STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600, Olympia, WA 98504-7600 • 360-407-6000

January 31, 2024

Sanjay Barik
Department of Ecology
Air Quality Program
Central Regional Office
1250 West Alder Street
Union Gap, WA 98903-0009

Re: Second Tier Review for Dirt Hugger

Dear Sanjay:

We have completed our review of health risks from increased diesel engine exhaust particulate emissions at Dirt Hugger in Dallesport, WA. We concluded that the health risk is acceptable and recommend approval of the project.

Dirt Hugger proposes to upgrade their facility which will enable them to increase their raw material throughput from 62,700 tons per year to 90,000 tons per year. The increase in throughput will require them to use new diesel-powered equipment and use existing engines more frequently.

The equipment considered under new source review consists of:

- One new Terra Select T70 Screen rated at 75 kW. Dirt Hugger proposes to operate this engine for up to 3,750 hours per year.
- One new Ecoverse SS 604 sorting station rated at 26 kW. Dirt Hugger proposes to operate this engine for up to 5,000 hours per year.
- One new Ecoverse Ecosift density separator rated at 130 kW. Dirt Hugger proposes to operate this engine up to 2,500 hours per year.
- One new Komptech Hurrikan Wind Sifter rated at 55 kW. Dirt Hugger proposes to operate this engine up to 2,500 hours per year.
- One existing Terra Select T70 Screen rated at 75 kW. Dirt Hugger proposes to increase the operation of this engine by up to 1,750 hours per year.
- One existing Terra Select T60 Screen rated at 75 kW. Dirt Hugger proposes to increase the operation of this engine by up to 500 hours per year.
- The removal of an existing Terra Select T70 Wind Sifter which was previously allowed to operate up to 2,000 hours per year.

Each of the units described above is powered by diesel engines that meet EPA Tier 4 emissions standards.

The increase in emissions from diesel engines results in an increase in emissions of diesel engine exhaust particulate triggering the need for a health impact assessment (i.e., second tier review).

Based on our evaluation of ambient impacts, increased diesel engine particle emissions result in a maximum increase lifetime cancer risk of about three in one million. Dirt Hugger's diesel engine particle emissions are not likely to cause adverse non-cancer effects to nearby residents, workers, or bystanders.

We recommend approval of the project because:

- We determined that the emission controls for the new and modified emission units represent best available control technology for toxics.
- The increase in emissions of toxic air pollutants is not likely to result in an increased cancer risk of more than one in one hundred thousand (10 in one million) which is the maximum risk allowed by a second tier review.
- We determined that the non-cancer hazard is acceptable.

This project has satisfied all requirements of second tier review under WAC 173-460-090. We recommend that you incorporate our findings as part of your ambient air impacts analysis and you may begin the public comment period when you are ready to do so.

If you would like to discuss this project further, please contact Gary Palcisko at gary.palcisko@ecy.wa.gov or 360-995-3447.

Sincerely,

Chris Hanlon-Meyer
Science and Analysis Section Manager
Air Quality Program

ch-m/tm

Enclosure

Second Tier Review Recommendation for:

Dirt Hugger Compost Facility Material Throughput Increase Dallesport, Washington

Air Quality Program
Washington Department of Ecology
Olympia, Washington

January 2024

DEPARTMENT OF ECOLOGY
State of Washington

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Second Tier Review Recommendation for:

Dirt Hugger Compost Facility

Material Throughput Increase

Dallesport, Washington

Air Quality Program
Washington Department of Ecology
Olympia, WA

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Executive Summary

This document presents and summarizes a review of health risks from an increase in toxic air pollutants emitted by diesel-powered equipment at the Dirt Hugger compost facility in Dallesport, WA. Diesel emissions will increase as part of a proposal to process and compost more material at the facility. Diesel engines will be used for a variety of processes including material separation, screening, shredding, and sorting. In general, increases in toxic air pollutant impacts near the Dirt Hugger facility will not result in excessive cancer risk or cause serious short- or long-term health effects. Ecology concludes that the health risk is acceptable and recommends approval of the project.

Dirt Hugger proposes to upgrade their facility which will enable them to increase their raw material throughput from 62,700 tons per year to 90,000 tons per year. The increase in throughput will require them to use new diesel-powered equipment and use existing engines more frequently.

The equipment considered under new source review consists of:

- One new Terra Select T70 Screen rated at 75 kW. Dirt Hugger proposes to operate this engine for up to 3,750 hours per year.
- One new Ecoverse SS 604 sorting station rated at 26 kW. Dirt Hugger proposes to operate this engine for up to 5,000 hours per year.
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- The removal of an existing Terra Select T70 Wind Sifter which was previously allowed to operate up to 2,000 hours per year.

Each of the units described above is powered by diesel engines that meet EPA Tier 4 emissions standards.

Increased emissions from new diesel-powered equipment and increased usage of existing engines increase emission of a toxic air pollutant - diesel engine exhaust particles - at a rate triggering a requirement for second tier toxics review. This review process requires an assessment of increased health risks from increased exposure to toxic air pollutants.

Ecology’s Air Quality Program agreed to allow a streamlined health impact assessment for this project because the overall horsepower of engines used in the project is less than 2000 bhp, and each engine will meet stringent Tier 4 emission standards.

Furthermore, Dirt Hugger plans to replace most of these engines with line power within 10 years.

Conclusions

- Increased emissions of diesel particulate at Dirt Hugger result in a maximum increased lifetime cancer risk of about three in one million for nearby commercial and residential receptors. Cancer risk can be expressed either as an increase in an individual's risk of disease or as the number of cancers that might occur in addition to those normally expected in a population of one million people. The reported estimates of diesel engine exhaust particulate-related cancer risk represent increases above a baseline lifetime cancer risk of about 40 percent in the United States.
- Lifetime exposure to "background" levels of diesel particles in the area results in a risk of about 34 in one million.
- Exposure to diesel particles in the area is not likely to result in long-term non-cancer health effects.

Ecology's recommendation

Ecology recommends approval of the project because:

- Emission controls for the new and modified emission units represent best available control technology for toxics.
- The increase in emissions of toxic air pollutants is not likely to result in an increased cancer risk of more than one in one hundred thousand (10 in one million) which is the maximum risk allowed by a second tier review.
- The non-cancer hazard is acceptable.

Streamlined Second Tier Review Processing and Approval Criteria

Ecology used a streamlined second tier review process for Dirt Hugger's proposed increases in diesel particulate emissions. This process is reserved for a very narrow set of circumstances based on Ecology's experience reviewing projects that trigger second tier review for diesel particulate emissions.

Streamlined second tier review processing requirements

Ecology agreed to a streamlined review of diesel particulate impacts from the Dirt Hugger project because:

- The cumulative brake horsepower of the engines used at Dirt Hugger is less than 2000 bhp.
- The engines will meet stringent EPA Tier 4 emission standards.
- Many of the functions served by these engines, except the shredder, will be replaced by line-powered equipment within 10 years.

Under a streamlined second tier review, the following regulatory requirements under Chapter 173-460-090 must be satisfied:

(a) The permitting authority has determined that other conditions for processing the Notice of Construction Order of Approval (NOC) have been met and has issued a preliminary approval order.

(b) Emission controls contained in the preliminary NOC approval order represent at least best available control technology for toxics (tBACT).

(c) The ambient impact of the emissions increases of each toxic air pollutant (TAP) that exceeds acceptable source impact levels (ASILs) has been quantified.

Acting as the "permitting authority" for this project, Ecology's project permit engineer satisfied item (a) and verified item (b) above on November 21, 2023.[1] Landau Associates submitted air dispersion modeling files that satisfy item (c).[2]

All processing requirements above are satisfied.

[1] Ryan Vicente, "Dirt Hugger – opportunity for an air permit factual review of revised draft," email with attachments, received November 21, 2023.
[2] Landau Associates, "Dirt Hugger Modeling Files," submitted March 27, 2023.

Second tier review approval criteria

As specified in WAC 173-460-090(7), Ecology may recommend approval of a project that is likely to cause an exceedance of ASILs for one or more TAPs only if it:

(a) Determines that the emission controls for the new and modified emission units represent tBACT.

(b) The applicant demonstrates that the increase in emissions of TAPs is not likely to result in an increased cancer risk of more than one in one hundred thousand.

(c) Ecology determines that the non-cancer hazard is acceptable.

tBACT determination

Ecology's permit engineer determined that Dirt Hugger's proposed pollution control equipment satisfies the BACT and tBACT requirements for diesel engines (Ecology, 2024). BACT and tBACT for diesel particles were determined to be met through restricted operation of engines meeting applicable emission standards of 40 C.F.R. Part 1039 (particulate matter emission standard = 0.02 g/kw-hr).

Streamlined Second Tier Review

This review document quantifies the non-cancer hazards and increased cancer risks attributable to Dirt Hugger's diesel particulate emissions. While other pollutants will be emitted as part of this project, diesel particulate is the only pollutant for which emissions exceed an SQER and ambient impacts exceed its ASIL (Landau Associates, 2023).

DEEP health effects summary

Diesel engines emit very small fine (<2.5 micrometers [µm]) and ultrafine (<0.1 µm) particles. These particles can easily enter deep into the lungs when inhaled. Mounting evidence indicates that inhaling fine particles can cause or contribute to numerous adverse health effects.

Studies of humans and animals specifically exposed to DEEP show that diesel particles can cause both acute and chronic health effects including cancer. Ecology has summarized these health effects in "Concerns about Adverse Health Effects of Diesel Engine Emissions" (Ecology, 2008).

DEEP toxicity values

Ecology identified toxicity values for DEEP from two agencies: the U.S. Environmental Protection Agency (EPA) (EPA, 2002; EPA, 2003), and California EPA's Office of Environmental Health Hazard Assessment (OEHHA) (CalEPA, 1998). These agencies derived toxicity values from studies of animals exposed to a known amount (concentration) of DEEP, or from epidemiological studies of exposed humans. These values represent a level at or below which we do not expect adverse non-cancer health effects and a metric by which to quantify increased risk from exposure to a carcinogen. Table 1 shows the DEEP non-cancer and cancer toxicity values identified by Ecology.

EPA based its reference concentration (RfC) and OEHHA based its reference exposure level (REL) for diesel engine exhaust (measured as DEEP) on dose-response data on inflammation and changes in the lung from rat inhalation studies. Each agency established a level of 5 µg/m^3 as the concentration of DEEP in air at which long-term exposure is unlikely to cause adverse non-cancer health effects.

EPA promulgated National Ambient Air Quality Standards (NAAQS) and other regulatory toxicological values for short- and intermediate-term exposure to particulate matter, but values specifically for DEEP exposure at these intervals do not currently exist.

OEHHA derived a unit risk factor (URF) for estimating cancer risk from exposure to DEEP. They based the URF on a meta-analysis of several epidemiological studies of humans occupationally exposed to DEEP. In these studies, researchers based exposure on measurements of elemental carbon and respirable particulate representing fresh diesel exhaust. Therefore, we define DEEP as the filterable fraction of particulate

emitted by diesel engines.[3] The URF is expressed as the upper-bound probability of developing cancer, assuming continuous lifetime exposure to a substance at a concentration of one microgram per cubic meter (1 µg/m^3) and is expressed in units of inverse concentration [i.e., (µg/m^3)$^{-1}$]. OEHHA's URF for DEEP is 0.0003 per µg/m^3 meaning that a lifetime of exposure to one µg/m^3 of DEEP results in an increased individual cancer risk of 0.03 percent or a population cancer risk of 300 excess cancer cases per million people exposed.

Table 1: Toxicity Values or Comparison Values Considered in Assessing and Quantifying Non-cancer Hazard and Cancer Risk

Pollutant	Agency	Non-cancer	Cancer
DEEP	U.S. Environmental Protection Agency	RfC[1] = 5 µg/m^3	NA[2]
DEEP	California EPA–Office of Environmental Health Hazard Assessment	Chronic REL[3] = 5 µg/m^3	URF[4] = 0.0003 per µg/m^3

[1] RfC – Reference Concentration

[2] EPA considers DEEP to be a probable human carcinogen but has not established a cancer slope factor or unit risk factor.

[3] REL – Reference Exposure Level

[4] URF – Unit Risk Factor

Community/receptors

Dirt Hugger's facility is in an industrially zoned area surrounded largely by agricultural and undeveloped parcels. An area of residential zoning occurs about one-mile southwest of the facility. Air dispersion modeling indicated that proposed DEEP emissions would not result in long-term concentrations greater than the ASIL at any parcels with a residential land use code (Ecology, 2022).

For estimating exposures to the project's diesel particulate, Ecology identified residential, commercial, and boundary receptors near the facility (Table 2, Figures 3 and 4). Ecology did not identify other sensitive receptors, such as childcare facilities, schools, or hospitals, within the area where the project's impacts exceed an ASIL.

[3] Condensable particulate does not represent DEEP for the purposes assessing health risks from DEEP exposure.

Table 2: Estimated Annual Average DEEP Concentrations at Key Receptor Locations

Receptor	UTM Coordinates Zone 10N	Annual DEEP Concentration ($\mu g/m^3$)
MIRR	643872.28, 5055298.67	0.01029
MIBR/PMI MICR	643912.23, 5055414.06	0.07566

MIRR – Maximally impacted residential receptor

MICR – Maximally impacted commercial receptor

MIBR/PMI – Maximally impacted boundary receptor/Point of maximum impact

Background concentrations of TAPs in ambient air

When reviewing increases in TAP emissions under second tier review, WAC 173-460-090 specifies that:

> Background concentrations of TAPs will be considered as part of a second tier review. Background concentrations can be estimated using:
>
> - The latest National Ambient Toxics Assessment data for the appropriate census tracts; or
> - Ambient monitoring data for the project's location; or
> - Modeling of emissions of the TAPs subject to second tier review from all stationary sources within 1.5 kilometers of the source location.

Table 3 shows the background DEEP levels identified near the facility based on the 2019 AirToxScreen (EPA 2022). AirToxScreen is the successor to EPA's National Ambient Toxics Assessment.

Table 3: Estimated "Background" Concentrations of Average DEEP near Dirt Hugger Compost Facility

Source	Average Annual Diesel Particulate Concentration ($\mu g/m^3$)
2019 AirToxScreen – Census Tract 53039950200	0.113

Increased cancer risk

Ecology assessed the increased risk of cancer from lifetime exposure to DEEP emitted from Dirt Hugger's engines. We characterized cancer risk in a manner consistent with EPA guidance for inhalation risk assessment (EPA, 2009) using the following equations:

Risk = IUR x EC

Where:

IUR $(\mu g/m^3)^{-1}$ = inhalation unit risk (i.e., unit risk factor); and

EC $(\mu g/m^3)$ = exposure concentration

EC = (CA x ET x EF x ED)/AT

Where:

EC $(\mu g/m^3)$ = exposure concentration;

CA $(\mu g/m^3)$ = contaminant concentration in air;

ET (hours/day) = exposure time;

EF (days/year) = exposure frequency;

ED (years) = exposure duration; and

AT (ED in years x 365 days/year x 24 hours/day) = averaging time

Cancer risk attributable to Dirt Hugger's increased DEEP emissions

Table 4 shows the estimated Dirt Hugger project-specific cancer risk per million for residential and commercial receptors. These receptors received the highest exposure of Dirt Hugger-related diesel emissions. Figure 1 shows the location of these receptors relative to Dirt Hugger. The increase in risks attributable to Dirt Hugger's emissions is about 3 in one per million[4] for residents of homes located near Dirt Hugger's property[5] and commercial workers in areas along the western boundary of the facility.[6]

Exposure to existing "background" levels of DEEP in the area results in a risk of about 34 in one million for residential receptors.

[4] Number per million represents an upper-bound theoretical estimate of the number of excess cancers that might result in an exposed population of one million people compared to an unexposed population of one million people. Alternatively, an individual's increase in risk of one in one million means a person's chance of getting cancer in their lifetime increases by one in one-million or 0.0001 percent.
[5] This parcel appears to be used for commercial purposes, but it may contain mobile homes.
[6] The maximum impact along the western boundary of the Dirt Hugger facility is a conservatively high estimate of future commercial worker exposure adjacent to Dirt Hugger's property.

Table 4: Estimated Increased Cancer Risk for Residential and Commercial Receptors Attributable to Dirt Hugger's DEEP Emissions

Exposure Parameter	MIRR	MICR
CA Dirt Hugger – concentration in air from Dirt Hugger's emissions (µg/m^3)	0.01029	0.07566
CA background – concentration in air from "background" sources (µg/m^3)	0.113	0.113
ET - Exposure Time (hours per day)	24	8
EF - Exposure Frequency (days per year)	365	250
ED - Exposure Duration (years)	70	40
AT - Averaging Time (hours)	613200	613200
EC Dirt Hugger - Dirt Hugger Related Exposure Concentration (µg/$^{m3)}$	0.0103	0.0099
EC background - Background source-related Exposure Concentration (µg/m^3)	0.1130	0.0147
IUR - Inhalation Unit Risk (µg/m^3)-1	3.0E-04	3.0E-04
Increased cancer risk from Dirt Hugger's emissions	**3.1E-06**	**3.0E-06**
Cancer risk from "background" sources	3.4E-05	4.4E-06
Total cancer risk from diesel particle exposures near Dirt Hugger	3.7E-05	7.4E-06

Non-cancer hazard

Ecology assessed the chronic non-cancer hazards from exposure to DEEP emissions from Dirt Hugger and other local sources. We estimated non-cancer hazards consistent with EPA guidance for inhalation risk assessment (EPA, 2009) using the following equations:

HQ = EC/Toxicity Value

Where:

HQ (unitless) = hazard quotient;

EC (µg/m^3) = exposure concentration;

Toxicity Value (µg/m^3) = inhalation toxicity value (e.g., RfC, REL) that is appropriate for the exposure scenario (acute, subchronic, or chronic).

EC = CA

Where:

EC ($\mu g/m^3$) = exposure concentration;[7]

CA ($\mu g/m^3$) = contaminant concentration in air.

Long-term exposure to increased levels of DEEP in the area results in HQs much lower than unity (Table 5). Additionally, HQs would remain low even when considering "background" exposures. This indicates that chronic non-cancer hazards are not likely to occur because of exposure to DEEP near the Dirt Hugger compost facility.

Table 5: Estimated Long-term DEEP Non-cancer Hazards Attributable to Dirt Hugger Emissions

Receptor	Project-related Annual Avg. DEEP Level ($\mu g/m^3$)	Existing Background DEEP Level ($\mu g/m^3$)	Cumulative Avg. DEEP Level ($\mu g/m^3$)	Chronic REL ($\mu g/m^3$)	HQ
MIBR/MICR	0.07566	0.1130	0.18866	5	<0.1
MIRR	0.01029	0.1130	0.12329	5	<0.1

[7] EPA's guidance allows for exposure frequency and exposure duration to be considered when determining exposure concentrations for chronic health effects, but for simplicity, Ecology assumed all receptors were exposed continuously to the average annual contaminant concentration in air at the relevant receptor locations.

Other Considerations

Short-term exposures to DEEP

Exposure to DEEP can cause both acute and chronic health effects. However, as discussed previously, reference toxicity values specifically for DEEP exposure at short-term or intermediate intervals do not currently exist. Therefore, Ecology did not quantify short-term risks or hazards from DEEP exposure. For air permitting purposes, Ecology assumes that compliance with the 24-hour $PM_{2.5}$ NAAQS indicates acceptable short-term health effects from DEEP exposure. Dirt Hugger's overall $PM_{2.5}$ emissions were less than exemption thresholds established in WAC 173-400-110, so Dirt Hugger's emissions are not expected to cause or contribute to an exceedance of the NAAQS (Ecology, 2024).

Uncertainty

Many factors of this second tier review are prone to uncertainty. Uncertainty relates to the lack of exact knowledge regarding many of the assumptions used to estimate the human health impacts of Dirt Hugger's emissions. The assumptions used in the face of uncertainty may tend to over- or underestimate the health risks. Key aspects of uncertainty related to Dirt Hugger's proposed increases in diesel emissions are exposure assumptions, emissions estimates, air dispersion modeling, and toxicity of DEEP.

Table 6: Qualitative Summary of How Uncertainty Affects the Quantitative Estimate of Risks or Hazards Attributable to Dirt Hugger Emissions

Source of Uncertainty	How Does it Affect Estimated Risk from this Project?
Exposure assumptions	Continuous lifetime exposure is likely an overestimate of DEEP exposure. Plans to provide line power to the facility's units may obviate the need for many of the engines.
Emissions estimates	Possible over - or underestimation of emissions because Landau Associates used Tier 4 emission standards to estimate DEEP emissions.
Air modeling methods	Possible underestimate of average long-term ambient concentrations and overestimate of short-term ambient concentration.
Toxicity of DEEP at low concentrations	Possible overestimate of cancer risk, possible underestimate of non-cancer hazard for sensitive individuals.

Exposure uncertainty

We can only estimate the amount of time an individual will be exposed to Dirt Hugger's DEEP emissions. To ensure public health protection, Ecology used conservative estimates of exposure duration and frequency. For example, we assume that nearby residents will be exposed to Dirt Hugger's diesel emissions continuously for 70 years. This assumption tends to overestimate exposure and risk. Furthermore, Dirt Hugger indicated that they will likely replace much of the diesel-powered equipment at their facility with line-powered equipment in the future. If this happens, then future exposures to diesel particulate will be less than was assumed.

Emissions uncertainty

The exact amount of DEEP emitted from Dirt Hugger's diesel-powered engines is uncertain. Landau Associates estimated emissions assuming engines would operate at varying loads, and therefore based diesel particle emission rates on Tier 4 emission standards. The actual emissions may be more or less than the Tier 4 standards based on engine performance and maintenance.

Air dispersion uncertainty

The transport of pollutants through the air is a complex process. Agencies develop regulatory air dispersion models to estimate the transport and dispersion of pollutants as they travel through the air. They update these models when more accurate techniques become known. Generally, agencies develop these models to avoid underestimating the modeled impacts. Even if we confidently know all the numerous input parameters to an air dispersion model, random effects found in the real atmosphere will introduce uncertainty.

Toxicity uncertainty

One of the largest sources of uncertainty in any risk evaluation is associated with the scientific community's limited understanding of the toxicity of most chemicals in humans following exposure to the low concentrations generally encountered in the environment. To account for uncertainty when developing toxicity values (e.g., RfCs), EPA and other agencies apply "uncertainty" factors to observed doses or concentrations that cause adverse non-cancer effects in animals or humans. Agencies apply these uncertainty factors so that they derive a toxicity value considered protective of humans including susceptible populations. In the case of DEEP exposure, EPA and OEHHA derived non-cancer reference values used in this assessment from animal studies. These reference values are probably protective of most of the population including sensitive individuals, but in the case of EPA's DEEP RfC, EPA acknowledges (EPA, 2002):

> "…the actual spectrum of the population that may have a greater susceptibility to diesel exhaust (DE) is unknown and cannot be better characterized until more information is available regarding the adverse effects of diesel particulate matter (DPM) in humans."

Quantifying DEEP cancer risk is also uncertain. Although EPA classifies DEEP as probably carcinogenic to humans, they have not established a URF for quantifying cancer risk. In their health assessment document, the EPA determined that "human exposure-response data are too uncertain to derive a confident quantitative estimate of cancer unit risk based on existing studies." However, EPA suggested that a URF based on existing DEEP toxicity studies would range from $1x10^{-5}$ to 1×10^{-3} per $\mu g/m^3$. OEHHA's DEEP URF (3×10^{-4} per $\mu g/m^3$) falls within this range. Regarding the range of URFs, EPA states in their health assessment document for diesel exhaust (EPA, 2002):

> "Lower risks are possible, and one cannot rule out zero risk. The risks could be zero because (a) some individuals within the population may have a high tolerance to exposure from [diesel exhaust] and therefore not be susceptible to the cancer risk from environmental exposure, and (b) although evidence of this has not been seen, there could be a threshold of exposure below which there is no cancer risk."

Other sources of uncertainty cited in EPA's health assessment document for diesel exhaust are:

- Lack of knowledge about the underlying mechanisms of DEEP toxicity.
- The question of whether toxicity studies of DEEP based on older engines are relevant to current diesel engines.

Regarding the second bullet above, California EPA's Office of Environmental Health Hazard Assessment evaluated experimental data from several new technology diesel engine emissions reflecting emission controls like those proposed for Dirt Hugger's engines (CalEPA, 2012).

> "These studies indicate that the reductions of some air toxics such as polycyclic aromatic hydrocarbons, benzene and 1,3- butadiene in new technology engine exhaust (often 80 – 90%) are not as great as the corresponding reductions in DEP [diesel engine particulate] (often 95 – 99%). The resulting air toxics/DEP ratios for NTE [new technology engine] exhaust may be greater than or equal to similar ratios found in exhaust from older diesel engines. As an example, an analysis of data from one published review indicated that the average 3-ring PAH, 1,3-butadiene and benzene/DEP ratios increased in NTE exhaust compared to older DEE [diesel engine emissions] by 2-, 10- and 4-fold, respectively. These data suggest that while the absolute amount of DEP (and thus estimated cancer risk) and air toxics is much reduced in NTE exhaust, the exhaust composition has not necessarily become less hazardous. Thus, the available data do not indicate that NTE exhaust should be considered to be fundamentally different in kind compared to older DEE for risk assessment purposes and suggests the TAC cancer unit risk value for DEP can continue to be applied to NTE exhaust risk assessments."

Conclusions and Recommendation

The project review team has reviewed the HIA and determined that:

(a) The TAP emissions estimates presented by Landau Associates represent a reasonable estimate of the project's future emissions.

(b) Emission controls for the new and modified emission units meet the tBACT requirement.

(c) The ambient impact of the emissions increases of each TAP that exceeds ASILs has been quantified using appropriate refined air dispersion modeling techniques.

Ecology estimated lifetime increased cancer risks attributable to Dirt Hugger-related DEEP and other toxic air pollutant emissions. DEEP emissions resulted in an increase cancer risk of about three in one million at the maximally impacted receptors.

Ecology also assessed chronic and acute non-cancer hazards attributable to the project's emissions and those from other nearby sources and determined that long-term adverse non-cancer health effects from exposure to DEEP are not likely to occur.

Ecology assessed the cumulative health risk by adding estimated concentrations attributable to Dirt Hugger emissions to an estimated background DEEP concentration. The maximum cumulative cancer risk from residents' exposure to DEEP near Dirt Hugger is approximately 37 in one million.

Because the increase in cancer risk attributable to Dirt Hugger's proposed increased emissions is less than the maximum risk allowed by a second tier review, which is 10 in one million, and the non-cancer hazard is acceptable, the project is approvable under WAC 173-460-090.

The risk manager may recommend approval of the permit because:

- Ecology determined that the emission controls for the new and modified emission units represent tBACT.
- The cancer risk from Dirt Hugger's TAP emissions is less than the maximum risk (10 in one million) allowed by a second tier review.
- Ecology determined that the non-cancer hazard is acceptable.

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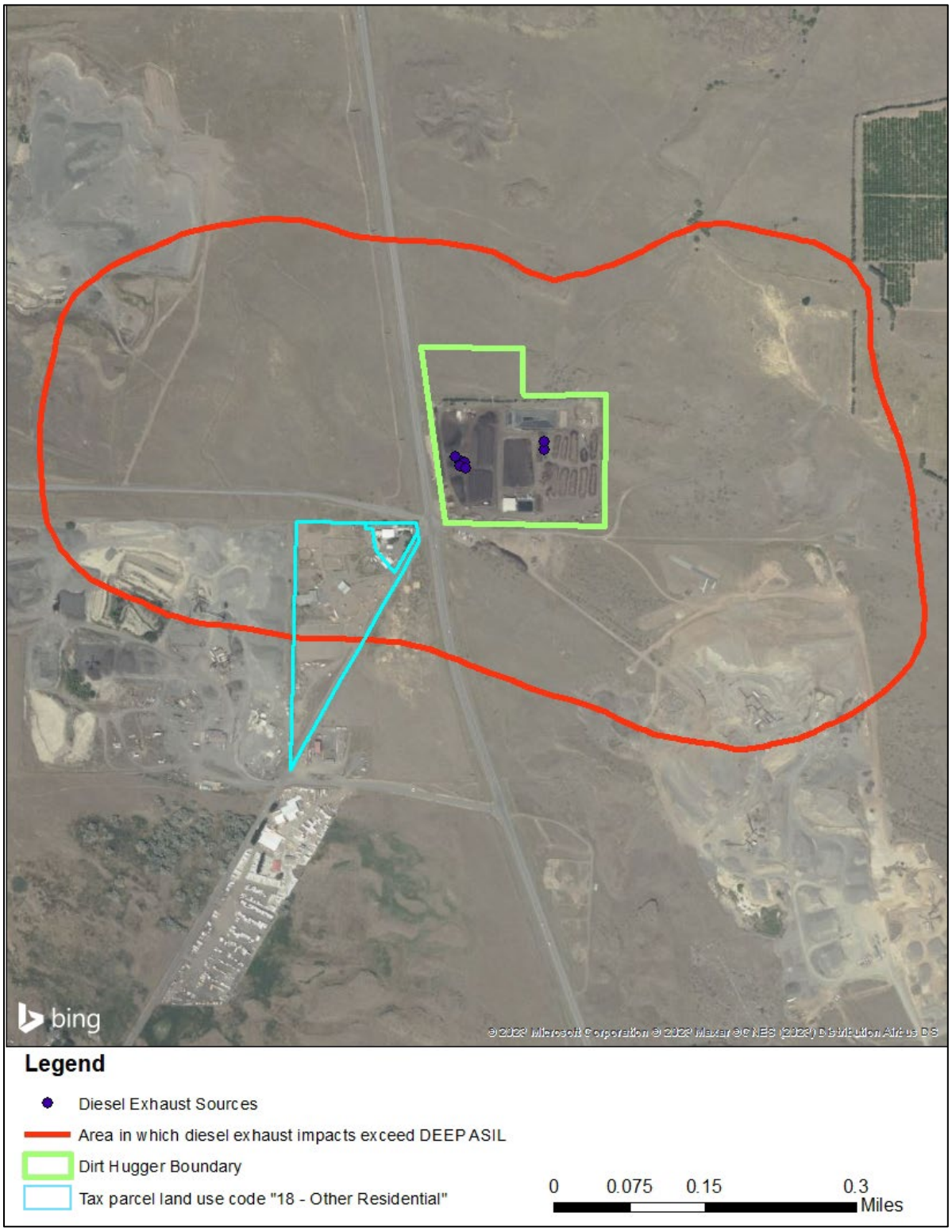

Figure 1: Geographic extent to which increased Dirt Hugger DEEP emissions may cause impacts that exceed the ASIL and key receptors for which health risks were evaluated

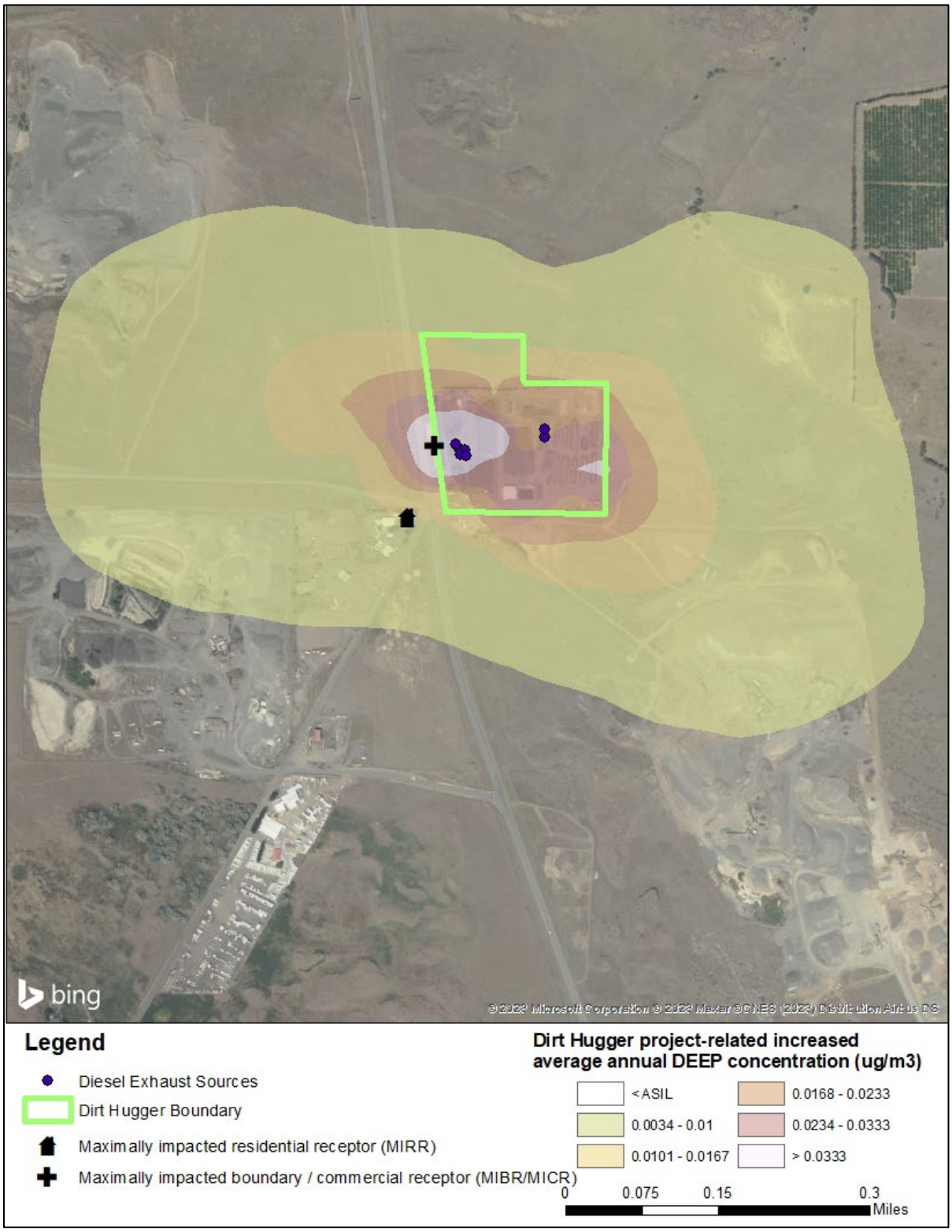

Figure 2: Estimated annual diesel particulate concentration from Dirt Hugger's emissions and the key receptors for which health risks were evaluated