STUDY ON DISPERSION OF POLLUTANTS IN THE ATMOSPHERE  
*for the* objective  
S.C. GREEN OIL AND LUBES S.R.L.   
Waste oil recycling plant, the Municipality of Oltenița, County of Calarași

**5. CONCLUSIONS**

As a result of the analysis of the calculations of the dispersion of pollutants generated from the activities that will take place on the site Green Oil and Lubes S.R.L. the Oltenița waste oil recycling plant, resulted in the maximum estimated concentrations of pollutant of SO2, NON, CO and PM10 powders in the ambient air in the site impact area.

The pollution dispersion modeling calculations were performed in three stages:

in the first stage, the dispersion of pollutants from sources at the site of the Waste Oil Recycling Factory - fixed sources and internal road traffic (**internal sources**) was modeled:

* in the second stage, the dispersion of pollutants from sources outside of the site - household consumers and road traffic in Oltenița (**external sources**) was modeled:

in the third stage, the dispersion of pollutants from internal sources as well as from external sources (**cumulative impact**) was modeled.

The modeling calculations were made for the averaging times stipulated by Law no. 104/2011 on ambient air quality, as follows:

* for SO2: 60 min.. 24 hours. annually and in winter:
* for NOx: 60 min. and annually: for CO: 8 hours;
* for PM10 powders: 24 hours and annually.

Based on climate and relief data characteristic to the Oltenița - Tutrakan area, in the modeling calculations of the pollutant dispersion on short averaging time, several scenarios, in which several wind directions and three classes of atmospheric stability were considered, were analyzed.

The atmospheric stability classes taken into account are:

stability class B (unstable), air temperature 25 ° C, wind speed 1 m / s - specific conditions for daytime during hot season:

* stability class D (neutral), air temperature 15 ° C, wind speed 10 m / s - storm conditions:
* stability class F (stable), air temperature 15 ° C, wind speed 0.5 m/s - specific conditions for night time.

The following wind directions were taken into consideration in the dispersion modeling calculations on a short averaging time:

* - WSW - predominant wind direction, parallel to the Dullard bed;
* NE - the third predominant direction towards Tutrakan,

NNE - the fourth predominant direction towards Tutrakan;

N - represents the least likely direction, but equally is the most unfavorable situation in the analysis of the impact on air quality in Tutrakan:

* SSW — towards Oltenița;
* Calm atmosphere.

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|  |  |  |
| --- | --- | --- |
| **STUDY ON DISPERSION OF POLLUTANTS IN THE ATMOSPHERE** *for the* **objective S.C. GREEN OIL AND LUBES** S.R.L.  Waste oil recycling plant, the Municipality of Oltenița, County of Calarași | |  |
|  |  |  |

For calm atmosphere, the stability classes B (unstable) and F (stable) were considered **under** the above mentioned temperature conditions. The stability class D (neutral) is not applicable to calm atmosphere situations.

In the modeling calculations of dispersion over a 24-hour averaging time, the following days considered as representative were selected from the climatic database:

- For cold season, the day of 15/01/2018;

- For hot season, the day of 05/07/2017;   
For the transition period, the day of 02/10/2017.

In the CO dispersion modeling calculations for 8-hour averaging time, runways were performed, ranging from 1.00 to 8.00 a.m., 9.00 a.m. to 4 p.m. and 5.00 p.m. to 12.00 a.m. for the 3 days mentioned above, 1.00 a.m. representing the time interval 12.01 a.m. - 1.00 a.m..

In the dispersion modeling calculations for the annual averaging time, the climate database for the calendar year 2017 was used.

For the SO2 dispersion modeling - averaging time for the cold season, the climate database for the period 01/10/2017 - 31/03/2018 was used.

In Tables 19-22, we compare the results of dispersion calculations for SO2, NOx**, CO and PM10** powder pollutants for internal sources, external sources and cumulative impacts, i.e. the maximum concentration resulting from the calculation and localization of the point at which the maximum concentration is reached. If the maximum concentration was reached for the two runways at the same point or in very close points, the contribution of the sources from the site of the waste oil recycling plant to the maximum concentration level resulted from the calculation was determined.

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**STUDY ON DISPERSION OF POLLUTANTS IN THE ATMOSPHERE**

***for*** *the objective*

**S.C. GREEN OIL AND LUBES S.R.L.**

**Waste oil recycling plant, the Municipality of Oltenița, County of Calarași**

**Table no. 19** Comparative analysis of the SO2 dispersion calculation results

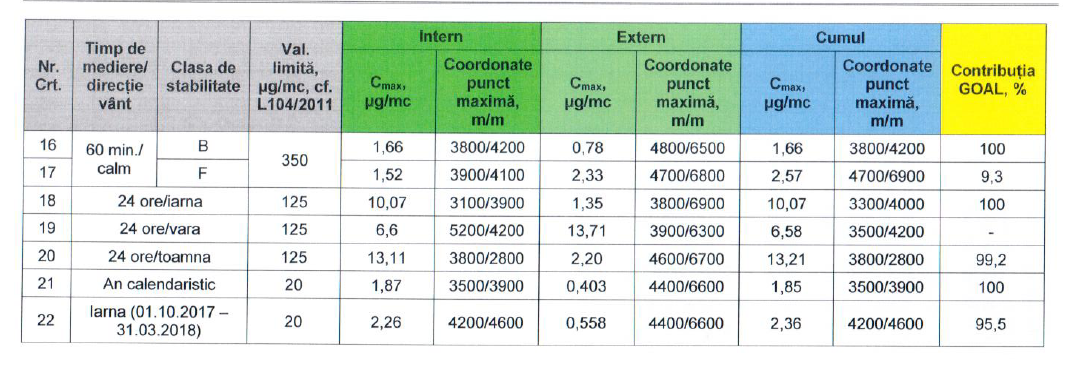
|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Averaging time/wind direction** | **Stability**  **class** | **Limit**  **value,**  **pg/mc, cf.**  **L104/2011** | **Internal** | | | **External** | | **Cumulation** | | **Contribution**  **Goal %** |
| **Cmax,**  **pg/mc** | | **Maximum point coordinates, m/m** | **Cmax,**  **pg/mc** | **Maximum point**  **coordinates,**  **m/m** | **Cmax,**  **pg/mc** | **Maximum point coordinates, m/m** |
| 1 | 60 min /VSV | B | 350 | 10,52 | 4300/4400 | | 2,63 | **5300/6800** | **13,91** | **5300/6800** | 75,5 |
| 2 | D | 2,92 | **4500/4500** | | **0,32** | **5300/6800** | **7,47** | **4100/4300** | - |
| 3 | F | 2,53 | **9450/4800** | | **3,23** | **9450/4800** | 2,60 | **9450/4800** | - |
| 4 | 60 min /NE | B | 350 | 16,25 | **3500/3900** | | **1,42** | 5200/6400 | 16,09 | 3500/3900 | **100** |
| 5 | D | 10,06 | **3500/3900** | | **0,28** | **4600/6700** | **9,97** | **4600/6700** | **100** |
| 6 | F | 22,19 | **1500/1800** | | **7,56** | **3700/6500** | **22,19** | **1500/1800** | **100** |
| 7 | 60 min/NNE | B | 350 | 14,91 | **3600/3800** | | **3,39** | **5200/6400** | **14,83** | **3600/3800** | **100** |
| 8 | D | 7,05 | **3600/3800** | | **0,64** | **5200/6400** | **7,17** | **3600/3800** | **98,3** |
| 9 | F | 61,32 | 3100/2600 | | **8,16** | 4700/6100 | 59,56 | 3200/2600 | 100 |
| 10 | 60 min, /N | B | 350 | 13,90 | 3800/3700 | | **3,34** | 5200/6400 | **13,90** | 3800/3700 | 100 |
| 11 | D | 6,18 | **3800/3700** | | **0,54** | **5200/6400** | **6,84** | **3800/3800** | **90,1** |
| 12 | F | 83,6 | **3800/2700** | | **1,70** | **5200/6300** | **83,88** | **3800/2700** | **99,7** |
| 13 | 60min/SSV | B | 350 | 10,50 | **4000/4700** | | **1,41** | **4400/6600** | 13,94 | **4000/4600** | **75,1** |
| 14 | D | 2,96 | **4100/4900** | | **0,29** | **4600/5600** | **6,95** | **4000/4700** | **41,2** |
| 15 | F | 2,53 | 4350/10050 | | 2,95 | 4600/5600 | **2,81** | 4200/9750 | - |

60 mir NNE

60 min

N

60 **min SSW**

**STUDY ON DISPERSION OF POLLUTANTS IN THE ATMOSPHERE***for the* **objective  
S.C. GREEN OIL AND LUBES S.R.L.**

**No.**

**Averaging time/wind direction**

**Stability   
class**

**Limit   
value,   
pglmc, cf.   
L104/2011**

**Internal**

**External**

**Cumulation**

**Contribution**

**Goal %**

**Maximum point coordinates, m/m**

**Maximumpoint**

**coordinates,**

**m/m**

**Maximum point coordinates, m/m**

**Winter(01.10.2017-**

**31.03.2018)**

**Calendar year**

**24h/autumn**

**24h/summer**

**24h/winter**

**24h/winter**

**STUDY ON DISPERSION OF POLLUTANTS IN THE ATMOSPHERE***for the objective***S.C. GREEN OIL AND LUBES S.R.L.   
Waste oil recycling plant, the Municipality of Oltenița, County of Călărași**

**Table no. 20** Comparative analysis of the NOx dispersion calculation results

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|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Averaging time/wind direction** | **Stability  class** | **Limit  value,  pglmc, cf.  L104/2011** | **Internal** | | Cmax,  **Maximum point  coordinates,  m/m**  **pg/mc** | **External** | **Cumulation** | | **Contribution  GOAL, %** |
| Cmax,  **pg/mc** | **Maximum point  coordinates,  m/m**  **4300/4400** |  | Cmax,  **pg/mc** | **Maximum point coordinates, m/m** |
| **1** | 60 min./VSV  60 min /NE | **B** | **200** | **5.35** | **144.3** | **5300/6800** | **144.3** | **5300/6800** | **0** |
| 2 | **D** | **2.72** | **4300/4400** | **18.0** | **5300/6800** | **18.0** | **5300/6800** | **0** |
| **3** | **F** | **11.9** | **4100/4300** | **172.0** | **4500/6800** | **172.0** | **4500/6800** | **0** |
| 4  5  **6** | **B** | **200** | **21.72** | 3900/4100 | **74.54** | **5200/6400** | **74.54** | 5200/6400 | 0 |
| 5 | **D** | **3.70** | **3500/3900** | **14.96** | **4600/6700** | **14.96** | **4600/6700** | **0** |
| 6 | **F** | **16.31** | **3800/4000** | **404.8** | **3700/6500** | **404.8** | **3700/6500** | **0** |
| **7** | 60 min./ NNE | **B** | **200** | **5.28** | **3600/3700** | **178.7** | **5200/6400** | **178.7** | **5200/6400** | **0** |
| **8** | **D** | **2.83** | **3600/3700** | **33.87** | **5200/6400** | **33.87** | **5200/6400** | **0** |
| **9** | **F** | **26.32** | **3800/4100** | **432.71** | **4700/6100** | **432.71** | **4700/6100** | **0** |
| **10** | 60 min./ N | **B** | **200** | **5.14** | **3800/3600** | **177.3** | **5200/6400** | **177.3** | **5200/6400** | **0** |
| 11 | **D** | **2.53** | **3800/3600** | **28.80** | **5200/6400** | **28.80** | **5200/6400** | **0** |
| **12** | **F** | **31.27** | **3800/2600** | **98.01** | **5200/6300** | **98.01** | **5200/6300** | **0** |
| **13** | 60 min./ SSV | **B** | **200** | **5.37** | **4000/4700** | **75.2** | **5300/6800** | **75.66** | **5300/6800** | **0.6** |
| **14** | **D** | **2.82** | **4000/4700** | **15.5** | **4600/5600** | **16.34** | **4600/5600** | **5.1** |
| **15** | **F** | **42.7** | **3900/4300** | **157.8** | **4600/5600** | **158.5** | **4600/5600** | **0.4** |
| **16** | 60 min./  calm | **B** | **200** | **2.54** | **3900/4100** | **40.97** | **4800/6500** | **40.99** | **4800/6500** | **0.05** |
| **17** | **F** | **10.6** | **3900/4100** | **278.9** | **4700/6800** | **279.1** | **4700/6800** | **0.07** |
| **18** | **Calendar year** | | **40 / 30** | **0.019** | **3900/4100** | **21.89** | **4400/6600** | **21.9** | **4400/6600** | **0.05** |

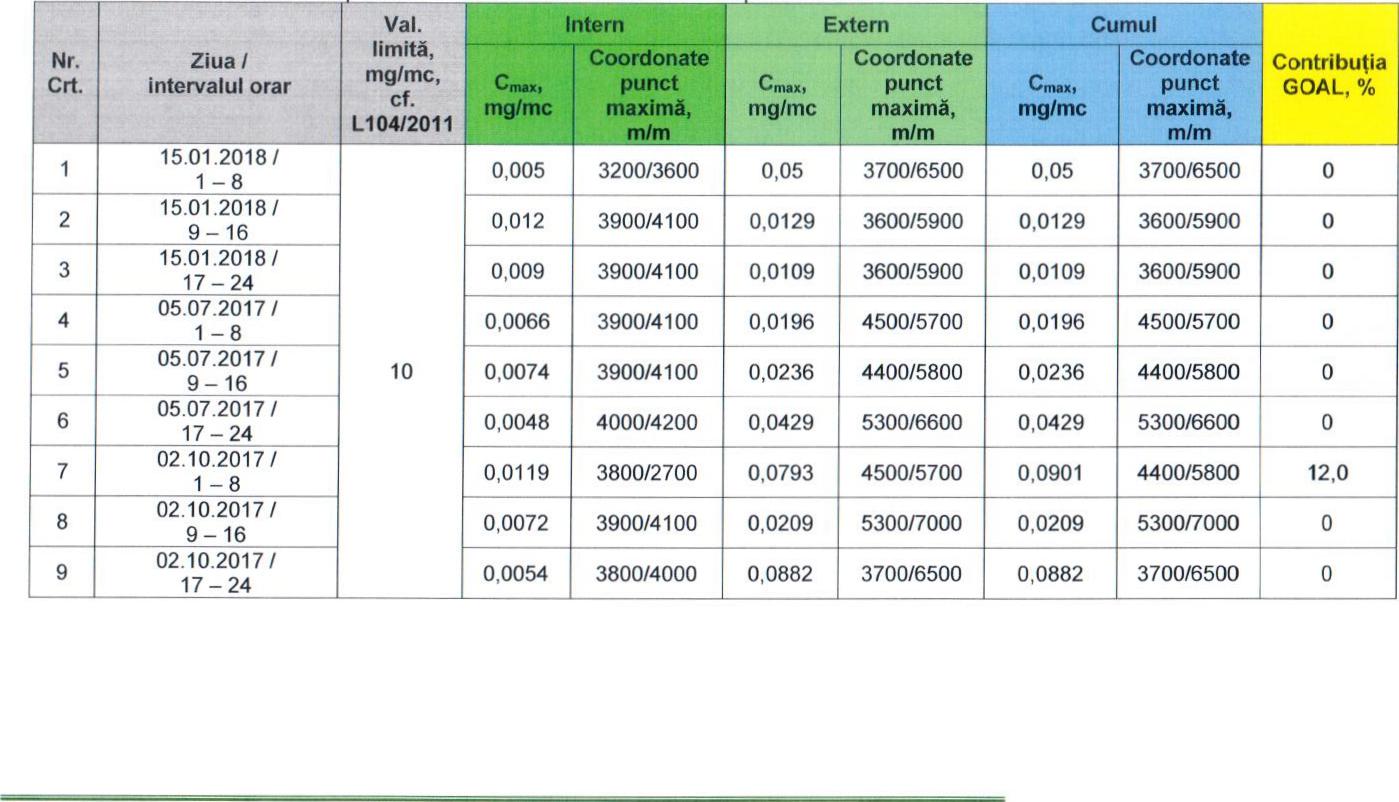
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|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | STUDY ***ON DISPERSION*** OF POLLUTANTS IN THE ATMOSPHERE *for the* objective S.C. GREEN OIL AND LUBES S.R.L.  Waste oil recycling plant, the Municipality of Oltenița, County of Călărași | | | | |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

**Table no. 21** Comparative analysis of the CO dispersion calculation results

**Maximum point coordinates, m/m**

**Internal**



**Cmax,   
mg/mc**

**External**

**Cumulation**

**3**

**No.**

**Limit**

**mg/mc,   
cf.**

**L104/2011**

**Cmax,   
mg/mc**

**Maximum   
point   
coordinates,   
m/m**

**Cmax,**

**mg/mc**

Maximum   
point   
coordinates,   
m/m

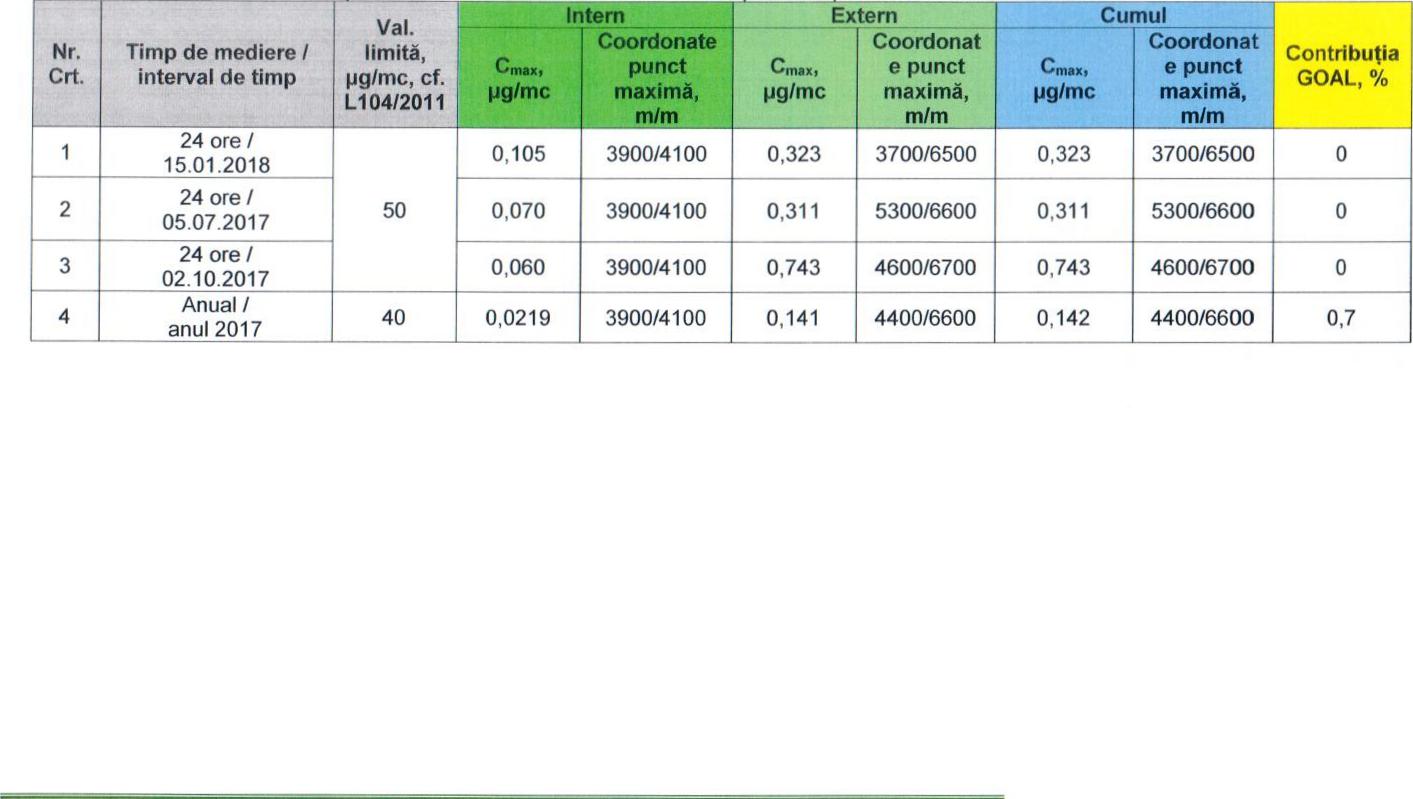
**Contribution GOAL,%**

**Day /**

**time interval**

**STUDY ON DISPERSION OF POLLUTANTS IN THE ATMOSPHERE  
*for the objective*S.C. GREEN OIL AND LUBES S.R.L.   
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Cumulation

**Internal External**

**24 hours /**

**05/07/2017**

**0**

**2**

**3**

**24 hours /**

**02/10/2017**

**0.743**

**4600/6700**

**3900/4100**

**4600/6700**

**0.743**

**0.060**

0

**0.070**

**3900/4100**

**0.311**

**5300/6600**

**4**

**Anually /year 2017**

**0.141**

**4400/6600**

3900/4100

**4400/6600**

**0.142**

0.0219

**0.7**

**0.311**

**5300/6600**

**No.**

**1**

**Limit**

**Value**

**pg/mc, cf. L104/2011**

**3900/4100**

**Cmax,   
pg/mc**

0.323

**Maximum**

**point   
coordinates,   
m/m**

**3700/6500**

**Cmax,**

**pglmc**

**0.323**

**3700/6500**

**GOAL contribution, %**

0

**24** hours /

**15/01/2018**

**Averaging time / time interval**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table no. 22** Comparative analysis of the PM10 powder dispersion calculation results |  |  |  |  |  |  |

**Maximum   
point   
coordinates,**

**m/m**

**Maximum   
point**

**coordinates,**

**mlm**

**Cmax,**

**pg/mc0.105**

**40**

**50**

**STUDY ON DISPERSION OF POLLUTANTS IN THE ATMOSPHERE  
*for the objective*S.C. GREEN OIL AND LUBES S.R.L.   
Waste oil recycling plant, the Municipality of Oltenița, County of Călărași**

From the data presented in Table 19 on SO2 dispersion modeling, it results from the commissioning of installations at the site of the waste oil recycling plant that no exceedance of the allowed limit values ​​for the SO2 pollutant will be recorded in any of the analyzed situations and the majority contribution to the SO2 level in the air belongs to site sources.

In the worst case, respectively, winds in the NNE and N sector, the maximum concentrations reached values ​​of 61.32 pg/mc, respectively 83.88 pg/mc, compared to the limit value of 350 pg/mc according to the Law no. 104/*2011 on ambient air quality* and Directive 2008/50/EC of the European Parliament and of *the Council on air quality and a cleaner air for Europe,* and are registered in the region of Tutrakan - Bulgaria.

For 24-hour averaging times, annually and in winter, the peak concentrations are reached adjacent to the site and are located with 1-2 orders of magnitude below the limit values ​​according to Law no. 104/2011 on ambient *air quality and Directive 2008*/50/EC of the European Parliament and of the Council on *ambient air quality and a cleaner air for Europe of 125* and 20 pg/m3 respectively.

***Therefore, in terms of SO2 pollution, it resulted that the activities carried*** out ***at the site of the waste oil recycling plant will have an insignificant impact on the quality of the air environment factor.***

From the data presented in Table 20, regarding the NOx dispersion model, it results that the main contributor to the level of nitrogen oxides in the air are the road traffic and the residential consumers from Oltenița.

In three of the analyzed scenarios, for a 60 minute averaging time and stability class F (stable), for wind directions NE, NNE and calm atmosphere, on the territory of Oltenița, local exceedances of the limit value of 200 pg / mc can be recorded. This exceedance is primarily due to domestic consumers and road traffic, the contribution of activities at the site of the Waste Oil Recycling Plant being insignificant in all three cases.

***Therefore, in terms of NOx pollution, it resulted that the activities carried out at the site of the waste oil recycling plant will have an insignificant impact on the quality of the air environment factor.***

From the data presented in Table 20 on CO dispersion modeling, it resulted that the peak values of CO concentrations in the air were found to be at 4 to 5 orders of magnitude below the limit value of 10 mg/mc, the contribution of sources at the site of the Waste Oil Recycling Plant being insignificant.

***Therefore, it is estimated that CO pollution resulting from site activities is at an insignificant level.***

From the data presented in Table 20, on PM10 powder dispersion modeling, it resulted that the maximum values of powder concentrations in the air are at 3 orders of magnitude below the limit value of 50 pg/mc for a 24 hours averaging time, respectively 40 pg/mc for an annual averaging time.

***Therefore, it is estimated that the powder pollution resulting from site activities is at an insignificant level.***

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