RISK SCREENING WORKSHEET FOR NON-ROAD DIESEL ENGINES

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Initial Reason for Development of Worksheet

- Air Enforcement would find unpermitted engines and advise facility to file an application
- Some applications were deemed unapprovable because of the health risk posed by Diesel Particulate Emissions
- Worksheet developed so Air Enforcement could give these facilities immediate feedback on whether the engine was going to have difficulty demonstrating negligible risk

Information Needed to be Entered into Worksheet

- Engine's Stack Height and Capacity in hp
  - Must be >= 15 feet if engine capacity <=600 hp
  - Must be >= 25 feet if engine capacity >600 hp
- Engine's Stack Discharge direction
  - Must be up
  - Fixed rain cap – Horizontal discharge
- Engine's Tier or Year of Manufacture
- Engine's maximum annual operating hours
- Distance to the property line

Output of Worksheet

- Incremental Cancer Risk (Four Ranges)
  - =< 1E-06, Risk is negligible (Range I)
  - > 1E-06 and <= 1E-05 (Range II)
    - May be acceptable
    - Minimization measures must be evaluated and reasonable ones implemented.

Output of Worksheet

- Incremental Cancer Risk (Four Ranges)
  - > 1E-05 and <= 1E-04 (Range III)
    - Refined air dispersion modeling needed
    - Some type of APC device, in addition to other risk minimization measures, most likely required
  - > 1E-04 (Range IV)
    - Not approvable
    - Engines operation has the potential to cause significant health risk to surrounding community

Step 1 - Determine If This Worksheet Is Appropriate For Your Diesel Engine

A. Engine's Stack Height: 15 feet

B. Engine's Horsepower: 250 hp

C. Discharge Direction of the Stack: (•) Up ( ) Down ( ) Horizontal

(A fixed rain cap is considered a horizontal discharge.)

Click here to test if this Worksheet is Appropriate for you

Step 2 - Determine the Potential Annual Diesel Particulate Matter (DPM) Emission Rate

A. Engine's horsepower (from above): 250 hp

B. Engine's tier or year of manufacture

[x] Tier 2 OR [ ] Year Manufactured 1997

C. Engine's maximum annual operating hours: 1200 hours/year

Click Here to Calculate DPM Emissions

D. DPM emission factor: 0.15 g/hp-hr

E. DPM emission rate = DPM emission factor * (Horsepower * hours of operation) / 454 g/lb

99.1 lbs/yr = 0.15 g/hp-hr * 250 hp * 1200 hrs/yr / 454 g/lb

Step 3 - Calculate Incremental Cancer Risk

For engines of 600 hp and less, an assumption was made of a stack height of 15 feet and a plume rise of 25 feet.

For engines rated over 600 hp, an assumption was made of a stack height of 25 feet and a plume rise of 50 feet.

A. DPM Emission Rate	99.1	lbs/year	Click here to Assess Cancer Risk-Impact
B. Distance from Stack to Property Line	475	feet	
C. Incremental Cancer Risk	9.20E-06	or less than 9.2 in a million	

Color Key for Incremental Cancer Risk

Green	The risk is less than or equal to 1 in a million (1E-06). The risk is negligible, and the permit should be approvable.
Yellow	The risk is greater than 1 in a million (1E-06) and less than or equal to 10 in a million (1E-05). The permit may be approvable. Risk minimization measures must be evaluated, and reasonable ones implemented. Consult with the NJDEP permit evaluator.
Orange	The risk is greater 10 in a million (1E-05) and less than or equal to 100 in a million (1E-04). The engine may pose a significant health risk to the surrounding community. More detailed evaluation is needed, including refined air dispersion modeling. Some type of control device to reduce emissions will most likely be required, along with other risk minimization measures.
Red	The risk is greater than 100 in a million (1E-04). The engine's operation has the potential to cause a significant health risk to the surrounding community. The permit is not approvable.

Advantages of diesel worksheet

- Calculates annual emissions of diesel particulate matter based on Tier or Year of Manufacture and annual operating hours
- Provides risk with an assumed plume rise
  - Engines =< 600 hp, assumes a 15 foot stack and 25 foot plume rise (40 foot discharge)
  - Engines >600 hp, assumes 25 foot stack and 50 foot plume rise (75 foot discharge)

NOTE: Worksheet only uses 40 foot/75 foot discharges, even if stack height greater than worksheet minimum

Comparison: Diesel Worksheet and 1st Level Risk Assessment Worksheet

CASE #, inputs to worksheet, and DPM emissions	1st Level Worksheet (without plume rise)	Screening Worksheet for Nonroad Diesel Engines
#1 – 250 HP, Tier 2, 1200 hr/yr, 15 foot stack, 100 feet to property line, DPM emissions– 99.1 lb/yr	1.7E-5	9.2E-06
#2 – 700 HP, Tier 2, 500 hr/yr, 30 foot stack, 300 feet to property line DPM emissions– 115.6 lb/yr	2.5E-5	9.7E-6
#3 – 650 HP, Tier 4, 450 hr/yr, 25 foot stack, 200 feet to property line DPM emissions– 9.7 lb/yr	4.2E-06	8.4E-7