.31×10^{3}	8.37×10^{3}	8.27×10^{3}	8.27×10^{3}	8.27×10^{3}
Cobalt	7.05×10^{3}	7.17×10^{3}	7.17×10^{3}	7.05×10^{3}	8.58×10^{3}	8.58×10^{3}	8.58×10^{3}
Copper	1.32×10^{4}	1.31×10^{4}	1.31×10^{4}	1.32×10^{4}	1.36×10^{4}	1.36×10^{4}	1.36×10^{4}
Iron	2.02×10^{7}	1.89×10^{7}	1.89×10^{7}	2.02×10^{7}	2.11×10^{7}	2.11×10^{7}	2.11×10^{7}
Magnesium	9.90×10^{6}	1.06×10^{7}	1.06×10^{7}	9.90×10^{6}	1.18×10^{7}	1.18×10^{7}	1.18×10^{7}
Manganese	4.58×10^{5}	4.28×10^{5}	4.28×10^{5}	4.58×10^{5}	5.52×10^{5}	5.52×10^{5}	5.52×10^{5}
Mercury	1.24×10^{1}	1.45×10^{1}	1.45×10^{1}	1.24×10^{1}	3.02×10^{1}	3.02×10^{1}	3.02×10^{1}
Molybdenum	7.74×10^{2}	9.46×10^{2}	9.46×10^{2}	7.74×10^{2}	5.63×10^{2}	5.63×10^{2}	5.63×10^{2}
Nickel	1.21×10^{4}	1.30×10^{4}	1.30×10^{4}	1.21×10^{4}	1.47×10^{4}	1.47×10^{4}	1.47×10^{4}
Selenium	3.01×10^{2}	3.04×10^{2}	3.04×10^{2}	3.01×10^{2}	3.82×10^{2}	3.82×10^{2}	3.82×10^{2}
Silver	1.28×10^{2}	1.17×10^{2}	1.17×10^{2}	1.28×10^{2}	1.13×10^{2}	1.13×10^{2}	1.13×10^{2}
Thallium	8.17×10^{1}	7.41×10^{1}	7.41×10^{1}	8.17×10^{1}	1.16×10^{2}	1.16×10^{2}	1.16×10^{2}
Thorium	7.35×10^{3}	7.35×10^{3}	7.35×10^{3}	7.35×10^{3}	6.25×10^{3}	6.25×10^{3}	6.25×10^{3}
Titanium	5.44×10^{5}	5.21×10^{5}	5.21×10^{5}	5.44×10^{5}	5.64×10^{5}	5.64×10^{5}	5.64×10^{5}
Vanadium	2.71×10^{4}	2.71×10^{4}	2.71×10^{4}	2.71×10^{4}	2.81×10^{4}	2.81×10^{4}	2.81×10^{4}
Zinc	4.38×10^{4}	4.10×10^{4}	4.10×10^{4}	4.38×10^{4}	5.59×10^{4}	5.59×10^{4}	5.59×10^{4}
1,2,3,4,6,7,8-HpCDD	1.45×10^{-3}	1.15×10^{-3}	1.15×10^{-3}	1.45×10^{-3}	8.75×10^{-4}	8.75×10^{-4}	8.75×10^{-4}
1,2,3,4,6,7,8-HpCDF	3.92×10^{-3}	3.69×10^{-3}	3.69×10^{-3}	3.92×10^{-3}	2.26×10^{-3}	2.26×10^{-3}	2.26×10^{-3}
1,2,3,4,7,8,9-HpCDF	1.72×10^{-3}	1.31×10^{-3}	1.31×10^{-3}	1.72×10^{-3}	8.81×10^{-4}	8.81×10^{-4}	8.81×10^{-4}
1,2,3,4,7,8-HxCDD	2.33×10^{-4}	2.31×10^{-4}	2.31×10^{-4}	2.33×10^{-4}	2.14×10^{-4}	2.14×10^{-4}	2.14×10^{-4}
1,2,3,4,7,8-HxCDF	1.94×10^{-3}	1.80×10^{-3}	1.80×10^{-3}	1.94×10^{-3}	1.47×10^{-3}	1.47×10^{-3}	1.47×10^{-3}
1,2,3,6,7,8-HxCDD	3.00×10^{-4}	2.81×10^{-4}	2.81×10^{-4}	3.00×10^{-4}	2.13×10^{-4}	2.13×10^{-4}	2.13×10^{-4}
1,2,3,6,7,8-HxCDF	1.52×10^{-3}	1.20×10^{-3}	1.20×10^{-3}	1.52×10^{-3}	6.65×10^{-4}	6.65×10^{-4}	6.65×10^{-4}
1,2,3,7,8,9-HxCDD	2.79×10^{-4}	2.68×10^{-4}	2.68×10^{-4}	2.79×10^{-4}	1.96×10^{-4}	1.96×10^{-4}	1.96×10^{-4}
1,2,3,7,8,9-HxCDF	2.56×10^{-4}	2.56×10^{-4}	2.56×10^{-4}	2.56×10^{-4}	1.94×10^{-4}	1.94×10^{-4}	1.94×10^{-4}
1,2,3,7,8-PeCDD	2.75×10^{-4}	2.86×10^{-4}	2.86×10^{-4}	2.75×10^{-4}	2.44×10^{-4}	2.44×10^{-4}	2.44×10^{-4}
1,2,3,7,8-PeCDF	1.33×10^{-3}	9.73×10^{-4}	9.73×10^{-4}	1.33×10^{-3}	5.68×10^{-4}	5.68×10^{-4}	5.68×10^{-4}

TABLE J-5a
Summary of Exposure Point Concentrations in Soil (µg/kg)
Used to Calculated Exposure Point Dust Concentrations in Air
During WRF Construction

COPC	SEA*				NEA*		
	Unpaved Road Traffic (0-1', 0-12' Samples)	Excavation (0-12', All Samples)	Dozing (0-12', All Samples)	Wind Erosion (0-1', 0-12' Samples)	Unpaved Road Traffic (0-1', 0-5' Samples)	Grading (0-1', 0-5' Samples)	Wind Erosion (0-1', 0-5' Samples)
2,3,4,6,7,8-HxCDF	3.98×10^{-4}	3.76×10^{-4}	3.76×10^{-4}	3.98×10^{-4}	1.93×10^{-4}	1.93×10^{-4}	1.93×10^{-4}
2,3,4,7,8-PeCDF	5.75×10^{-4}	5.32×10^{-4}	5.32×10^{-4}	5.75×10^{-4}	3.63×10^{-4}	3.63×10^{-4}	3.63×10^{-4}
2,3,7,8-TCDD	1.62×10^{-4}	1.64×10^{-4}	1.64×10^{-4}	1.62×10^{-4}	1.62×10^{-4}	1.62×10^{-4}	1.62×10^{-4}
2,3,7,8-TCDF	9.81×10^{-4}	7.55×10^{-4}	7.55×10^{-4}	9.81×10^{-4}	5.64×10^{-4}	5.64×10^{-4}	5.64×10^{-4}
TEQ	1.30×10^{-3}	1.11×10^{-3}	1.11×10^{-3}	1.30×10^{-3}	8.71×10^{-4}	8.71×10^{-4}	8.71×10^{-4}
OCDD	5.25×10^{-3}	4.25×10^{-3}	4.25×10^{-3}	5.25×10^{-3}	4.16×10^{-3}	4.16×10^{-3}	4.16×10^{-3}
OCDF	1.60×10^{-2}	1.60×10^{-2}	1.60×10^{-2}	1.60×10^{-2}	1.19×10^{-2}	1.19×10^{-2}	1.19×10^{-2}
4,4'-DDD	4.00×10^{-1}	4.00×10^{-1}	4.00×10^{-1}	4.00×10^{-1}	3.41×10^{-1}	3.41×10^{-1}	3.41×10^{-1}
4,4'-DDE	1.65×10^{0}	1.07×10^{0}	1.07×10^{0}	1.65×10^{0}	7.45×10^{-1}	7.45×10^{-1}	7.45×10^{-1}
4,4'-DDT	1.45×10^{0}	1.01×10^{0}	1.01×10^{0}	1.45×10^{0}	4.98×10^{-1}	4.98×10^{-1}	4.98×10^{-1}
alpha-Chlordane	2.42×10^{-1}	2.50×10^{-1}	2.50×10^{-1}	2.42×10^{-1}	2.39×10^{-1}	2.39×10^{-1}	2.39×10^{-1}
beta-BHC	6.78×10^{-1}	5.96×10^{-1}	5.96×10^{-1}	6.78×10^{-1}	5.26×10^{-1}	5.26×10^{-1}	5.26×10^{-1}
Dieldrin	4.22×10^{-1}	3.74×10^{-1}	3.74×10^{-1}	4.22×10^{-1}	3.08×10^{-1}	3.08×10^{-1}	3.08×10^{-1}
Endosulfan II	3.39×10^{-1}	3.49×10^{-1}	3.49×10^{-1}	3.39×10^{-1}	3.36×10^{-1}	3.36×10^{-1}	3.36×10^{-1}
Endosulfan sulfate	2.85×10^{-1}	2.94×10^{-1}	2.94×10^{-1}	2.85×10^{-1}	2.82×10^{-1}	2.82×10^{-1}	2.82×10^{-1}
Endrin	2.99×10^{-1}	3.07×10^{-1}	3.07×10^{-1}	2.99×10^{-1}	2.97×10^{-1}	2.97×10^{-1}	2.97×10^{-1}
Endrin aldehyde	6.12×10^{-1}	6.29×10^{-1}	6.29×10^{-1}	6.12×10^{-1}	6.09×10^{-1}	6.09×10^{-1}	6.09×10^{-1}
Endrin ketone	2.85×10^{-1}	2.95×10^{-1}	2.95×10^{-1}	2.85×10^{-1}	2.82×10^{-1}	2.82×10^{-1}	2.82×10^{-1}
gamma-Chlordane	5.13×10^{-1}	5.26×10^{-1}	5.26×10^{-1}	5.13×10^{-1}	5.05×10^{-1}	5.05×10^{-1}	5.05×10^{-1}
Heptachlor epoxide	2.51×10^{-1}	2.56×10^{-1}	2.56×10^{-1}	2.51×10^{-1}	2.49×10^{-1}	2.49×10^{-1}	2.49×10^{-1}
Methoxychlor	6.99×10^{-1}	7.20×10^{-1}	7.20×10^{-1}	6.99×10^{-1}	6.98×10^{-1}	6.98×10^{-1}	6.98×10^{-1}
Perchlorate	1.20×10^{4}	3.77×10^{3}	3.77×10^{3}	1.20×10^{4}	2.05×10^{3}	2.05×10^{3}	2.05×10^{3}

Note:
* When more than one sample group is indicated, the larger of the two EPCs is used

TABLE J-5b Summary of Exposure Point Concentrations in Soil (µg/kg) Used to Calculated Exposure Point Dust Concentrations in Air Future (Post WRF Construction)				
	NEA*			
COPC	Unpaved Road Traffic (0-1', 0-5' Samples)	Excavation (0-1', 0-5' Samples)	Dozing (0-1', 0-5' Samples)	Wind Erosion (0-1', 0-5' Samples)
Aluminum	1.37×10^{7}	1.37×10^{7}	1.37×10^{7}	1.37×10^{7}
Antimony	8.36×10^{1}	8.36×10^{1}	8.36×10^{1}	8.36×10^{1}
Arsenic	4.05×10^{3}	4.05×10^{3}	4.05×10^{3}	4.05×10^{3}
Barium	2.9×10^{5}	2.90×10^{5}	2.90×10^{5}	2.9×10^{5}
Beryllium	6.36×10^{2}	6.36×10^{2}	6.36×10^{2}	6.36×10^{2}
Cadmium	1.03×10^{2}	1.03×10^{2}	1.03×10^{2}	1.03×10^{2}
Chromium (total)	8.27×10^{3}	8.27×10^{3}	8.27×10^{3}	8.27×10^{3}
Cobalt	8.58×10^{3}	8.58×10^{3}	8.58×10^{3}	8.58×10^{3}
Copper	1.36×10^{4}	1.36×10^{4}	1.36×10^{4}	1.36×10^{4}
Iron	2.11×10^{7}	2.11×10^{7}	2.11×10^{7}	2.11×10^{7}
Magnesium	1.18×10^{7}	1.18×10^{7}	1.18×10^{7}	1.18×10^{7}
Manganese	5.52×10^{5}	5.52×10^{5}	5.52×10^{5}	5.52×10^{5}
Mercury	3.02×10^{1}	3.02×10^{1}	3.02×10^{1}	3.02×10^{1}
Molybdenum	5.63×10^{2}	5.63×10^{2}	5.63×10^{2}	5.63×10^{2}
Nickel	1.47×10^{4}	1.47×10^{4}	1.47×10^{4}	1.47×10^{4}
Selenium	3.82×10^{2}	3.82×10^{2}	3.82×10^{2}	3.82×10^{2}
Silver	1.13×10^{2}	1.13×10^{2}	1.13×10^{2}	1.13×10^{2}
Thallium	1.16×10^{2}	1.16×10^{2}	1.16×10^{2}	1.16×10^{2}
Thorium	6.25×10^{3}	6.25×10^{3}	6.25×10^{3}	6.25×10^{3}
Titanium	5.64×10^{5}	5.64×10^{5}	5.64×10^{5}	5.64×10^{5}
Vanadium	2.81×10^{4}	2.81×10^{4}	2.81×10^{4}	2.81×10^{4}
Zinc	5.59×10^{4}	5.59×10^{4}	5.59×10^{4}	5.59×10^{4}
1,2,3,4,6,7,8-HpCDD	8.75×10^{-4}	8.75×10^{-4}	8.75×10^{-4}	8.75×10^{-4}
1,2,3,4,6,7,8-HpCDF	2.26×10^{-3}	2.26×10^{-3}	2.26×10^{-3}	2.26×10^{-3}
1,2,3,4,7,8,9-HpCDF	8.81×10^{-4}	8.81×10^{-4}	8.81×10^{-4}	8.81×10^{-4}
1,2,3,4,7,8-HxCDD	2.14×10^{-4}	2.14×10^{-4}	2.14×10^{-4}	2.14×10^{-4}
1,2,3,4,7,8-HxCDF	1.47×10^{-3}	1.47×10^{-3}	1.47×10^{-3}	1.47×10^{-3}
1,2,3,6,7,8-HxCDD	2.13×10^{-4}	2.13×10^{-4}	2.13×10^{-4}	2.13×10^{-4}
1,2,3,6,7,8-HxCDF	6.65×10^{-4}	6.65×10^{-4}	6.65×10^{-4}	6.65×10^{-4}
1,2,3,7,8,9-HxCDD	1.96×10^{-4}	1.96×10^{-4}	1.96×10^{-4}	1.96×10^{-4}
1,2,3,7,8,9-HxCDF	1.94×10^{-4}	1.94×10^{-4}	1.94×10^{-4}	1.94×10^{-4}
1,2,3,7,8-PeCDD	2.44×10^{-4}	2.44×10^{-4}	2.44×10^{-4}	2.44×10^{-4}
1,2,3,7,8-PeCDF	5.68×10^{-4}	5.68×10^{-4}	5.68×10^{-4}	5.68×10^{-4}
2,3,4,6,7,8-HxCDF	1.93×10^{-4}	1.93×10^{-4}	1.93×10^{-4}	1.93×10^{-4}
2,3,4,7,8-PeCDF	3.63×10^{-4}	3.63×10^{-4}	3.63×10^{-4}	3.63×10^{-4}
2,3,7,8-TCDD	1.62×10^{-4}	1.62×10^{-4}	1.62×10^{-4}	1.62×10^{-4}

TABLE J-5b Summary of Exposure Point Concentrations in Soil (µg/kg) Used to Calculated Exposure Point Dust Concentrations in Air Future (Post WRF Construction)				
	NEA*			
COPC	Unpaved Road Traffic (0-1', 0-5' Samples)	Excavation (0-1', 0-5' Samples)	Dozing (0-1', 0-5' Samples)	Wind Erosion (0-1', 0-5' Samples)
2,3,7,8-TCDF	5.64×10^{-4}	5.64×10^{-4}	5.64×10^{-4}	5.64×10^{-4}
TEQ	8.71×10^{-4}	8.71×10^{-4}	8.71×10^{-4}	8.71×10^{-4}
OCDD	4.16×10^{-3}	4.16×10^{-3}	4.16×10^{-3}	4.16×10^{-3}
OCDF	1.19×10^{-2}	1.19×10^{-2}	1.19×10^{-2}	1.19×10^{-2}
4,4'-DDD	3.41×10^{-1}	3.41×10^{-1}	3.41×10^{-1}	3.41×10^{-1}
4,4'-DDE	7.45×10^{-1}	7.45×10^{-1}	7.45×10^{-1}	7.45×10^{-1}
4,4'-DDT	4.98×10^{-1}	4.98×10^{-1}	4.98×10^{-1}	4.98×10^{-1}
alpha-Chlordane	2.39×10^{-1}	2.39×10^{-1}	2.39×10^{-1}	2.39×10^{-1}
beta-BHC	5.26×10^{-1}	5.26×10^{-1}	5.26×10^{-1}	5.26×10^{-1}
Dieldrin	3.08×10^{-1}	3.08×10^{-1}	3.08×10^{-1}	3.08×10^{-1}
Endosulfan II	3.36×10^{-1}	3.36×10^{-1}	3.36×10^{-1}	3.36×10^{-1}
Endosulfan sulfate	2.82×10^{-1}	2.82×10^{-1}	2.82×10^{-1}	2.82×10^{-1}
Endrin	2.97×10^{-1}	2.97×10^{-1}	2.97×10^{-1}	2.97×10^{-1}
Endrin aldehyde	6.09×10^{-1}	6.09×10^{-1}	6.09×10^{-1}	6.09×10^{-1}
Endrin ketone	2.82×10^{-1}	2.82×10^{-1}	2.82×10^{-1}	2.82×10^{-1}
gamma-Chlordane	5.05×10^{-1}	5.05×10^{-1}	5.05×10^{-1}	5.05×10^{-1}
Heptachlor epoxide	2.49×10^{-1}	2.49×10^{-1}	2.49×10^{-1}	2.49×10^{-1}
Methoxychlor	6.98×10^{-1}	6.98×10^{-1}	6.98×10^{-1}	6.98×10^{-1}
Perchlorate	2.05×10^{3}	2.05×10^{3}	2.05×10^{3}	2.05×10^{3}

Note:
* When more than one sample group is indicated, the larger of the two EPCs is used

TABLE J-6 Chemical-specific Parameters Used to Estimate Passive Volatile Emissions from Ground Water		
Chemical	**H' (unitless)**	**Da (cm^2/sec)**
Acetone	1.59×10^{-3}	1.24×10^{-1}
Carbon tetrachloride	1.25×10^{0}	7.8×10^{-2}
Chloroform	1.5×10^{-1}	1.04×10^{-1}
Tetrachloroethene	7.54×10^{-1}	7.2×10^{-2}
Toluene	2.72×10^{-1}	8.7×10^{-2}
Note: All chemical-specific parameters are taken from USEPA (2001)		

TABLE J-7
Model Parameters Used to Estimate Passive Volatile Emissions from Ground Water

Chemical	EPC (µg/L)	Ca (g/cm^3)	De (cm^2/sec)	J_{LT} ($g/sec\text{-}m^2$)
Northern Exposure Area				
Acetone	3	4.77×10^{-12}	9.63×10^{-3}	1.08×10^{-12}
Carbon tetrachloride	1.6	2.00×10^{-9}	6.06×10^{-3}	2.84×10^{-10}
Chloroform	150	2.25×10^{-8}	8.08×10^{-3}	4.26×10^{-9}
Tetrachloroethene	1	7.54×10^{-10}	5.59×10^{-3}	9.88×10^{-11}
Toluene	0.27	7.34×10^{-11}	6.76×10^{-3}	1.16×10^{-11}
Southern Exposure Area				
Acetone	2.8	4.45×10^{-12}	9.86×10^{-3}	7.50×10^{-13}
Carbon tetrachloride	0.325	4.06×10^{-10}	6.20×10^{-3}	4.30×10^{-11}
Chloroform	93	1.39×10^{-8}	8.27×10^{-3}	1.97×10^{-9}
Tetrachloroethene	3.3	2.49×10^{-9}	5.72×10^{-3}	2.43×10^{-10}
Toluene	0.72	1.96×10^{-10}	6.92×10^{-3}	2.31×10^{-11}

TABLE J-8
Inputs Parameter Values for Johnson & Ettinger Model

Parameter	Value
Chemical concentration in ground water (µg/L)	Chemical-specific EPC
Building ventilation rate (cm^3/s)	125,000[a]
Depth below grade to bottom of enclosed space floor (cm)	15[b]
Depth below grade to water table (cm)	NEA: 427[c] SEA: 585.5[c]
SCS soil type directly above water table[d]	loamy sand (LS)[c]
Average soil/ground water temperature (° C)	23.4[c,f]
Vadose zone SCS soil type[d]	loamy sand (LS)[c]
Vadose zone soil dry bulk density (g/cm^3)	NEA: 1.65[e] SEA: 1.61[e]
Vadose zone total soil porosity	NEA: 0.38[e] SEA: 0.40[e]
Vadose zone water-filled porosity	NEA: 0.12[e] SEA: 0.13[e]
Vadose zone air-filled porosity	NEA: 0.26[e] SEA: 0.27[e]

Notes:
a – Using the default building dimensions in the screening model, this value is equivalent to a building air exchange rate of 1/hr, which is typically used for commercial buildings.
b – The USEPA screening-level model allows for the input of either 15 cm or 200 cm. It was assumed that the building will not have a basement.
c – Based on the results of the May 2001 site characterization field program
d – The USEPA screening model assigns default soil parameters values, depending on the SCS soil type entered into the model.
e – Based on physical soil analyses of samples collected from the vadose zone during the May 2001 site characterization field program
f – The ground water temperature was measured during the May 2001 site characterization program. Average annual ground water temperatures will be lower; however, the cited value is conservative.

TABLE J-9 Exposure Point Concentrations in Air and Contributing Sources WRF Construction Worker During WRF Construction					
COPC	Contributing Sources to the Exposure Point Concentration in Air (µg/m³)				Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions		Volatile Emissions		
	SEA[a]	NEA[b]	SEA	NEA	
Acetone	NA	NA	1.11×10^{-4}	2.14×10^{-5}	1.33×10^{-4}
Carbon tetrachloride	NA	NA	6.39×10^{-3}	5.65×10^{-3}	1.20×10^{-2}
Chloroform	NA	NA	2.93×10^{-1}	8.47×10^{-2}	3.77×10^{-1}
Tetrachloroethene	NA	NA	3.61×10^{-2}	1.97×10^{-3}	3.81×10^{-2}
Toluene	NA	NA	3.44×10^{-3}	2.31×10^{-4}	3.67×10^{-3}
Aluminum	2.1	0.0073	NA	NA	2.1
Antimony	5.40E-05	4.60E-08	NA	NA	5.40E-05
Arsenic	1.50E-03	4.30E-06	NA	NA	1.50E-03
Barium	6.70E-02	1.60E-04	NA	NA	6.70E-02
Beryllium	1.00E-04	3.40E-07	NA	NA	1.00E-04
Cadmium	2.80E-05	8.40E-08	NA	NA	2.80E-05
Chromium (total)	2.20E-03	7.80E-06	NA	NA	2.20E-03
Cobalt	1.30E-03	4.60E-06	NA	NA	1.30E-03
Copper	2.90E-03	1.10E-05	NA	NA	2.90E-03
Iron	3.20E+00	1.10E-02	NA	NA	3.20E+00
Magnesium	1.80E+00	6.30E-03	NA	NA	1.80E+00
Manganese	1.30E-01	3.00E-04	NA	NA	1.30E-01
Mercury	4.40E-06	1.60E-08	NA	NA	4.50E-06
Molybdenum	3.50E-04	7.20E-07	NA	NA	3.50E-04
Nickel	2.20E-03	7.90E-06	NA	NA	2.20E-03
Selenium	9.10E-05	2.00E-07	NA	NA	9.20E-05
Silver	3.90E-05	9.10E-08	NA	NA	3.90E-05
Thallium	4.70E-05	6.20E-08	NA	NA	4.70E-05
Thorium	1.10E-03	4.10E-06	NA	NA	1.20E-03
Titanium	1.20E-01	3.00E-04	NA	NA	1.20E-01
Vanadium	5.30E-03	1.50E-05	NA	NA	5.30E-03
Zinc	9.10E-03	3.00E-05	NA	NA	9.20E-03
1,2,3,4,6,7,8-HpCDD	1.90E-09	2.70E-12	NA	NA	1.90E-09
1,2,3,4,6,7,8-HpCDF	1.20E-08	1.20E-11	NA	NA	1.20E-08
1,2,3,4,7,8,9-HpCDF	5.60E-09	3.50E-12	NA	NA	5.60E-09
1,2,3,4,7,8-HxCDD	1.50E-10	1.60E-13	NA	NA	1.50E-10
1,2,3,4,7,8-HxCDF	6.10E-09	6.20E-12	NA	NA	6.10E-09
1,2,3,6,7,8-HxCDD	3.80E-10	4.90E-13	NA	NA	3.80E-10
1,2,3,6,7,8-HxCDF	4.00E-09	3.10E-12	NA	NA	4.00E-09
1,2,3,7,8,9-HxCDD	3.40E-10	4.30E-13	NA	NA	3.40E-10
1,2,3,7,8,9-HxCDF	7.10E-10	5.30E-13	NA	NA	7.10E-10
1,2,3,7,8-PeCDD	2.50E-10	1.90E-13	NA	NA	2.50E-10
1,2,3,7,8-PeCDF	3.00E-09	2.50E-12	NA	NA	3.10E-09
2,3,4,6,7,8-HxCDF	1.00E-09	7.60E-13	NA	NA	1.00E-09
2,3,4,7,8-PeCDF	1.60E-09	1.40E-12	NA	NA	1.60E-09
2,3,7,8-TCDD	9.20E-11	8.70E-14	NA	NA	9.20E-11
2,3,7,8-TCDF	1.90E-09	1.70E-12	NA	NA	1.90E-09

TABLE J-9 Exposure Point Concentrations in Air and Contributing Sources WRF Construction Worker During WRF Construction					
COPC	Contributing Sources to the Exposure Point Concentration in Air (µg/m³)				Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions		Volatile Emissions		
	SEA[a]	NEA[b]	SEA	NEA	
Dioxins/Furans TEQ	3.00E-09	2.50E-12	NA	NA	3.00E-09
OCDD	9.10E-09	1.10E-11	NA	NA	9.10E-09
OCDF	1.40E-07	7.10E-11	NA	NA	1.40E-07
4,4'-DDD	1.80E-07	3.80E-10	NA	NA	1.80E-07
4,4'-DDE	1.50E-06	1.00E-08	NA	NA	1.50E-06
4,4'-DDT	1.60E-06	9.50E-09	NA	NA	1.60E-06
alpha-Chlordane	1.90E-07	2.70E-10	NA	NA	1.90E-07
beta-BHC	3.70E-07	2.80E-09	NA	NA	3.70E-07
Dieldrin	2.60E-07	3.40E-10	NA	NA	2.60E-07
Endosulfan II	1.90E-07	3.80E-10	NA	NA	1.90E-07
Endosulfan sulfate	3.30E-07	3.10E-10	NA	NA	3.30E-07
Endrin	7.00E-08	2.90E-09	NA	NA	7.30E-08
Endrin aldehyde	1.60E-07	2.10E-09	NA	NA	1.60E-07
Endrin ketone	1.30E-07	3.10E-10	NA	NA	1.30E-07
gamma-Chlordane	2.00E-07	5.60E-10	NA	NA	2.00E-07
Heptachlor epoxide	5.80E-08	2.80E-10	NA	NA	5.90E-08
Methoxychlor	3.20E-07	3.90E-09	NA	NA	3.20E-07
Perchlorate	1.90E-03	8.80E-06	NA	NA	1.90E-03

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Emission sources include traffic on unpaved roads, excavation, dozing, and wind erosion
b - Construction activities include traffic on unpaved roads, grading, and wind erosion

TABLE J-10 Exposure Point Concentrations in Air and Contributing Sources Off-site Resident During WRF Construction					
COPC	Contributing Sources to the Exposure Point Concentration in Air (μg/m³)				Exposure Point Concentration in Air (μg/m³)
	Fugitive Dust Emissions		Volatile Emissions		
	SEA[a]	NEA[b]	SEA	NEA	
Acetone	NA	NA	1.43×10^{-5}	2.14×10^{-5}	3.57×10^{-5}
Carbon tetrachloride	NA	NA	8.22×10^{-4}	5.65×10^{-3}	6.47×10^{-3}
Chloroform	NA	NA	3.76×10^{-2}	8.47×10^{-2}	1.22×10^{-1}
Tetrachloroethene	NA	NA	4.65×10^{-3}	1.97×10^{-3}	6.61×10^{-3}
Toluene	NA	NA	4.42×10^{-4}	2.31×10^{-4}	6.73×10^{-4}
Aluminum	1.16×10^{-2}	1.67×10^{-3}	NA	NA	1.32×10^{-2}
Antimony	2.90×10^{-7}	1.05×10^{-8}	NA	NA	3.00×10^{-7}
Arsenic	8.60×10^{-6}	9.71×10^{-7}	NA	NA	9.57×10^{-6}
Barium	3.71×10^{-4}	3.55×10^{-5}	NA	NA	4.06×10^{-4}
Beryllium	5.67×10^{-7}	7.78×10^{-8}	NA	NA	6.45×10^{-7}
Cadmium	1.55×10^{-7}	1.91×10^{-8}	NA	NA	1.74×10^{-7}
Chromium (total)	1.25×10^{-5}	1.79×10^{-6}	NA	NA	1.43×10^{-5}
Cobalt	7.47×10^{-6}	1.05×10^{-6}	NA	NA	8.52×10^{-6}
Copper	1.61×10^{-5}	2.61×10^{-6}	NA	NA	1.87×10^{-5}
Iron	1.78×10^{-2}	2.59×10^{-3}	NA	NA	2.04×10^{-2}
Magnesium	1.07×10^{-2}	1.45×10^{-3}	NA	NA	1.21×10^{-2}
Manganese	7.03×10^{-4}	6.75×10^{-5}	NA	NA	7.71×10^{-4}
Mercury	2.56×10^{-8}	3.69×10^{-9}	NA	NA	2.93×10^{-8}
Molybdenum	1.92×10^{-6}	1.65×10^{-7}	NA	NA	2.08×10^{-6}
Nickel	1.23×10^{-5}	1.80×10^{-6}	NA	NA	1.41×10^{-5}
Selenium	5.21×10^{-7}	4.68×10^{-8}	NA	NA	5.68×10^{-7}
Silver	2.14×10^{-7}	2.08×10^{-8}	NA	NA	2.35×10^{-7}
Thallium	2.53×10^{-7}	1.42×10^{-8}	NA	NA	2.67×10^{-7}
Thorium	6.55×10^{-6}	9.33×10^{-7}	NA	NA	7.48×10^{-6}
Titanium	6.59×10^{-4}	6.90×10^{-5}	NA	NA	7.28×10^{-4}
Vanadium	2.98×10^{-5}	3.45×10^{-6}	NA	NA	3.33×10^{-5}
Zinc	5.10×10^{-5}	6.85×10^{-6}	NA	NA	5.78×10^{-5}
1,2,3,4,6,7,8-HpCDD	1.02×10^{-11}	6.12×10^{-13}	NA	NA	1.08×10^{-11}
1,2,3,4,6,7,8-HpCDF	6.15×10^{-11}	2.76×10^{-12}	NA	NA	6.43×10^{-11}
1,2,3,4,7,8,9-HpCDF	2.99×10^{-11}	7.96×10^{-13}	NA	NA	3.07×10^{-11}
1,2,3,4,7,8-HxCDD	8.15×10^{-13}	3.59×10^{-14}	NA	NA	8.51×10^{-13}
1,2,3,4,7,8-HxCDF	3.23×10^{-11}	1.41×10^{-12}	NA	NA	3.37×10^{-11}
1,2,3,6,7,8-HxCDD	2.02×10^{-12}	1.13×10^{-13}	NA	NA	2.13×10^{-12}
1,2,3,6,7,8-HxCDF	2.12×10^{-11}	7.18×10^{-13}	NA	NA	2.19×10^{-11}
1,2,3,7,8,9-HxCDD	1.81×10^{-12}	9.79×10^{-14}	NA	NA	1.91×10^{-12}
1,2,3,7,8,9-HxCDF	3.77×10^{-12}	1.20×10^{-13}	NA	NA	3.89×10^{-12}

TABLE J-10 Exposure Point Concentrations in Air and Contributing Sources Off-site Resident During WRF Construction					
	Contributing Sources to the Exposure Point Concentration in Air (µg/m³)				Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions		Volatile Emissions		
COPC	SEA[a]	NEA[b]	SEA	NEA	
1,2,3,7,8-PeCDD	1.33×10^{-12}	4.42×10^{-14}	NA	NA	1.38×10^{-12}
1,2,3,7,8-PeCDF	1.63×10^{-11}	5.79×10^{-13}	NA	NA	1.68×10^{-11}
2,3,4,6,7,8-HxCDF	5.34×10^{-12}	1.75×10^{-13}	NA	NA	5.52×10^{-12}
2,3,4,7,8-PeCDF	8.57×10^{-12}	3.16×10^{-13}	NA	NA	8.88×10^{-12}
2,3,7,8-TCDD	4.97×10^{-13}	1.98×10^{-14}	NA	NA	5.17×10^{-13}
2,3,7,8-TCDF	9.91×10^{-12}	3.88×10^{-13}	NA	NA	1.03×10^{-11}
Dioxins/Furans TEQ	1.58×10^{-11}	5.62×10^{-13}	NA	NA	1.64×10^{-11}
OCDD	4.86×10^{-11}	2.54×10^{-12}	NA	NA	5.11×10^{-11}
OCDF	7.28×10^{-10}	1.63×10^{-11}	NA	NA	7.45×10^{-10}
4,4'-DDD	9.69×10^{-10}	8.62×10^{-11}	NA	NA	1.06×10^{-9}
4,4'-DDE	7.78×10^{-9}	2.34×10^{-9}	NA	NA	1.01×10^{-8}
4,4'-DDT	8.45×10^{-9}	2.18×10^{-9}	NA	NA	1.06×10^{-8}
alpha-Chlordane	1.01×10^{-9}	6.18×10^{-11}	NA	NA	1.07×10^{-9}
beta-BHC	2.00×10^{-9}	6.47×10^{-10}	NA	NA	2.64×10^{-9}
Dieldrin	1.42×10^{-9}	7.86×10^{-11}	NA	NA	1.50×10^{-9}
Endosulfan II	1.03×10^{-9}	8.56×10^{-11}	NA	NA	1.11×10^{-9}
Endosulfan sulfate	1.75×10^{-9}	7.17×10^{-11}	NA	NA	1.82×10^{-9}
Endrin	3.99×10^{-10}	6.70×10^{-10}	NA	NA	1.07×10^{-9}
Endrin aldehyde	9.06×10^{-10}	4.80×10^{-10}	NA	NA	1.39×10^{-9}
Endrin ketone	7.05×10^{-10}	7.17×10^{-11}	NA	NA	7.77×10^{-10}
gamma-Chlordane	1.12×10^{-9}	1.29×10^{-10}	NA	NA	1.25×10^{-9}
Heptachlor epoxide	3.33×10^{-10}	6.42×10^{-11}	NA	NA	3.97×10^{-10}
Methoxychlor	1.73×10^{-9}	8.90×10^{-10}	NA	NA	2.62×10^{-9}
Perchlorate	1.01×10^{-5}	2.02×10^{-6}	NA	NA	1.21×10^{-5}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Emission sources include traffic on unpaved roads, excavation, dozing, and wind erosion
b - Construction activities include traffic on unpaved roads, grading, and wind erosion

TABLE J-11 Exposure Point Concentrations in Air and Contributing Sources Off-site Worker During WRF Construction					
	Contributing Sources to the Exposure Point Concentration in Air (µg/m³)				Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions		Volatile Emissions		
COPC	SEA[a]	NEA[b]	SEA	NEA	
Acetone	NA	NA	1.43×10^{-5}	2.14×10^{-5}	3.57×10^{-5}
Carbon tetrachloride	NA	NA	8.22×10^{-4}	5.65×10^{-3}	6.47×10^{-3}
Chloroform	NA	NA	3.76×10^{-2}	8.47×10^{-2}	1.22×10^{-1}
Tetrachloroethene	NA	NA	4.65×10^{-3}	1.97×10^{-3}	6.61×10^{-3}
Toluene	NA	NA	4.42×10^{-4}	2.31×10^{-4}	6.73×10^{-4}
Aluminum	1.16×10^{-2}	1.67×10^{-3}	NA	NA	1.32×10^{-2}
Antimony	2.90×10^{-7}	1.05×10^{-8}	NA	NA	3.00×10^{-7}
Arsenic	8.60×10^{-6}	9.71×10^{-7}	NA	NA	9.57×10^{-6}
Barium	3.71×10^{-4}	3.55×10^{-5}	NA	NA	4.06×10^{-4}
Beryllium	5.67×10^{-7}	7.78×10^{-8}	NA	NA	6.45×10^{-7}
Cadmium	1.55×10^{-7}	1.91×10^{-8}	NA	NA	1.74×10^{-7}
Chromium (total)	1.25×10^{-5}	1.79×10^{-6}	NA	NA	1.43×10^{-5}
Cobalt	7.47×10^{-6}	1.05×10^{-6}	NA	NA	8.52×10^{-6}
Copper	1.61×10^{-5}	2.61×10^{-6}	NA	NA	1.87×10^{-5}
Iron	1.78×10^{-2}	2.59×10^{-3}	NA	NA	2.04×10^{-2}
Magnesium	1.07×10^{-2}	1.45×10^{-3}	NA	NA	1.21×10^{-2}
Manganese	7.03×10^{-4}	6.75×10^{-5}	NA	NA	7.71×10^{-4}
Mercury	2.56×10^{-8}	3.69×10^{-9}	NA	NA	2.93×10^{-8}
Molybdenum	1.92×10^{-6}	1.65×10^{-7}	NA	NA	2.08×10^{-6}
Nickel	1.23×10^{-5}	1.80×10^{-6}	NA	NA	1.41×10^{-5}
Selenium	5.21×10^{-7}	4.68×10^{-8}	NA	NA	5.68×10^{-7}
Silver	2.14×10^{-7}	2.08×10^{-8}	NA	NA	2.35×10^{-7}
Thallium	2.53×10^{-7}	1.42×10^{-8}	NA	NA	2.67×10^{-7}
Thorium	6.55×10^{-6}	9.33×10^{-7}	NA	NA	7.48×10^{-6}
Titanium	6.59×10^{-4}	6.90×10^{-5}	NA	NA	7.28×10^{-4}
Vanadium	2.98×10^{-5}	3.45×10^{-6}	NA	NA	3.33×10^{-5}
Zinc	5.10×10^{-5}	6.85×10^{-6}	NA	NA	5.78×10^{-5}
1,2,3,4,6,7,8-HpCDD	1.02×10^{-11}	6.12×10^{-13}	NA	NA	1.08×10^{-11}
1,2,3,4,6,7,8-HpCDF	6.15×10^{-11}	2.76×10^{-12}	NA	NA	6.43×10^{-11}
1,2,3,4,7,8,9-HpCDF	2.99×10^{-11}	7.96×10^{-13}	NA	NA	3.07×10^{-11}
1,2,3,4,7,8-HxCDD	8.15×10^{-13}	3.59×10^{-14}	NA	NA	8.51×10^{-13}
1,2,3,4,7,8-HxCDF	3.23×10^{-11}	1.41×10^{-12}	NA	NA	3.37×10^{-11}
1,2,3,6,7,8-HxCDD	2.02×10^{-12}	1.13×10^{-13}	NA	NA	2.13×10^{-12}
1,2,3,6,7,8-HxCDF	2.12×10^{-11}	7.18×10^{-13}	NA	NA	2.19×10^{-11}
1,2,3,7,8,9-HxCDD	1.81×10^{-12}	9.79×10^{-14}	NA	NA	1.91×10^{-12}
1,2,3,7,8,9-HxCDF	3.77×10^{-12}	1.20×10^{-13}	NA	NA	3.89×10^{-12}

TABLE J-11
Exposure Point Concentrations in Air and Contributing Sources
Off-site Worker
During WRF Construction

COPC	Contributing Sources to the Exposure Point Concentration in Air (µg/m³)				Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions		Volatile Emissions		
	SEA[a]	NEA[b]	SEA	NEA	
1,2,3,7,8-PeCDD	1.33×10^{-12}	4.42×10^{-14}	NA	NA	1.38×10^{-12}
1,2,3,7,8-PeCDF	1.63×10^{-11}	5.79×10^{-13}	NA	NA	1.68×10^{-11}
2,3,4,6,7,8-HxCDF	5.34×10^{-12}	1.75×10^{-13}	NA	NA	5.52×10^{-12}
2,3,4,7,8-PeCDF	8.57×10^{-12}	3.16×10^{-13}	NA	NA	8.88×10^{-12}
2,3,7,8-TCDD	4.97×10^{-13}	1.98×10^{-14}	NA	NA	5.17×10^{-13}
2,3,7,8-TCDF	9.91×10^{-12}	3.88×10^{-13}	NA	NA	1.03×10^{-11}
Dioxins/Furans TEQ	1.58×10^{-11}	5.62×10^{-13}	NA	NA	1.64×10^{-11}
OCDD	4.86×10^{-11}	2.54×10^{-12}	NA	NA	5.11×10^{-11}
OCDF	7.28×10^{-10}	1.63×10^{-11}	NA	NA	7.45×10^{-10}
4,4'-DDD	9.69×10^{-10}	8.62×10^{-11}	NA	NA	1.06×10^{-9}
4,4'-DDE	7.78×10^{-9}	2.34×10^{-9}	NA	NA	1.01×10^{-8}
4,4'-DDT	8.45×10^{-9}	2.18×10^{-9}	NA	NA	1.06×10^{-8}
alpha-Chlordane	1.01×10^{-9}	6.18×10^{-11}	NA	NA	1.07×10^{-9}
beta-BHC	2.00×10^{-9}	6.47×10^{-10}	NA	NA	2.64×10^{-9}
Dieldrin	1.42×10^{-9}	7.86×10^{-11}	NA	NA	1.50×10^{-9}
Endosulfan II	1.03×10^{-9}	8.56×10^{-11}	NA	NA	1.11×10^{-9}
Endosulfan sulfate	1.75×10^{-9}	7.17×10^{-11}	NA	NA	1.82×10^{-9}
Endrin	3.99×10^{-10}	6.70×10^{-10}	NA	NA	1.07×10^{-9}
Endrin aldehyde	9.06×10^{-10}	4.80×10^{-10}	NA	NA	1.39×10^{-9}
Endrin ketone	7.05×10^{-10}	7.17×10^{-11}	NA	NA	7.77×10^{-10}
gamma-Chlordane	1.12×10^{-9}	1.29×10^{-10}	NA	NA	1.25×10^{-9}
Heptachlor epoxide	3.33×10^{-10}	6.42×10^{-11}	NA	NA	3.97×10^{-10}
Methoxychlor	1.73×10^{-9}	8.90×10^{-10}	NA	NA	2.62×10^{-9}
Perchlorate	1.01×10^{-5}	2.02×10^{-6}	NA	NA	1.21×10^{-5}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Emission sources include traffic on unpaved roads, excavation, dozing, and wind erosion
b - Construction activities include traffic on unpaved roads, grading, and wind erosion

TABLE J-12 Exposure Point Concentrations in Air and Contributing Sources Default NEA Construction Worker Future (Post WRF Construction)			
COPC	Contributing Sources to the Exposure Point Concentrations in Air (µg/m³)		Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
Acetone	NA	1.25×10^{-4}	1.25×10^{-4}
Carbon tetrachloride	NA	3.28×10^{-2}	3.28×10^{-2}
Chloroform	NA	4.93×10^{-1}	4.93×10^{-1}
Tetrachloroethene	NA	1.14×10^{-2}	1.14×10^{-2}
Toluene	NA	1.34×10^{-3}	1.34×10^{-3}
Aluminum	2.14×10^{0}	NA	2.14×10^{0}
Antimony	1.34×10^{-5}	NA	1.34×10^{-5}
Arsenic	1.24×10^{-3}	NA	1.24×10^{-3}
Barium	4.53×10^{-2}	NA	4.53×10^{-2}
Beryllium	9.94×10^{-5}	NA	9.94×10^{-5}
Cadmium	2.44×10^{-5}	NA	2.44×10^{-5}
Chromium (total)	2.29×10^{-3}	NA	2.29×10^{-3}
Cobalt	1.34×10^{-3}	NA	1.34×10^{-3}
Copper	3.33×10^{-3}	NA	3.33×10^{-3}
Iron	3.30×10^{0}	NA	3.30×10^{0}
Magnesium	1.85×10^{0}	NA	1.85×10^{0}
Manganese	8.63×10^{-2}	NA	8.63×10^{-2}
Mercury	4.72×10^{-6}	NA	4.72×10^{-6}
Molybdenum	2.10×10^{-4}	NA	2.10×10^{-4}
Nickel	2.30×10^{-3}	NA	2.30×10^{-3}
Selenium	5.97×10^{-5}	NA	5.97×10^{-5}
Silver	2.66×10^{-5}	NA	2.66×10^{-5}
Thallium	1.81×10^{-5}	NA	1.81×10^{-5}
Thorium	1.19×10^{-3}	NA	1.19×10^{-3}
Titanium	8.81×10^{-2}	NA	8.81×10^{-2}
Vanadium	4.40×10^{-3}	NA	4.40×10^{-3}
Zinc	8.74×10^{-3}	NA	8.74×10^{-3}
1,2,3,4,6,7,8-HpCDD	7.81×10^{-10}	NA	7.81×10^{-10}
1,2,3,4,6,7,8-HpCDF	3.53×10^{-9}	NA	3.53×10^{-9}
1,2,3,4,7,8,9-HpCDF	1.02×10^{-9}	NA	1.02×10^{-9}
1,2,3,4,7,8-HxCDD	4.59×10^{-11}	NA	4.59×10^{-11}
1,2,3,4,7,8-HxCDF	1.80×10^{-9}	NA	1.80×10^{-9}
1,2,3,6,7,8-HxCDD	1.44×10^{-10}	NA	1.44×10^{-10}
1,2,3,6,7,8-HxCDF	9.17×10^{-10}	NA	9.17×10^{-10}
1,2,3,7,8,9-HxCDD	1.25×10^{-10}	NA	1.25×10^{-10}
1,2,3,7,8,9-HxCDF	1.53×10^{-10}	NA	1.53×10^{-10}

TABLE J-12 Exposure Point Concentrations in Air and Contributing Sources Default NEA Construction Worker Future (Post WRF Construction)			
	Contributing Sources to the Exposure Point Concentrations in Air (µg/m³)		Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
COPC	NEA[a]	NEA	
1,2,3,7,8-PeCDD	5.65×10^{-11}	NA	5.65×10^{-11}
1,2,3,7,8-PeCDF	7.39×10^{-10}	NA	7.39×10^{-10}
2,3,4,6,7,8-HxCDF	2.23×10^{-10}	NA	2.23×10^{-10}
2,3,4,7,8-PeCDF	4.04×10^{-10}	NA	4.04×10^{-10}
2,3,7,8-TCDD	2.53×10^{-11}	NA	2.53×10^{-11}
2,3,7,8-TCDF	4.96×10^{-10}	NA	4.96×10^{-10}
Dioxins/Furans TEQ	7.18×10^{-10}	NA	7.18×10^{-10}
OCDD	3.24×10^{-9}	NA	3.24×10^{-9}
OCDF	2.08×10^{-8}	NA	2.08×10^{-8}
4,4'-DDD	1.10×10^{-7}	NA	1.10×10^{-7}
4,4'-DDE	2.99×10^{-6}	NA	2.99×10^{-6}
4,4'-DDT	2.78×10^{-6}	NA	2.78×10^{-6}
alpha-Chlordane	7.89×10^{-8}	NA	7.89×10^{-8}
beta-BHC	8.26×10^{-7}	NA	8.26×10^{-7}
Dieldrin	1.00×10^{-7}	NA	1.00×10^{-7}
Endosulfan II	1.09×10^{-7}	NA	1.09×10^{-7}
Endosulfan sulfate	9.16×10^{-8}	NA	9.16×10^{-8}
Endrin	8.55×10^{-7}	NA	8.55×10^{-7}
Endrin aldehyde	6.13×10^{-7}	NA	6.13×10^{-7}
Endrin ketone	9.16×10^{-8}	NA	9.16×10^{-8}
gamma-Chlordane	1.65×10^{-7}	NA	1.65×10^{-7}
Heptachlor epoxide	8.19×10^{-8}	NA	8.19×10^{-8}
Methoxychlor	1.14×10^{-6}	NA	1.14×10^{-6}
Perchlorate	2.58×10^{-3}	NA	2.58×10^{-3}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Emission sources include traffic on unpaved roads, excavation, dozing, and wind erosion

TABLE J-13
Exposure Point Concentrations in Air and Contributing Sources
SEA Maintenance Worker
Future (Post WRF Construction)

COPC	Contributing Sources to the Exposure Point Concentrations in Air (μg/m³)		Exposure Point Concentration in Air (μg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
Acetone	NA	2.14×10^{-5}	2.14×10^{-5}
Carbon tetrachloride	NA	5.65×10^{-3}	5.65×10^{-3}
Chloroform	NA	8.47×10^{-2}	8.47×10^{-2}
Tetrachloroethene	NA	1.97×10^{-3}	1.97×10^{-3}
Toluene	NA	2.31×10^{-4}	2.31×10^{-4}
Aluminum	8.87×10^{-4}	NA	8.87×10^{-4}
Antimony	5.57×10^{-9}	NA	5.57×10^{-9}
Arsenic	5.14×10^{-7}	NA	5.14×10^{-7}
Barium	1.88×10^{-5}	NA	1.88×10^{-5}
Beryllium	4.12×10^{-8}	NA	4.12×10^{-8}
Cadmium	1.01×10^{-8}	NA	1.01×10^{-8}
Chromium (total)	9.48×10^{-7}	NA	9.48×10^{-7}
Cobalt	5.56×10^{-7}	NA	5.56×10^{-7}
Copper	1.38×10^{-6}	NA	1.38×10^{-6}
Iron	1.37×10^{-3}	NA	1.37×10^{-3}
Magnesium	7.66×10^{-4}	NA	7.66×10^{-4}
Manganese	3.58×10^{-5}	NA	3.58×10^{-5}
Mercury	1.96×10^{-9}	NA	1.96×10^{-9}
Molybdenum	8.72×10^{-8}	NA	8.72×10^{-8}
Nickel	9.52×10^{-7}	NA	9.52×10^{-7}
Selenium	2.48×10^{-8}	NA	2.48×10^{-8}
Silver	1.10×10^{-8}	NA	1.10×10^{-8}
Thallium	7.52×10^{-9}	NA	7.52×10^{-9}
Thorium	4.95×10^{-7}	NA	4.95×10^{-7}
Titanium	3.66×10^{-5}	NA	3.66×10^{-5}
Vanadium	1.83×10^{-6}	NA	1.83×10^{-6}
Zinc	3.63×10^{-6}	NA	3.63×10^{-6}
1,2,3,4,6,7,8-HpCDD	3.24×10^{-13}	NA	3.24×10^{-13}
1,2,3,4,6,7,8-HpCDF	1.46×10^{-12}	NA	1.46×10^{-12}
1,2,3,4,7,8,9-HpCDF	4.22×10^{-13}	NA	4.22×10^{-13}
1,2,3,4,7,8-HxCDD	1.90×10^{-14}	NA	1.90×10^{-14}
1,2,3,4,7,8-HxCDF	7.47×10^{-13}	NA	7.47×10^{-13}
1,2,3,6,7,8-HxCDD	5.98×10^{-14}	NA	5.98×10^{-14}
1,2,3,6,7,8-HxCDF	3.81×10^{-13}	NA	3.81×10^{-13}
1,2,3,7,8,9-HxCDD	5.19×10^{-14}	NA	5.19×10^{-14}
1,2,3,7,8,9-HxCDF	6.36×10^{-14}	NA	6.36×10^{-14}

TABLE J-13 Exposure Point Concentrations in Air and Contributing Sources SEA Maintenance Worker Future (Post WRF Construction)			
COPC	Contributing Sources to the Exposure Point Concentrations in Air (µg/m³)		Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
1,2,3,7,8-PeCDD	2.34×10^{-14}	NA	2.34×10^{-14}
1,2,3,7,8-PeCDF	3.07×10^{-13}	NA	3.07×10^{-13}
2,3,4,6,7,8-HxCDF	9.25×10^{-14}	NA	9.25×10^{-14}
2,3,4,7,8-PeCDF	1.67×10^{-13}	NA	1.67×10^{-13}
2,3,7,8-TCDD	1.05×10^{-14}	NA	1.05×10^{-14}
2,3,7,8-TCDF	2.06×10^{-13}	NA	2.06×10^{-13}
Dioxins/Furans TEQ	2.98×10^{-13}	NA	2.98×10^{-13}
OCDD	1.34×10^{-12}	NA	1.34×10^{-12}
OCDF	8.63×10^{-12}	NA	8.63×10^{-12}
4,4'-DDD	4.57×10^{-11}	NA	4.57×10^{-11}
4,4'-DDE	1.24×10^{-9}	NA	1.24×10^{-9}
4,4'-DDT	1.15×10^{-9}	NA	1.15×10^{-9}
alpha-Chlordane	3.27×10^{-11}	NA	3.27×10^{-11}
beta-BHC	3.43×10^{-10}	NA	3.43×10^{-10}
Dieldrin	4.17×10^{-11}	NA	4.17×10^{-11}
Endosulfan II	4.54×10^{-11}	NA	4.54×10^{-11}
Endosulfan sulfate	3.80×10^{-11}	NA	3.80×10^{-11}
Endrin	3.55×10^{-10}	NA	3.55×10^{-10}
Endrin aldehyde	2.54×10^{-10}	NA	2.54×10^{-10}
Endrin ketone	3.80×10^{-11}	NA	3.80×10^{-11}
gamma-Chlordane	6.83×10^{-11}	NA	6.83×10^{-11}
Heptachlor epoxide	3.40×10^{-11}	NA	3.40×10^{-11}
Methoxychlor	4.72×10^{-10}	NA	4.72×10^{-10}
Perchlorate	1.07×10^{-6}	NA	1.07×10^{-6}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Fugitive emissions due to include wind erosion in the NEA

TABLE J-14 Exposure Point Concentrations in Air and Contributing Sources NEA Maintenance Worker Future (Post WRF Construction)			
	Contributing Sources to the Exposure Point Concentrations in Air (µg/m³)		Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
COPC	NEA[a]	NEA	
Acetone	NA	2.74×10^{-5}	2.74×10^{-5}
Carbon tetrachloride	NA	7.24×10^{-3}	7.24×10^{-3}
Chloroform	NA	1.09×10^{-1}	1.09×10^{-1}
Tetrachloroethene	NA	2.52×10^{-3}	2.52×10^{-3}
Toluene	NA	2.96×10^{-4}	2.96×10^{-4}
Aluminum	5.68×10^{-4}	NA	5.68×10^{-4}
Antimony	3.57×10^{-9}	NA	3.57×10^{-9}
Arsenic	3.29×10^{-7}	NA	3.29×10^{-7}
Barium	1.20×10^{-5}	NA	1.20×10^{-5}
Beryllium	2.64×10^{-8}	NA	2.64×10^{-8}
Cadmium	6.48×10^{-9}	NA	6.48×10^{-9}
Chromium (total)	6.07×10^{-7}	NA	6.07×10^{-7}
Cobalt	3.56×10^{-7}	NA	3.56×10^{-7}
Copper	8.84×10^{-7}	NA	8.84×10^{-7}
Iron	8.77×10^{-4}	NA	8.77×10^{-4}
Magnesium	4.90×10^{-4}	NA	4.90×10^{-4}
Manganese	2.29×10^{-5}	NA	2.29×10^{-5}
Mercury	1.25×10^{-9}	NA	1.25×10^{-9}
Molybdenum	5.58×10^{-8}	NA	5.58×10^{-8}
Nickel	6.10×10^{-7}	NA	6.10×10^{-7}
Selenium	1.59×10^{-8}	NA	1.59×10^{-8}
Silver	7.05×10^{-9}	NA	7.05×10^{-9}
Thallium	4.81×10^{-9}	NA	4.81×10^{-9}
Thorium	3.17×10^{-7}	NA	3.17×10^{-7}
Titanium	2.34×10^{-5}	NA	2.34×10^{-5}
Vanadium	1.17×10^{-6}	NA	1.17×10^{-6}
Zinc	2.32×10^{-6}	NA	2.32×10^{-6}
1,2,3,4,6,7,8-HpCDD	2.08×10^{-13}	NA	2.08×10^{-13}
1,2,3,4,6,7,8-HpCDF	9.37×10^{-13}	NA	9.37×10^{-13}
1,2,3,4,7,8,9-HpCDF	2.70×10^{-13}	NA	2.70×10^{-13}
1,2,3,4,7,8-HxCDD	1.22×10^{-14}	NA	1.22×10^{-14}
1,2,3,4,7,8-HxCDF	4.78×10^{-13}	NA	4.78×10^{-13}
1,2,3,6,7,8-HxCDD	3.83×10^{-14}	NA	3.83×10^{-14}
1,2,3,6,7,8-HxCDF	2.44×10^{-13}	NA	2.44×10^{-13}
1,2,3,7,8,9-HxCDD	3.32×10^{-14}	NA	3.32×10^{-14}
1,2,3,7,8,9-HxCDF	4.07×10^{-14}	NA	4.07×10^{-14}

TABLE J-14
Exposure Point Concentrations in Air and Contributing Sources
NEA Maintenance Worker
Future (Post WRF Construction)

COPC	Contributing Sources to the Exposure Point Concentrations in Air (µg/m³)		Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
1,2,3,7,8-PeCDD	1.50×10^{-14}	NA	1.50×10^{-14}
1,2,3,7,8-PeCDF	1.96×10^{-13}	NA	1.96×10^{-13}
2,3,4,6,7,8-HxCDF	5.92×10^{-14}	NA	5.92×10^{-14}
2,3,4,7,8-PeCDF	1.07×10^{-13}	NA	1.07×10^{-13}
2,3,7,8-TCDD	6.71×10^{-15}	NA	6.71×10^{-15}
2,3,7,8-TCDF	1.32×10^{-13}	NA	1.32×10^{-13}
Dioxins/Furans TEQ	1.91×10^{-13}	NA	1.91×10^{-13}
OCDD	8.60×10^{-13}	NA	8.60×10^{-13}
OCDF	5.53×10^{-12}	NA	5.53×10^{-12}
4,4'-DDD	2.93×10^{-11}	NA	2.93×10^{-11}
4,4'-DDE	7.94×10^{-10}	NA	7.94×10^{-10}
4,4'-DDT	7.39×10^{-10}	NA	7.39×10^{-10}
alpha-Chlordane	2.10×10^{-11}	NA	2.10×10^{-11}
beta-BHC	2.19×10^{-10}	NA	2.19×10^{-10}
Dieldrin	2.67×10^{-11}	NA	2.67×10^{-11}
Endosulfan II	2.91×10^{-11}	NA	2.91×10^{-11}
Endosulfan sulfate	2.43×10^{-11}	NA	2.43×10^{-11}
Endrin	2.27×10^{-10}	NA	2.27×10^{-10}
Endrin aldehyde	1.63×10^{-10}	NA	1.63×10^{-10}
Endrin ketone	2.43×10^{-11}	NA	2.43×10^{-11}
gamma-Chlordane	4.37×10^{-11}	NA	4.37×10^{-11}
Heptachlor epoxide	2.18×10^{-11}	NA	2.18×10^{-11}
Methoxychlor	3.02×10^{-10}	NA	3.02×10^{-10}
Perchlorate	6.85×10^{-7}	NA	6.85×10^{-7}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Fugitive emissions due to include wind erosion in the NEA

TABLE J-15 Trespassing Child Future (Post WRF Construction)			
COPC	Contributing Sources to the Exposure Point Concentrations in Air (µg/m³)		Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
Acetone	NA	2.74×10^{-5}	2.74×10^{-5}
Carbon tetrachloride	NA	7.24×10^{-3}	7.24×10^{-3}
Chloroform	NA	1.09×10^{-1}	1.09×10^{-1}
Tetrachloroethene	NA	2.52×10^{-3}	2.52×10^{-3}
Toluene	NA	2.96×10^{-4}	2.96×10^{-4}
Aluminum	1.14×10^{-3}	NA	1.14×10^{-3}
Antimony	7.13×10^{-9}	NA	7.13×10^{-9}
Arsenic	6.59×10^{-7}	NA	6.59×10^{-7}
Barium	2.41×10^{-5}	NA	2.41×10^{-5}
Beryllium	5.28×10^{-8}	NA	5.28×10^{-8}
Cadmium	1.30×10^{-8}	NA	1.30×10^{-8}
Chromium (total)	1.21×10^{-6}	NA	1.21×10^{-6}
Cobalt	7.12×10^{-7}	NA	7.12×10^{-7}
Copper	1.77×10^{-6}	NA	1.77×10^{-6}
Iron	1.75×10^{-3}	NA	1.75×10^{-3}
Magnesium	9.81×10^{-4}	NA	9.81×10^{-4}
Manganese	4.58×10^{-5}	NA	4.58×10^{-5}
Mercury	2.51×10^{-9}	NA	2.51×10^{-9}
Molybdenum	1.12×10^{-7}	NA	1.12×10^{-7}
Nickel	1.22×10^{-6}	NA	1.22×10^{-6}
Selenium	3.17×10^{-8}	NA	3.17×10^{-8}
Silver	1.41×10^{-8}	NA	1.41×10^{-8}
Thallium	9.63×10^{-9}	NA	9.63×10^{-9}
Thorium	6.33×10^{-7}	NA	6.33×10^{-7}
Titanium	4.68×10^{-5}	NA	4.68×10^{-5}
Vanadium	2.34×10^{-6}	NA	2.34×10^{-6}
Zinc	4.65×10^{-6}	NA	4.65×10^{-6}
1,2,3,4,6,7,8-HpCDD	4.15×10^{-13}	NA	4.15×10^{-13}
1,2,3,4,6,7,8-HpCDF	1.87×10^{-12}	NA	1.87×10^{-12}
1,2,3,4,7,8,9-HpCDF	5.40×10^{-13}	NA	5.40×10^{-13}
1,2,3,4,7,8-HxCDD	2.44×10^{-14}	NA	2.44×10^{-14}
1,2,3,4,7,8-HxCDF	9.57×10^{-13}	NA	9.57×10^{-13}
1,2,3,6,7,8-HxCDD	7.66×10^{-14}	NA	7.66×10^{-14}
1,2,3,6,7,8-HxCDF	4.87×10^{-13}	NA	4.87×10^{-13}
1,2,3,7,8,9-HxCDD	6.64×10^{-14}	NA	6.64×10^{-14}
1,2,3,7,8,9-HxCDF	8.14×10^{-14}	NA	8.14×10^{-14}
1,2,3,7,8-PeCDD	3.00×10^{-14}	NA	3.00×10^{-14}

TABLE J-15 Trespassing Child Future (Post WRF Construction)			
COPC	Contributing Sources to the Exposure Point Concentrations in Air (µg/m³)		Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
1,2,3,7,8-PeCDF	3.93×10^{-13}	NA	3.93×10^{-13}
2,3,4,6,7,8-HxCDF	1.18×10^{-13}	NA	1.18×10^{-13}
2,3,4,7,8-PeCDF	2.14×10^{-13}	NA	2.14×10^{-13}
2,3,7,8-TCDD	1.34×10^{-14}	NA	1.34×10^{-14}
2,3,7,8-TCDF	2.64×10^{-13}	NA	2.64×10^{-13}
Dioxins/Furans TEQ	3.82×10^{-13}	NA	3.82×10^{-13}
OCDD	1.72×10^{-12}	NA	1.72×10^{-12}
OCDF	1.11×10^{-11}	NA	1.11×10^{-11}
4,4'-DDD	5.85×10^{-11}	NA	5.85×10^{-11}
4,4'-DDE	1.59×10^{-9}	NA	1.59×10^{-9}
4,4'-DDT	1.48×10^{-9}	NA	1.48×10^{-9}
alpha-Chlordane	4.19×10^{-11}	NA	4.19×10^{-11}
beta-BHC	4.39×10^{-10}	NA	4.39×10^{-10}
Dieldrin	5.34×10^{-11}	NA	5.34×10^{-11}
Endosulfan II	5.81×10^{-11}	NA	5.81×10^{-11}
Endosulfan sulfate	4.87×10^{-11}	NA	4.87×10^{-11}
Endrin	4.55×10^{-10}	NA	4.55×10^{-10}
Endrin aldehyde	3.26×10^{-10}	NA	3.26×10^{-10}
Endrin ketone	4.86×10^{-11}	NA	4.86×10^{-11}
gamma-Chlordane	8.74×10^{-11}	NA	8.74×10^{-11}
Heptachlor epoxide	4.35×10^{-11}	NA	4.35×10^{-11}
Methoxychlor	6.04×10^{-10}	NA	6.04×10^{-10}
Perchlorate	1.37×10^{-6}	NA	1.37×10^{-6}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Fugitive emissions due to include wind erosion in the NEA

TABLE J-16 Exposure Point Concentrations in Air and Contributing Sources Off-site Resident Future (Post WRF Construction)			
	Contributing Sources to the Exposure Point Concentrations in Air (µg/m³)		Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
COPC	NEA[a]	NEA	
Acetone	NA	2.14×10^{-5}	2.14×10^{-5}
Carbon tetrachloride	NA	5.65×10^{-3}	5.65×10^{-3}
Chloroform	NA	8.47×10^{-2}	8.47×10^{-2}
Tetrachloroethene	NA	1.97×10^{-3}	1.97×10^{-3}
Toluene	NA	2.31×10^{-4}	2.31×10^{-4}
Aluminum	8.87×10^{-4}	NA	8.87×10^{-4}
Antimony	5.57×10^{-9}	NA	5.57×10^{-9}
Arsenic	5.14×10^{-7}	NA	5.14×10^{-7}
Barium	1.88×10^{-5}	NA	1.88×10^{-5}
Beryllium	4.12×10^{-8}	NA	4.12×10^{-8}
Cadmium	1.01×10^{-8}	NA	1.01×10^{-8}
Chromium (total)	9.48×10^{-7}	NA	9.48×10^{-7}
Cobalt	5.56×10^{-7}	NA	5.56×10^{-7}
Copper	1.38×10^{-6}	NA	1.38×10^{-6}
Iron	1.37×10^{-3}	NA	1.37×10^{-3}
Magnesium	7.66×10^{-4}	NA	7.66×10^{-4}
Manganese	3.58×10^{-5}	NA	3.58×10^{-5}
Mercury	1.96×10^{-9}	NA	1.96×10^{-9}
Molybdenum	8.72×10^{-8}	NA	8.72×10^{-8}
Nickel	9.52×10^{-7}	NA	9.52×10^{-7}
Selenium	2.48×10^{-8}	NA	2.48×10^{-8}
Silver	1.10×10^{-8}	NA	1.10×10^{-8}
Thallium	7.52×10^{-9}	NA	7.52×10^{-9}
Thorium	4.95×10^{-7}	NA	4.95×10^{-7}
Titanium	3.66×10^{-5}	NA	3.66×10^{-5}
Vanadium	1.83×10^{-6}	NA	1.83×10^{-6}
Zinc	3.63×10^{-6}	NA	3.63×10^{-6}
1,2,3,4,6,7,8-HpCDD	3.24×10^{-13}	NA	3.24×10^{-13}
1,2,3,4,6,7,8-HpCDF	1.46×10^{-12}	NA	1.46×10^{-12}
1,2,3,4,7,8,9-HpCDF	4.22×10^{-13}	NA	4.22×10^{-13}
1,2,3,4,7,8-HxCDD	1.90×10^{-14}	NA	1.90×10^{-14}
1,2,3,4,7,8-HxCDF	7.47×10^{-13}	NA	7.47×10^{-13}
1,2,3,6,7,8-HxCDD	5.98×10^{-14}	NA	5.98×10^{-14}
1,2,3,6,7,8-HxCDF	3.81×10^{-13}	NA	3.81×10^{-13}
1,2,3,7,8,9-HxCDD	5.19×10^{-14}	NA	5.19×10^{-14}
1,2,3,7,8,9-HxCDF	6.36×10^{-14}	NA	6.36×10^{-14}

TABLE J-16 Exposure Point Concentrations in Air and Contributing Sources Off-site Resident Future (Post WRF Construction)			
COPC	Contributing Sources to the Exposure Point Concentrations in Air (μg/m³)		Exposure Point Concentration in Air (μg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
1,2,3,7,8-PeCDD	2.34×10^{-14}	NA	2.34×10^{-14}
1,2,3,7,8-PeCDF	3.07×10^{-13}	NA	3.07×10^{-13}
2,3,4,6,7,8-HxCDF	9.25×10^{-14}	NA	9.25×10^{-14}
2,3,4,7,8-PeCDF	1.67×10^{-13}	NA	1.67×10^{-13}
2,3,7,8-TCDD	1.05×10^{-14}	NA	1.05×10^{-14}
2,3,7,8-TCDF	2.06×10^{-13}	NA	2.06×10^{-13}
Dioxins/Furans TEQ	2.98×10^{-13}	NA	2.98×10^{-13}
OCDD	1.34×10^{-12}	NA	1.34×10^{-12}
OCDF	8.63×10^{-12}	NA	8.63×10^{-12}
4,4'-DDD	4.57×10^{-11}	NA	4.57×10^{-11}
4,4'-DDE	1.24×10^{-9}	NA	1.24×10^{-9}
4,4'-DDT	1.15×10^{-9}	NA	1.15×10^{-9}
alpha-Chlordane	3.27×10^{-11}	NA	3.27×10^{-11}
beta-BHC	3.43×10^{-10}	NA	3.43×10^{-10}
Dieldrin	4.17×10^{-11}	NA	4.17×10^{-11}
Endosulfan II	4.54×10^{-11}	NA	4.54×10^{-11}
Endosulfan sulfate	3.80×10^{-11}	NA	3.80×10^{-11}
Endrin	3.55×10^{-10}	NA	3.55×10^{-10}
Endrin aldehyde	2.54×10^{-10}	NA	2.54×10^{-10}
Endrin ketone	3.80×10^{-11}	NA	3.80×10^{-11}
gamma-Chlordane	6.83×10^{-11}	NA	6.83×10^{-11}
Heptachlor epoxide	3.40×10^{-11}	NA	3.40×10^{-11}
Methoxychlor	4.72×10^{-10}	NA	4.72×10^{-10}
Perchlorate	1.07×10^{-6}	NA	1.07×10^{-6}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Fugitive emissions due to include wind erosion in the NEA

TABLE J-17 Exposure Point Concentrations in Air and Contributing Sources Off-site Worker Future (Post WRF Construction)			
COPC	Contributing Sources to the Exposure Point Concentrations in Air (µg/m³)		Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
Acetone	NA	2.14×10^{-5}	2.14×10^{-5}
Carbon tetrachloride	NA	5.65×10^{-3}	5.65×10^{-3}
Chloroform	NA	8.47×10^{-2}	8.47×10^{-2}
Tetrachloroethene	NA	1.97×10^{-3}	1.97×10^{-3}
Toluene	NA	2.31×10^{-4}	2.31×10^{-4}
Aluminum	8.87×10^{-4}	NA	8.87×10^{-4}
Antimony	5.57×10^{-9}	NA	5.57×10^{-9}
Arsenic	5.14×10^{-7}	NA	5.14×10^{-7}
Barium	1.88×10^{-5}	NA	1.88×10^{-5}
Beryllium	4.12×10^{-8}	NA	4.12×10^{-8}
Cadmium	1.01×10^{-8}	NA	1.01×10^{-8}
Chromium (total)	9.48×10^{-7}	NA	9.48×10^{-7}
Cobalt	5.56×10^{-7}	NA	5.56×10^{-7}
Copper	1.38×10^{-6}	NA	1.38×10^{-6}
Iron	1.37×10^{-3}	NA	1.37×10^{-3}
Magnesium	7.66×10^{-4}	NA	7.66×10^{-4}
Manganese	3.58×10^{-5}	NA	3.58×10^{-5}
Mercury	1.96×10^{-9}	NA	1.96×10^{-9}
Molybdenum	8.72×10^{-8}	NA	8.72×10^{-8}
Nickel	9.52×10^{-7}	NA	9.52×10^{-7}
Selenium	2.48×10^{-8}	NA	2.48×10^{-8}
Silver	1.10×10^{-8}	NA	1.10×10^{-8}
Thallium	7.52×10^{-9}	NA	7.52×10^{-9}
Thorium	4.95×10^{-7}	NA	4.95×10^{-7}
Titanium	3.66×10^{-5}	NA	3.66×10^{-5}
Vanadium	1.83×10^{-6}	NA	1.83×10^{-6}
Zinc	3.63×10^{-6}	NA	3.63×10^{-6}
1,2,3,4,6,7,8-HpCDD	3.24×10^{-13}	NA	3.24×10^{-13}
1,2,3,4,6,7,8-HpCDF	1.46×10^{-12}	NA	1.46×10^{-12}
1,2,3,4,7,8,9-HpCDF	4.22×10^{-13}	NA	4.22×10^{-13}
1,2,3,4,7,8-HxCDD	1.90×10^{-14}	NA	1.90×10^{-14}
1,2,3,4,7,8-HxCDF	7.47×10^{-13}	NA	7.47×10^{-13}
1,2,3,6,7,8-HxCDD	5.98×10^{-14}	NA	5.98×10^{-14}
1,2,3,6,7,8-HxCDF	3.81×10^{-13}	NA	3.81×10^{-13}
1,2,3,7,8,9-HxCDD	5.19×10^{-14}	NA	5.19×10^{-14}
1,2,3,7,8,9-HxCDF	6.36×10^{-14}	NA	6.36×10^{-14}

TABLE J-17 Exposure Point Concentrations in Air and Contributing Sources Off-site Worker Future (Post WRF Construction)			
	Contributing Sources to the Exposure Point Concentrations in Air (µg/m³)		Exposure Point Concentration in Air (µg/m³)
	Fugitive Dust Emissions	Volatile Emissions	
COPC	NEA[a]	NEA	
1,2,3,7,8-PeCDD	2.34×10^{-14}	NA	2.34×10^{-14}
1,2,3,7,8-PeCDF	3.07×10^{-13}	NA	3.07×10^{-13}
2,3,4,6,7,8-HxCDF	9.25×10^{-14}	NA	9.25×10^{-14}
2,3,4,7,8-PeCDF	1.67×10^{-13}	NA	1.67×10^{-13}
2,3,7,8-TCDD	1.05×10^{-14}	NA	1.05×10^{-14}
2,3,7,8-TCDF	2.06×10^{-13}	NA	2.06×10^{-13}
Dioxins/Furans TEQ	2.98×10^{-13}	NA	2.98×10^{-13}
OCDD	1.34×10^{-12}	NA	1.34×10^{-12}
OCDF	8.63×10^{-12}	NA	8.63×10^{-12}
4,4'-DDD	4.57×10^{-11}	NA	4.57×10^{-11}
4,4'-DDE	1.24×10^{-9}	NA	1.24×10^{-9}
4,4'-DDT	1.15×10^{-9}	NA	1.15×10^{-9}
alpha-Chlordane	3.27×10^{-11}	NA	3.27×10^{-11}
beta-BHC	3.43×10^{-10}	NA	3.43×10^{-10}
Dieldrin	4.17×10^{-11}	NA	4.17×10^{-11}
Endosulfan II	4.54×10^{-11}	NA	4.54×10^{-11}
Endosulfan sulfate	3.80×10^{-11}	NA	3.80×10^{-11}
Endrin	3.55×10^{-10}	NA	3.55×10^{-10}
Endrin aldehyde	2.54×10^{-10}	NA	2.54×10^{-10}
Endrin ketone	3.80×10^{-11}	NA	3.80×10^{-11}
gamma-Chlordane	6.83×10^{-11}	NA	6.83×10^{-11}
Heptachlor epoxide	3.40×10^{-11}	NA	3.40×10^{-11}
Methoxychlor	4.72×10^{-10}	NA	4.72×10^{-10}
Perchlorate	1.07×10^{-6}	NA	1.07×10^{-6}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Fugitive emissions due to include wind erosion in the NEA

TABLE J-18 Exposure Point Concentrations in Air and Contributing Sources SEA Indoor Worker Future (Post WRF Construction)		
COPC	Contributing Sources to the Exposure Point Concentrations in Air (μg/m³) Volatilization from Ground Water into On-site Buildings	Exposure Point Concentration in Air (μg/m³)
Acetone	2.21×10^{-4}	2.21×10^{-4}
Carbon tetrachloride	1.14×10^{-2}	1.14×10^{-2}
Chloroform	4.81×10^{-1}	4.81×10^{-1}
Tetrachloroethene	6.47×10^{-2}	6.47×10^{-2}
Toluene	5.87×10^{-3}	5.87×10^{-3}
Aluminum	NA	NA
Antimony	NA	NA
Arsenic	NA	NA
Barium	NA	NA
Beryllium	NA	NA
Cadmium	NA	NA
Chromium (total)	NA	NA
Cobalt	NA	NA
Copper	NA	NA
Iron	NA	NA
Magnesium	NA	NA
Manganese	NA	NA
Mercury	NA	NA
Molybdenum	NA	NA
Nickel	NA	NA
Selenium	NA	NA
Silver	NA	NA
Thallium	NA	NA
Thorium	NA	NA
Titanium	NA	NA
Vanadium	NA	NA
Zinc	NA	NA
1,2,3,4,6,7,8-HpCDD	NA	NA
1,2,3,4,6,7,8-HpCDF	NA	NA
1,2,3,4,7,8,9-HpCDF	NA	NA
1,2,3,4,7,8-HxCDD	NA	NA
1,2,3,4,7,8-HxCDF	NA	NA
1,2,3,6,7,8-HxCDD	NA	NA
1,2,3,6,7,8-HxCDF	NA	NA
1,2,3,7,8,9-HxCDD	NA	NA
1,2,3,7,8,9-HxCDF	NA	NA
1,2,3,7,8-PeCDD	NA	NA
1,2,3,7,8-PeCDF	NA	NA
2,3,4,6,7,8-HxCDF	NA	NA
2,3,4,7,8-PeCDF	NA	NA
2,3,7,8-TCDD	NA	NA
2,3,7,8-TCDF	NA	NA

TABLE J-18 Exposure Point Concentrations in Air and Contributing Sources SEA Indoor Worker Future (Post WRF Construction)		
COPC	Contributing Sources to the Exposure Point Concentrations in Air (μg/m³) Volatilization from Ground Water into On-site Buildings	Exposure Point Concentration in Air (μg/m³)
Dioxins/Furans TEQ	NA	NA
OCDD	NA	NA
OCDF	NA	NA
4,4'-DDD	NA	NA
4,4'-DDE	NA	NA
4,4'-DDT	NA	NA
alpha-Chlordane	NA	NA
beta-BHC	NA	NA
Dieldrin	NA	NA
Endosulfan II	NA	NA
Endosulfan sulfate	NA	NA
Endrin	NA	NA
Endrin aldehyde	NA	NA
Endrin ketone	NA	NA
gamma-Chlordane	NA	NA
Heptachlor epoxide	NA	NA
Methoxychlor	NA	NA
Perchlorate	NA	NA

TABLE J-19 Exposure Point Concentrations in Air and Contributing Sources NEA Indoor Worker Future (Post WRF Construction)		
COPC	Contributing Sources to the Exposure Point Concentrations in Air (µg/m³) Volatilization from Ground Water into On-site Buildings	Exposure Point Concentration in Air (µg/m³)
Acetone	2.65×10^{-4}	2.65×10^{-4}
Carbon tetrachloride	4.52×10^{-2}	4.52×10^{-2}
Chloroform	6.51×10^{-1}	6.51×10^{-1}
Tetrachloroethene	1.58×10^{-2}	1.58×10^{-2}
Toluene	1.81×10^{-3}	1.81×10^{-3}
Aluminum	NA	NA
Antimony	NA	NA
Arsenic	NA	NA
Barium	NA	NA
Beryllium	NA	NA
Cadmium	NA	NA
Chromium (total)	NA	NA
Cobalt	NA	NA
Copper	NA	NA
Iron	NA	NA
Magnesium	NA	NA
Manganese	NA	NA
Mercury	NA	NA
Molybdenum	NA	NA
Nickel	NA	NA
Selenium	NA	NA
Silver	NA	NA
Thallium	NA	NA
Thorium	NA	NA
Titanium	NA	NA
Vanadium	NA	NA
Zinc	NA	NA
1,2,3,4,6,7,8-HpCDD	NA	NA
1,2,3,4,6,7,8-HpCDF	NA	NA
1,2,3,4,7,8,9-HpCDF	NA	NA
1,2,3,4,7,8-HxCDD	NA	NA
1,2,3,4,7,8-HxCDF	NA	NA
1,2,3,6,7,8-HxCDD	NA	NA
1,2,3,6,7,8-HxCDF	NA	NA
1,2,3,7,8,9-HxCDD	NA	NA
1,2,3,7,8,9-HxCDF	NA	NA
1,2,3,7,8-PeCDD	NA	NA
1,2,3,7,8-PeCDF	NA	NA
2,3,4,6,7,8-HxCDF	NA	NA
2,3,4,7,8-PeCDF	NA	NA
2,3,7,8-TCDD	NA	NA
2,3,7,8-TCDF	NA	NA

TABLE J-19 Exposure Point Concentrations in Air and Contributing Sources NEA Indoor Worker Future (Post WRF Construction)		
COPC	**Contributing Sources to the Exposure Point Concentrations in Air (µg/m³)** **Volatilization from Ground Water into On-site Buildings**	**Exposure Point Concentration in Air (µg/m³)**
Dioxins/Furans TEQ	NA	NA
OCDD	NA	NA
OCDF	NA	NA
4,4'-DDD	NA	NA
4,4'-DDE	NA	NA
4,4'-DDT	NA	NA
alpha-Chlordane	NA	NA
beta-BHC	NA	NA
Dieldrin	NA	NA
Endosulfan II	NA	NA
Endosulfan sulfate	NA	NA
Endrin	NA	NA
Endrin aldehyde	NA	NA
Endrin ketone	NA	NA
gamma-Chlordane	NA	NA
Heptachlor epoxide	NA	NA
Methoxychlor	NA	NA
Perchlorate	NA	NA

TABLE J-20 Radionuclide Exposure Point Concentrations in Air and Contributing Sources WRF Construction Worker During WRF Construction					
COPC	Contributing Sources to the Radionuclide Exposure Point Concentration in Air (pCi/m³)				Radionuclide Exposure Point Concentration in Air (pCi/m³)
	Fugitive Dust Emissions		Volatile Emissions		
	SEA[a]	NEA[b]	SEA	NEA	
Actinium 228	2.36×10^{-4}	8.04×10^{-7}	NA	NA	2.37×10^{-4}
Bismuth 210	2.16×10^{-4}	6.33×10^{-7}	NA	NA	2.17×10^{-4}
Bismuth 212	2.15×10^{-4}	8.36×10^{-7}	NA	NA	2.16×10^{-4}
Bismuth 214	1.71×10^{-4}	4.92×10^{-7}	NA	NA	1.71×10^{-4}
Lead 210	2.16×10^{-4}	6.33×10^{-7}	NA	NA	2.17×10^{-4}
Lead 212	1.96×10^{-4}	6.92×10^{-7}	NA	NA	1.96×10^{-4}
Lead 214	1.59×10^{-4}	4.48×10^{-7}	NA	NA	1.60×10^{-4}
Polonium 210	2.16×10^{-4}	6.33×10^{-7}	NA	NA	2.17×10^{-4}
Polonium 212	2.15×10^{-4}	8.36×10^{-7}	NA	NA	2.16×10^{-4}
Polonium 214	1.71×10^{-4}	4.92×10^{-7}	NA	NA	1.71×10^{-4}
Polonium 216	5.74×10^{-4}	1.93×10^{-6}	NA	NA	5.76×10^{-4}
Polonium 218	2.68×10^{-4}	9.27×10^{-7}	NA	NA	2.69×10^{-4}
Potassium 40	4.01×10^{-3}	1.37×10^{-5}	NA	NA	4.03×10^{-3}
Protactinium 234	1.87×10^{-4}	5.55×10^{-7}	NA	NA	1.87×10^{-4}
Radium 224	5.74×10^{-4}	1.93×10^{-6}	NA	NA	5.76×10^{-4}
Radium 226	2.68×10^{-4}	9.27×10^{-7}	NA	NA	2.69×10^{-4}
Radium 228	2.11×10^{-4}	9.65×10^{-7}	NA	NA	2.12×10^{-4}
Radon 220	5.74×10^{-4}	1.93×10^{-6}	NA	NA	5.76×10^{-4}
Radon 222	2.68×10^{-4}	9.27×10^{-7}	NA	NA	2.69×10^{-4}
Thallium 208	7.12×10^{-5}	2.65×10^{-7}	NA	NA	7.14×10^{-5}
Thorium 228	2.22×10^{-4}	7.95×10^{-7}	NA	NA	2.23×10^{-4}
Thorium 230	2.12×10^{-4}	6.25×10^{-7}	NA	NA	2.13×10^{-4}
Thorium 232	2.20×10^{-4}	8.31×10^{-7}	NA	NA	2.21×10^{-4}
Thorium 234	1.67×10^{-4}	5.50×10^{-7}	NA	NA	1.67×10^{-4}
Uranium 234	2.18×10^{-4}	6.92×10^{-7}	NA	NA	2.19×10^{-4}
Uranium 235	9.76×10^{-6}	5.22×10^{-8}	NA	NA	9.81×10^{-6}
Uranium 238	1.87×10^{-4}	5.55×10^{-7}	NA	NA	1.87×10^{-4}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Emission sources include traffic on unpaved roads, excavation, dozing, and wind erosion
b - Construction activities include traffic on unpaved roads, grading, and wind erosion

TABLE J-21 Radionuclide Exposure Point Concentrations in Air and Contributing Sources Off-site Resident During WRF Construction					
COPC	Contributing Sources to the Radionuclide Exposure Point Concentration in Air (pCi/m³)				Radionuclide Exposure Point Concentration in Air (pCi/m³)
	Fugitive Dust Emissions		Volatile Emissions		
	SEA[a]	NEA[b]	SEA	NEA	
Actinium 228	1.34×10^{-6}	1.84×10^{-7}	NA	NA	1.52×10^{-6}
Bismuth 210	1.29×10^{-6}	1.44×10^{-7}	NA	NA	1.43×10^{-6}
Bismuth 212	1.21×10^{-6}	1.91×10^{-7}	NA	NA	1.40×10^{-6}
Bismuth 214	1.03×10^{-6}	1.12×10^{-7}	NA	NA	1.14×10^{-6}
Lead 210	1.29×10^{-6}	1.44×10^{-7}	NA	NA	1.43×10^{-6}
Lead 212	1.12×10^{-6}	1.58×10^{-7}	NA	NA	1.27×10^{-6}
Lead 214	9.64×10^{-7}	1.02×10^{-7}	NA	NA	1.07×10^{-6}
Polonium 210	1.29×10^{-6}	1.44×10^{-7}	NA	NA	1.43×10^{-6}
Polonium 212	1.21×10^{-6}	1.91×10^{-7}	NA	NA	1.40×10^{-6}
Polonium 214	1.03×10^{-6}	1.12×10^{-7}	NA	NA	1.14×10^{-6}
Polonium 216	3.29×10^{-6}	4.41×10^{-7}	NA	NA	3.73×10^{-6}
Polonium 218	1.53×10^{-6}	2.12×10^{-7}	NA	NA	1.74×10^{-6}
Potassium 40	2.29×10^{-5}	3.14×10^{-6}	NA	NA	2.60×10^{-5}
Protactinium 234	1.10×10^{-6}	1.27×10^{-7}	NA	NA	1.22×10^{-6}
Radium 224	3.29×10^{-6}	4.41×10^{-7}	NA	NA	3.73×10^{-6}
Radium 226	1.53×10^{-6}	2.12×10^{-7}	NA	NA	1.74×10^{-6}
Radium 228	1.20×10^{-6}	2.20×10^{-7}	NA	NA	1.42×10^{-6}
Radon 220	3.29×10^{-6}	4.41×10^{-7}	NA	NA	3.73×10^{-6}
Radon 222	1.53×10^{-6}	2.12×10^{-7}	NA	NA	1.74×10^{-6}
Thallium 208	4.05×10^{-7}	6.06×10^{-8}	NA	NA	4.66×10^{-7}
Thorium 228	1.27×10^{-6}	1.81×10^{-7}	NA	NA	1.45×10^{-6}
Thorium 230	1.25×10^{-6}	1.43×10^{-7}	NA	NA	1.39×10^{-6}
Thorium 232	1.26×10^{-6}	1.90×10^{-7}	NA	NA	1.45×10^{-6}
Thorium 234	9.76×10^{-7}	1.26×10^{-7}	NA	NA	1.10×10^{-6}
Uranium 234	1.27×10^{-6}	1.58×10^{-7}	NA	NA	1.43×10^{-6}
Uranium 235	5.76×10^{-8}	1.19×10^{-8}	NA	NA	6.96×10^{-8}
Uranium 238	1.10×10^{-6}	1.27×10^{-7}	NA	NA	1.22×10^{-6}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Emission sources include traffic on unpaved roads, excavation, dozing, and wind erosion
b - Construction activities include traffic on unpaved roads, grading, and wind erosion

TABLE J-22
Radionuclide Exposure Point Concentrations in Air and Contributing Sources
Off-site Worker
During WRF Construction

COPC	Contributing Sources to the Radionuclide Exposure Point Concentration in Air (pCi/m³)				Radionuclide Exposure Point Concentration in Air (pCi/m³)
	Fugitive Dust Emissions		Volatile Emissions		
	SEA[a]	NEA[b]	SEA	NEA	
Actinium 228	1.34×10^{-6}	1.84×10^{-7}	NA	NA	1.52×10^{-6}
Bismuth 210	1.29×10^{-6}	1.44×10^{-7}	NA	NA	1.43×10^{-6}
Bismuth 212	1.21×10^{-6}	1.91×10^{-7}	NA	NA	1.40×10^{-6}
Bismuth 214	1.03×10^{-6}	1.12×10^{-7}	NA	NA	1.14×10^{-6}
Lead 210	1.29×10^{-6}	1.44×10^{-7}	NA	NA	1.43×10^{-6}
Lead 212	1.12×10^{-6}	1.58×10^{-7}	NA	NA	1.27×10^{-6}
Lead 214	9.64×10^{-7}	1.02×10^{-7}	NA	NA	1.07×10^{-6}
Polonium 210	1.29×10^{-6}	1.44×10^{-7}	NA	NA	1.43×10^{-6}
Polonium 212	1.21×10^{-6}	1.91×10^{-7}	NA	NA	1.40×10^{-6}
Polonium 214	1.03×10^{-6}	1.12×10^{-7}	NA	NA	1.14×10^{-6}
Polonium 216	3.29×10^{-6}	4.41×10^{-7}	NA	NA	3.73×10^{-6}
Polonium 218	1.53×10^{-6}	2.12×10^{-7}	NA	NA	1.74×10^{-6}
Potassium 40	2.29×10^{-5}	3.14×10^{-6}	NA	NA	2.60×10^{-5}
Protactinium 234	1.10×10^{-6}	1.27×10^{-7}	NA	NA	1.22×10^{-6}
Radium 224	3.29×10^{-6}	4.41×10^{-7}	NA	NA	3.73×10^{-6}
Radium 226	1.53×10^{-6}	2.12×10^{-7}	NA	NA	1.74×10^{-6}
Radium 228	1.20×10^{-6}	2.20×10^{-7}	NA	NA	1.42×10^{-6}
Radon 220	3.29×10^{-6}	4.41×10^{-7}	NA	NA	3.73×10^{-6}
Radon 222	1.53×10^{-6}	2.12×10^{-7}	NA	NA	1.74×10^{-6}
Thallium 208	4.05×10^{-7}	6.06×10^{-8}	NA	NA	4.66×10^{-7}
Thorium 228	1.27×10^{-6}	1.81×10^{-7}	NA	NA	1.45×10^{-6}
Thorium 230	1.25×10^{-6}	1.43×10^{-7}	NA	NA	1.39×10^{-6}
Thorium 232	1.26×10^{-6}	1.90×10^{-7}	NA	NA	1.45×10^{-6}
Thorium 234	9.76×10^{-7}	1.26×10^{-7}	NA	NA	1.10×10^{-6}
Uranium 234	1.27×10^{-6}	1.58×10^{-7}	NA	NA	1.43×10^{-6}
Uranium 235	5.76×10^{-8}	1.19×10^{-8}	NA	NA	6.96×10^{-8}
Uranium 238	1.10×10^{-6}	1.27×10^{-7}	NA	NA	1.22×10^{-6}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Emission sources include traffic on unpaved roads, excavation, dozing, and wind erosion
b - Construction activities include traffic on unpaved roads, grading, and wind erosion

TABLE J-23 Radionuclide Exposure Point Concentrations in Air and Contributing Sources Default NEA Construction Worker Future (Post WRF Construction)			
COPC	Contributing Sources to the Radionuclide Exposure Point Concentrations in Air (pCi/m³)		Radionuclide Exposure Point Concentration in Air (pCi/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
Actinium 228	2.34×10^{-4}	NA	2.34×10^{-4}
Bismuth 210	1.85×10^{-4}	NA	1.85×10^{-4}
Bismuth 212	2.44×10^{-4}	NA	2.44×10^{-4}
Bismuth 214	1.43×10^{-4}	NA	1.43×10^{-4}
Lead 210	1.85×10^{-4}	NA	1.85×10^{-4}
Lead 212	2.02×10^{-4}	NA	2.02×10^{-4}
Lead 214	1.31×10^{-4}	NA	1.31×10^{-4}
Polonium 210	1.85×10^{-4}	NA	1.85×10^{-4}
Polonium 212	2.44×10^{-4}	NA	2.44×10^{-4}
Polonium 214	1.43×10^{-4}	NA	1.43×10^{-4}
Polonium 216	5.63×10^{-4}	NA	5.63×10^{-4}
Polonium 218	2.70×10^{-4}	NA	2.70×10^{-4}
Potassium 40	4.00×10^{-3}	NA	4.00×10^{-3}
Protactinium 234	1.62×10^{-4}	NA	1.62×10^{-4}
Radium 224	5.63×10^{-4}	NA	5.63×10^{-4}
Radium 226	2.70×10^{-4}	NA	2.70×10^{-4}
Radium 228	2.81×10^{-4}	NA	2.81×10^{-4}
Radon 220	5.63×10^{-4}	NA	5.63×10^{-4}
Radon 222	2.70×10^{-4}	NA	2.70×10^{-4}
Thallium 208	7.74×10^{-5}	NA	7.74×10^{-5}
Thorium 228	2.32×10^{-4}	NA	2.32×10^{-4}
Thorium 230	1.82×10^{-4}	NA	1.82×10^{-4}
Thorium 232	2.42×10^{-4}	NA	2.42×10^{-4}
Thorium 234	1.60×10^{-4}	NA	1.60×10^{-4}
Uranium 234	2.02×10^{-4}	NA	2.02×10^{-4}
Uranium 235	1.52×10^{-5}	NA	1.52×10^{-5}
Uranium 238	1.62×10^{-4}	NA	1.62×10^{-4}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Emission sources include traffic on unpaved roads, excavation, dozing, and wind erosion

TABLE J-24
Radionuclide Exposure Point Concentrations in Air and Contributing Sources
SEA Maintenance Worker
Future (Post WRF Construction)

COPC	Contributing Sources to the Radionuclide Exposure Point Concentrations in Air (pCi/m³)		Radionuclide Exposure Point Concentration in Air (pCi/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
Actinium 228	9.73×10^{-8}	NA	9.73×10^{-8}
Bismuth 210	7.66×10^{-8}	NA	7.66×10^{-8}
Bismuth 212	1.01×10^{-7}	NA	1.01×10^{-7}
Bismuth 214	5.95×10^{-8}	NA	5.95×10^{-8}
Lead 210	7.66×10^{-8}	NA	7.66×10^{-8}
Lead 212	8.37×10^{-8}	NA	8.37×10^{-8}
Lead 214	5.42×10^{-8}	NA	5.42×10^{-8}
Polonium 210	7.66×10^{-8}	NA	7.66×10^{-8}
Polonium 212	1.01×10^{-7}	NA	1.01×10^{-7}
Polonium 214	5.95×10^{-8}	NA	5.95×10^{-8}
Polonium 216	2.34×10^{-7}	NA	2.34×10^{-7}
Polonium 218	1.12×10^{-7}	NA	1.12×10^{-7}
Potassium 40	1.66×10^{-6}	NA	1.66×10^{-6}
Protactinium 234	6.72×10^{-8}	NA	6.72×10^{-8}
Radium 224	2.34×10^{-7}	NA	2.34×10^{-7}
Radium 226	1.12×10^{-7}	NA	1.12×10^{-7}
Radium 228	1.17×10^{-7}	NA	1.17×10^{-7}
Radon 220	2.34×10^{-7}	NA	2.34×10^{-7}
Radon 222	1.12×10^{-7}	NA	1.12×10^{-7}
Thallium 208	3.21×10^{-8}	NA	3.21×10^{-8}
Thorium 228	9.62×10^{-8}	NA	9.62×10^{-8}
Thorium 230	7.56×10^{-8}	NA	7.56×10^{-8}
Thorium 232	1.01×10^{-7}	NA	1.01×10^{-7}
Thorium 234	6.66×10^{-8}	NA	6.66×10^{-8}
Uranium 234	8.38×10^{-8}	NA	8.38×10^{-8}
Uranium 235	6.32×10^{-9}	NA	6.32×10^{-9}
Uranium 238	6.72×10^{-8}	NA	6.72×10^{-8}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Fugitive emissions due to include wind erosion in the NEA

TABLE J-25 Radionuclide Exposure Point Concentrations in Air and Contributing Sources NEA Maintenance Worker Future (Post WRF Construction)			
COPC	Contributing Sources to the Radionuclide Exposure Point Concentrations in Air (pCi/m³)		Radionuclide Exposure Point Concentration in Air (pCi/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
Actinium 228	6.23×10^{-8}	NA	6.23×10^{-8}
Bismuth 210	4.90×10^{-8}	NA	4.90×10^{-8}
Bismuth 212	6.47×10^{-8}	NA	6.47×10^{-8}
Bismuth 214	3.81×10^{-8}	NA	3.81×10^{-8}
Lead 210	4.90×10^{-8}	NA	4.90×10^{-8}
Lead 212	5.36×10^{-8}	NA	5.36×10^{-8}
Lead 214	3.47×10^{-8}	NA	3.47×10^{-8}
Polonium 210	4.90×10^{-8}	NA	4.90×10^{-8}
Polonium 212	6.47×10^{-8}	NA	6.47×10^{-8}
Polonium 214	3.81×10^{-8}	NA	3.81×10^{-8}
Polonium 216	1.50×10^{-7}	NA	1.50×10^{-7}
Polonium 218	7.18×10^{-8}	NA	7.18×10^{-8}
Potassium 40	1.06×10^{-6}	NA	1.06×10^{-6}
Protactinium 234	4.30×10^{-8}	NA	4.30×10^{-8}
Radium 224	1.50×10^{-7}	NA	1.50×10^{-7}
Radium 226	7.18×10^{-8}	NA	7.18×10^{-8}
Radium 228	7.47×10^{-8}	NA	7.47×10^{-8}
Radon 220	1.50×10^{-7}	NA	1.50×10^{-7}
Radon 222	7.18×10^{-8}	NA	7.18×10^{-8}
Thallium 208	2.06×10^{-8}	NA	2.06×10^{-8}
Thorium 228	6.16×10^{-8}	NA	6.16×10^{-8}
Thorium 230	4.84×10^{-8}	NA	4.84×10^{-8}
Thorium 232	6.43×10^{-8}	NA	6.43×10^{-8}
Thorium 234	4.26×10^{-8}	NA	4.26×10^{-8}
Uranium 234	5.36×10^{-8}	NA	5.36×10^{-8}
Uranium 235	4.04×10^{-9}	NA	4.04×10^{-9}
Uranium 238	4.30×10^{-8}	NA	4.30×10^{-8}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Fugitive emissions due to include wind erosion in the NEA

TABLE J-26 Radionuclide Exposure Point Concentrations in Air and Contributing Sources Trespassing Child Future (Post WRF Construction)			
COPC	Contributing Sources to the Radionuclide Exposure Point Concentrations in Air (pCi/m³)		Radionuclide Exposure Point Concentration in Air (pCi/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
Actinium 228	1.25×10^{-7}	NA	1.25×10^{-7}
Bismuth 210	9.80×10^{-8}	NA	9.80×10^{-8}
Bismuth 212	1.29×10^{-7}	NA	1.29×10^{-7}
Bismuth 214	7.62×10^{-8}	NA	7.62×10^{-8}
Lead 210	9.80×10^{-8}	NA	9.80×10^{-8}
Lead 212	1.07×10^{-7}	NA	1.07×10^{-7}
Lead 214	6.94×10^{-8}	NA	6.94×10^{-8}
Polonium 210	9.80×10^{-8}	NA	9.80×10^{-8}
Polonium 212	1.29×10^{-7}	NA	1.29×10^{-7}
Polonium 214	7.62×10^{-8}	NA	7.62×10^{-8}
Polonium 216	2.99×10^{-7}	NA	2.99×10^{-7}
Polonium 218	1.44×10^{-7}	NA	1.44×10^{-7}
Potassium 40	2.13×10^{-6}	NA	2.13×10^{-6}
Protactinium 234	8.60×10^{-8}	NA	8.60×10^{-8}
Radium 224	2.99×10^{-7}	NA	2.99×10^{-7}
Radium 226	1.44×10^{-7}	NA	1.44×10^{-7}
Radium 228	1.49×10^{-7}	NA	1.49×10^{-7}
Radon 220	2.99×10^{-7}	NA	2.99×10^{-7}
Radon 222	1.44×10^{-7}	NA	1.44×10^{-7}
Thallium 208	4.11×10^{-8}	NA	4.11×10^{-8}
Thorium 228	1.23×10^{-7}	NA	1.23×10^{-7}
Thorium 230	9.69×10^{-8}	NA	9.69×10^{-8}
Thorium 232	1.29×10^{-7}	NA	1.29×10^{-7}
Thorium 234	8.52×10^{-8}	NA	8.52×10^{-8}
Uranium 234	1.07×10^{-7}	NA	1.07×10^{-7}
Uranium 235	8.09×10^{-9}	NA	8.09×10^{-9}
Uranium 238	8.60×10^{-8}	NA	8.60×10^{-8}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Fugitive emissions due to include wind erosion in the NEA

TABLE J-27 Radionuclide Exposure Point Concentrations in Air and Contributing Sources Off-site Resident Future (Post WRF Construction)			
COPC	Contributing Sources to the Radionuclide Exposure Point Concentrations in Air (pCi/m³)		Radionuclide Exposure Point Concentration in Air (pCi/m³)
	Fugitive Dust Emissions	Volatile Emissions	
	NEA[a]	NEA	
Actinium 228	9.73×10^{-8}	NA	9.73×10^{-8}
Bismuth 210	7.66×10^{-8}	NA	7.66×10^{-8}
Bismuth 212	1.01×10^{-7}	NA	1.01×10^{-7}
Bismuth 214	5.95×10^{-8}	NA	5.95×10^{-8}
Lead 210	7.66×10^{-8}	NA	7.66×10^{-8}
Lead 212	8.37×10^{-8}	NA	8.37×10^{-8}
Lead 214	5.42×10^{-8}	NA	5.42×10^{-8}
Polonium 210	7.66×10^{-8}	NA	7.66×10^{-8}
Polonium 212	1.01×10^{-7}	NA	1.01×10^{-7}
Polonium 214	5.95×10^{-8}	NA	5.95×10^{-8}
Polonium 216	2.34×10^{-7}	NA	2.34×10^{-7}
Polonium 218	1.12×10^{-7}	NA	1.12×10^{-7}
Potassium 40	1.66×10^{-6}	NA	1.66×10^{-6}
Protactinium 234	6.72×10^{-8}	NA	6.72×10^{-8}
Radium 224	2.34×10^{-7}	NA	2.34×10^{-7}
Radium 226	1.12×10^{-7}	NA	1.12×10^{-7}
Radium 228	1.17×10^{-7}	NA	1.17×10^{-7}
Radon 220	2.34×10^{-7}	NA	2.34×10^{-7}
Radon 222	1.12×10^{-7}	NA	1.12×10^{-7}
Thallium 208	3.21×10^{-8}	NA	3.21×10^{-8}
Thorium 228	9.62×10^{-8}	NA	9.62×10^{-8}
Thorium 230	7.56×10^{-8}	NA	7.56×10^{-8}
Thorium 232	1.01×10^{-7}	NA	1.01×10^{-7}
Thorium 234	6.66×10^{-8}	NA	6.66×10^{-8}
Uranium 234	8.38×10^{-8}	NA	8.38×10^{-8}
Uranium 235	6.32×10^{-9}	NA	6.32×10^{-9}
Uranium 238	6.72×10^{-8}	NA	6.72×10^{-8}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Fugitive emissions due to include wind erosion in the NEA

TABLE J-28 Radionuclide Exposure Point Concentrations in Air and Contributing Sources Off-site Worker Future (Post WRF Construction)			
	Contributing Sources to the Radionuclide Exposure Point Concentrations in Air (pCi/m³)		Radionuclide Exposure Point Concentration in Air (pCi/m³)
	Fugitive Dust Emissions	Volatile Emissions	
COPC	NEA[a]	NEA	
Actinium 228	9.73×10^{-8}	NA	9.73×10^{-8}
Bismuth 210	7.66×10^{-8}	NA	7.66×10^{-8}
Bismuth 212	1.01×10^{-7}	NA	1.01×10^{-7}
Bismuth 214	5.95×10^{-8}	NA	5.95×10^{-8}
Lead 210	7.66×10^{-8}	NA	7.66×10^{-8}
Lead 212	8.37×10^{-8}	NA	8.37×10^{-8}
Lead 214	5.42×10^{-8}	NA	5.42×10^{-8}
Polonium 210	7.66×10^{-8}	NA	7.66×10^{-8}
Polonium 212	1.01×10^{-7}	NA	1.01×10^{-7}
Polonium 214	5.95×10^{-8}	NA	5.95×10^{-8}
Polonium 216	2.34×10^{-7}	NA	2.34×10^{-7}
Polonium 218	1.12×10^{-7}	NA	1.12×10^{-7}
Potassium 40	1.66×10^{-6}	NA	1.66×10^{-6}
Protactinium 234	6.72×10^{-8}	NA	6.72×10^{-8}
Radium 224	2.34×10^{-7}	NA	2.34×10^{-7}
Radium 226	1.12×10^{-7}	NA	1.12×10^{-7}
Radium 228	1.17×10^{-7}	NA	1.17×10^{-7}
Radon 220	2.34×10^{-7}	NA	2.34×10^{-7}
Radon 222	1.12×10^{-7}	NA	1.12×10^{-7}
Thallium 208	3.21×10^{-8}	NA	3.21×10^{-8}
Thorium 228	9.62×10^{-8}	NA	9.62×10^{-8}
Thorium 230	7.56×10^{-8}	NA	7.56×10^{-8}
Thorium 232	1.01×10^{-7}	NA	1.01×10^{-7}
Thorium 234	6.66×10^{-8}	NA	6.66×10^{-8}
Uranium 234	8.38×10^{-8}	NA	8.38×10^{-8}
Uranium 235	6.32×10^{-9}	NA	6.32×10^{-9}
Uranium 238	6.72×10^{-8}	NA	6.72×10^{-8}

Notes:
Fugitive dust emissions have been reduced by 90% to account for the implementation of dust control measures.
a - Fugitive emissions due to include wind erosion in the NEA