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7. Abstract

The design of the modular exhauster for rotary mode core sampling requires information on the masses of aerosols expected to be generated during operation. This study used various models to predict the mass of aerosol encountered by the exhauster and its filters for different operating conditions. The information gathered showed that aerosol generation could be a major design factor for this exhauster under certain circumstances.

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AEROSOL STUDY FOR THE ROTARY MODE EXHAUSTER

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Richland, Washington
October 15, 1992

EXECUTIVE SUMMARY

The rotary mode core sampling system requires a modular exhauster to filter the nitrogen purge gas used and also to maintain a negative pressure in the tank. For the design of the exhauster system, it is necessary to predict the impact of the solid or liquid aerosols that can be generated while drilling through hard salt cake material. In this study, a computer simulation was run that provided data on the masses of aerosol escaping out the exhaust riser, given a variety of operating conditions. The data will support the design of a modular exhauster system.

The results showed that, for dry aerosol cases under anticipated worst case conditions, approximately 3.5 kg of aerosol could be drawn up the exhaust riser over the period for drilling a full 30-ft core. Some measures could be taken to reduce this amount. Closing off cascade lines or other valves would decrease the exhauster flow rate requirements, which could lessen the mass of aerosol escaping. Spacing the drill and exhaust risers far apart would allow for more settling of the aerosols, and high penetration rates (2 in./sec. or greater) decrease the drilling time and limit the length of time that aerosol is generated. The liquid aerosol runs showed much greater quantities lost out the riser, and measures will have to be taken to avoid a liquid aerosol spray.

To ensure operator safety and environmental compliance, research was performed to estimate the impact of aerosol generation on the HEPA filter elements of a modular exhauster system. It was shown that the exposure rates from the HEPA filter surface could be an extremely important consideration, and this may be one of the major limiting factors in the design of the modular exhauster system.

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ABBREVIATIONS, ACRONYMS, INITIALISMS

atm	atmosphere
cc	cubic centimeter
cfm	cubic feet per minute
°C	degrees centigrade
°F	degrees fahrenheit
°K	degrees Kelvin
ft	feet
g	gram(s)
in. w.g.	inches - water gauge (pressure)
K	thousand
lb	pound (force)
μin.	micron
min.	minute
mph	miles per hour
psi	pounds per square inch
psig	pounds per square inch gauge
rpm	revolutions per minute
scfm	standard cubic feet per minute
sec.	seconds

1.0 INTRODUCTION AND BACKGROUND

The Tri-Party Agreement milestone M-10 ("Complete analyses of at least two complete core samples from each single-shell tank") is currently being performed by the push mode core drilling operations. In the push mode process, a core drilling truck inserts a sampler/drill string apparatus through a riser in the tank and down into the waste material. To perform push mode sampling, the waste material in the tank must be soft enough to "push" through. However, a number of the tanks have a hard salt cake material at the surface and will require a different sampling method.

The waste in these salt cake-type single shell tanks will be core sampled by the rotary mode method (see Figure 1). The sample core will be cut by a specially designed rotating drill bit. Nitrogen gas will flow inside the drill string and out the drill bit, as shown in Figure 2. The purpose of the nitrogen flow will be threefold: 1) to provide a heat sink that prevents excessive temperatures at the drill bit/waste interface; 2) to provide the lift necessary to remove drill cuttings from the annulus bore; and 3) to maintain a hydrostatic pressure at the drill bit to keep the waste out of the drill string during sampler changes.

The nitrogen gas so released inside the underground waste tank will be exhausted through a riser and filtered by a modular exhauster system located above ground. The basic elements of the exhauster system will consist of a demister/moisture separator, heater, HEPA filter, charcoal filter, test section, charcoal filter, HEPA filter, variable speed fan, and stack system.

Testing of the rotary mode core drilling performance in the laboratory has shown a noticeable amount of dust produced (Claybrook 1992). It is at present unknown how dust (solid aerosol) generated during actual core drilling operations on single-shell tank waste will impact the modular exhauster system. It is estimated that if a pool of liquid is encountered during the drilling process, that there may be liquid aerosol generation as well. Therefore, a method of estimating the masses of aerosols formed and exiting out the exhaust riser was required to support the design of the rotary mode exhauster.

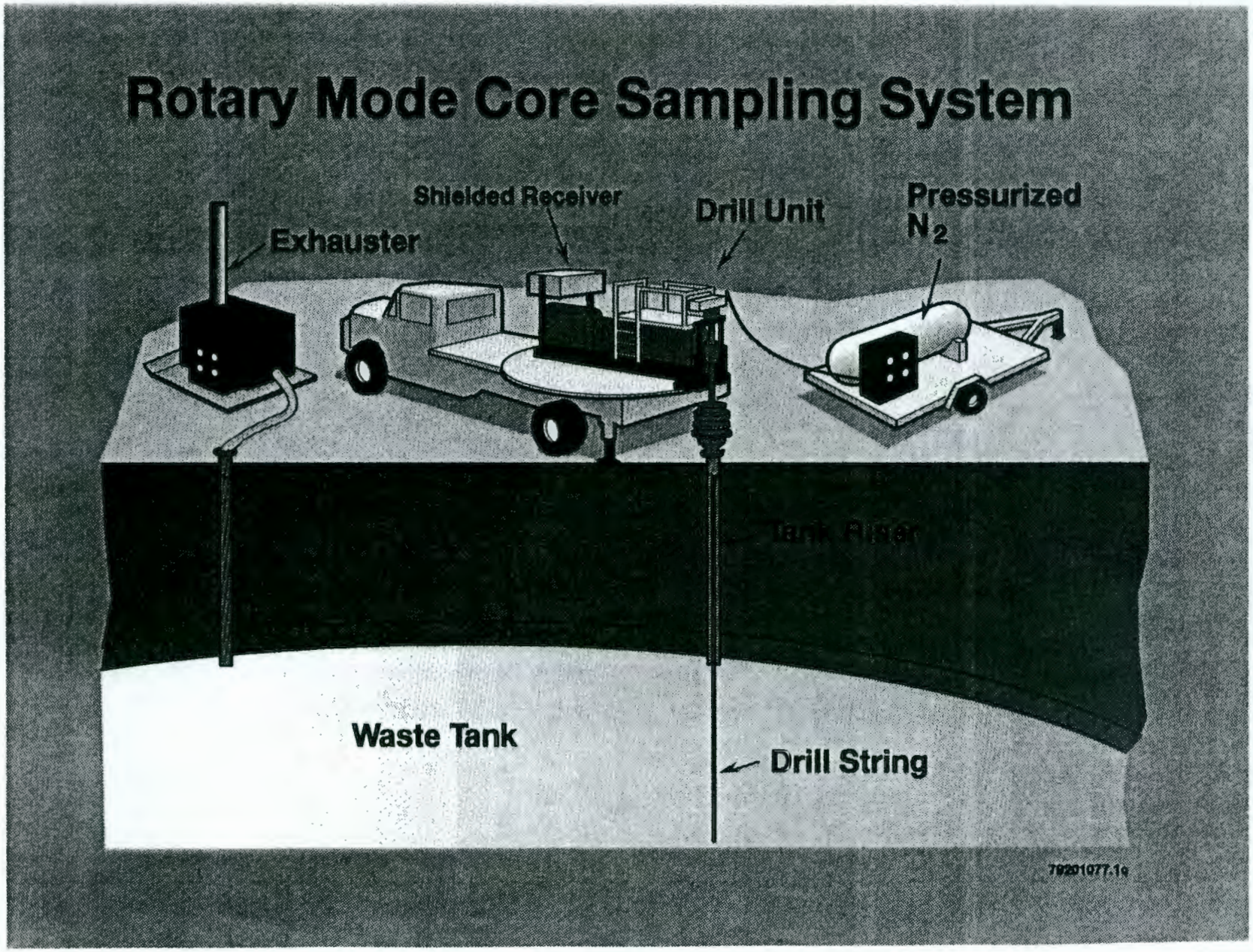
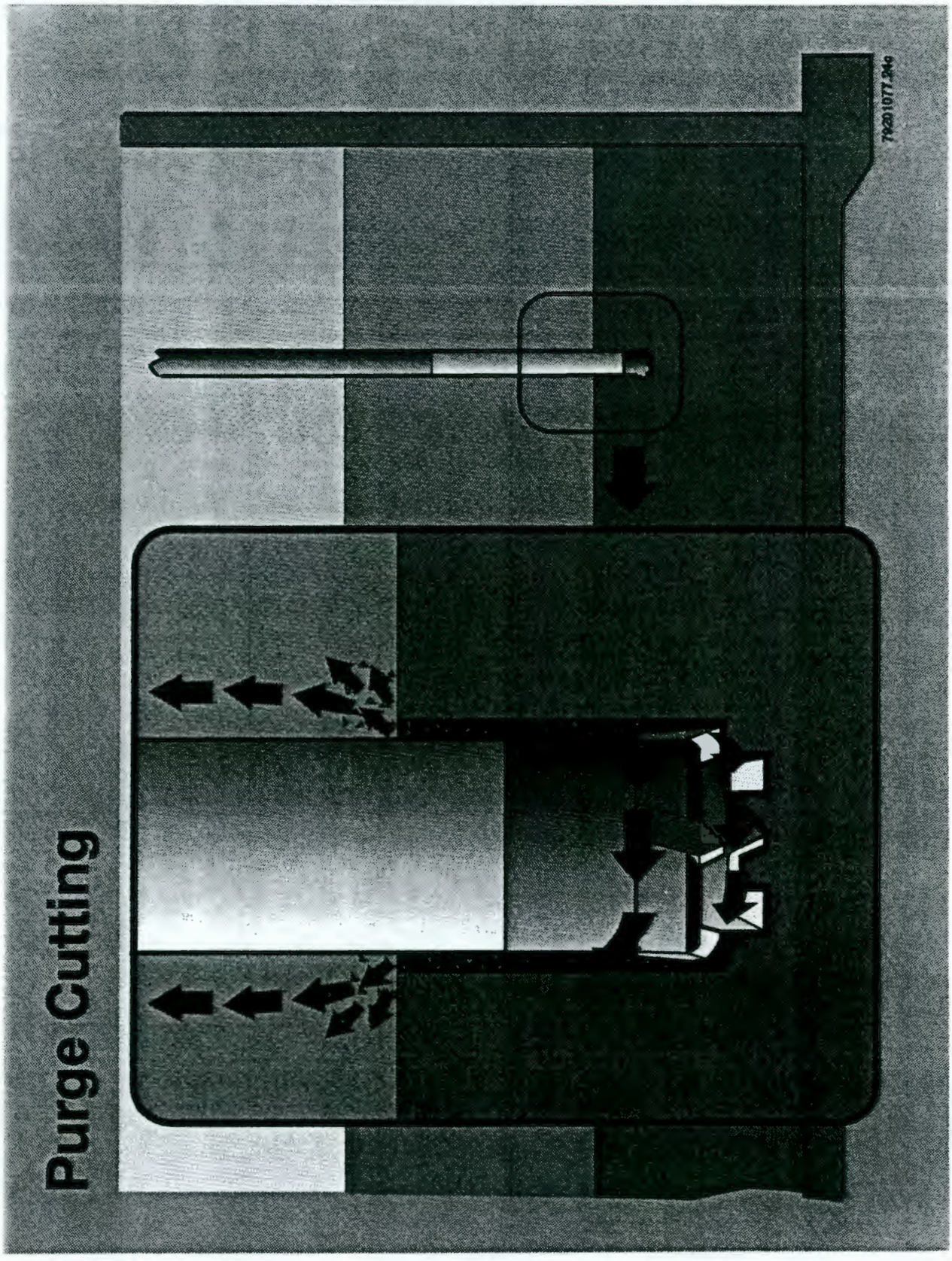


Figure 1. Components of the Rotary Mode Core Sampling System.

Figure 2. Drill Bit With Purge Gas System.



2.0 OBJECTIVE

The objective of this study is to support the design criteria document to be written for the rotary mode exhauster system. Data is provided on simulation runs of aerosol generation during drilling operations in the waste tanks. This information is needed to assure a properly designed exhauster that will not cause adverse effects on rotary mode core drilling personnel, equipment, or the environment.

A secondary purpose of this study is to estimate the impact that aerosol generation might have on the HEPA filter elements of a modular exhauster system. This information will serve as a verification to support the design of the modular exhauster system.

3.0 CONCLUSIONS AND RECOMMENDATIONS

The information gathered for aerosol generation during salt cake drilling can provide insight into the trends and the general magnitude of aerosol to be expected during rotary mode sampling. When the data from the simulations for aerosol generation is used for the exhauster design, special attention should be paid to the assumptions made for the models. The results of the simulations were valid for the parameters chosen, but the conditions of aerosol generation were simplified, and the results may not predict the exact behavior during operation.

Trends were shown by varying the five parameters: tank size, in-leakage, penetration rate, waste depth, and bypass fraction (amount that forgoes settling). Penetration rate was the most sensitive factor. Since the mass lost out the riser increases dramatically below 2 in./min., that range should be examined carefully when using this data. The higher in-leakage values resulted in more aerosol through the riser, so a reduction in the sources of in-leakage would provide better conditions for the exhauster.

The runs that incorporated a bypass fraction showed the importance of proper positioning of the exhaust riser. If a "direct shot" up the riser can be avoided, the aerosol escaping could be reduced up to 34%. Also, the bypass fraction had much less effect on the shallower wastes (below 100 in.). For those tanks where the waste is higher, it may be desirable either to ensure that the riser is a sufficient distance away or (if spacing is impossible) to have some type of deflector shield around the exhaust riser.

When a liquid pool is encountered, a much larger mass of aerosol is generated than in the solid cases. The results were based on a simplified model with broad assumptions. Therefore, careful review and consideration of the criteria for these runs is recommended. For example, the worst case scenario for liquid generation depicted drilling through 30 ft of waste a constant source of liquid filling the bore hole, and such a case is quite unlikely. Nevertheless, the presence of a liquid layer will increase the mass lost out the riser, and measures to counteract this situation should be taken such as reducing the purge gas flow or incorporating a demister. The data results involved only the mass out the riser, and overloading of the exhauster filters should be preventable with proper design.

The amount of aerosol generation could have a direct impact on exposure rates to the operators and the environment. The results for exposure rates from a HEPA filter surface showed notably high values for the worst case scenarios. If operating parameters like this are used while drilling (350 scfm for 2.2 hrs with full bypass), the exhauster design could be effected substantially. If normal operating conditions can be ensured, the exposure rates from HEPA filter surfaces should fall within a more acceptable range.

4.0 DATA ACQUISITION AND ASSUMPTIONS

Simulation models were built to estimate the amount of solid and liquid aerosol particles that will flow out the exhaust riser due to the nitrogen purge flow during the operation of the modular exhauster. Two models were used, a bounding model and a transient model. The bounding case involved actually drilling a simulant to examine aerosol behavior and establish an upper limit of aerosol that may exit the exhaust riser. The transient case was included after it was determined that the bounding case produced an unrealistic amount of aerosol.

4.1 SOLID AEROSOL

The procedures and assumptions that were employed to determine the amount of solid aerosol exiting the tank and engaging the modular exhauster are described below. The operating conditions during drilling operations are explained in Sections 4.1.1 - 4.1.3. Sections 4.1.4 - 4.1.7 cover the procedures for establishing a bounding case. The last section describes the transient case model.

4.1.1 Collect Representative Solid Particle Sample

In order to provide information on particle size and behavior, a representative dust sample had to be collected in a practical manner. This involved two steps. Step one was to locate a salt cake simulant, and step two was to generate and collect dust.

The first step was to select a representative simulant waste from which a dust sample could be generated. The main concern was to ensure that the major components in the rotary mode tanks were represented in the simulant, particularly tank BY-104, because it is the first tank planned to be sampled by rotary mode. The selection of a simulant was based on the data outlined in Appendix C-4 and on the following criteria:

- The average particle density dictates the source term for the aerosol.
- The majority of rotary mode tanks are salt cake tanks and therefore have a high sodium nitrate content.
- Sodium nitrate would be the most crystalline of all rotary mode tank solids and thus would be the waste type which would form the most dust.

Simulant RBM#2 was chosen because its high content of sodium nitrate (82%) and sodium aluminate (7%). Although this simulant has a slightly higher average density, the difference was considered negligible compared to the advantages of its physical characteristics. See Appendix A for documentation on the preparation of this simulant.

The second step was to depict actual drilling conditions while collecting a representative amount of drill chips and dust. The method was to

drill into the top of the RBM#2 barrel without any nitrogen gas flow, and collect a cup sample of drilling dust as the drill head displaced the dust. The total depth that the drill bit penetrated the simulant was only 2-3 in. Some assumptions had to be made, since this was only a collecting run and the full effects of particle generation could not be established within the scope of the project. The assumptions for this step were:

- Small variations in the rpm and penetration rate of the drill would not affect particle size distribution.
- Dust collected in the top couple inches of simulant would be essentially identical to dust collected at greater depths in the simulant.
- The absence of nitrogen flow would not cause any re-crushing of the particle and, thus, not affect particle size distribution.
- Transporting the dust sample to the labs for analysis did not cause excessive wear and grinding of the particles against one another resulting in smaller particles.
- When the dust sample was collected, the drill bit design was still ongoing. Variation in drill bit design would not affect particle size distribution.

4.1.2 Determine the Particle Distribution of Sample

The particle distribution in weight percent for each particle size was desired. Two laboratories were used to provide particle distribution data. These were the Pacific Northwest Laboratory (PNL) and the laboratory at the Westinghouse-operated Plutonium Finishing Plant (PFP). Two labs were chosen so that results could be compared and verified. Each lab used samples from the same collection runs, and they each had different methods to determine particle size distribution. PNL used an optical microscopy method, which measures particles between 1 and 100 μin., while PFP used Laser Diffraction Analysis that covers sizes between 0.1 and 10 μin. The report in Appendix B describes the two processes.

Particle distributions were calculated by each lab in the form of weight percent versus size range. The results are summarized in Appendix B, page 2, Table 1. It was recommended that the PFP data should be used, because it showed a larger weight percent of smaller particles, giving more conservative data, since lighter particles are less likely to settle out. It should be noted, though, that the PFP method showed a greater amount of small sized particles because the process was geared towards that range of 0.1 to 10 μin.

4.1.3 Set Tank Dimensional Data and Operating Conditions

The tank dimensions and operating conditions were considered in this section because they could influence the amount of aerosol exiting the exhaust riser. Each parameter was examined for the purpose of estimating what value, in concert with the other parameters, would cause the greatest emission of aerosol into the exhaust riser. The parameters considered were nitrogen flow

and temperature, particle density, solid aerosol generation rate, tank air space, drill riser location, exhaust riser location, exhaust riser pipe dimensions, and distance from waste surface to exhaust riser inlet.

4.1.3.1 Nitrogen flow and temperature

The system specifications call for the delivery of 50 cfm of nitrogen at 90 psig and 35 °F. This would be the highest flow case expected in the drill string during operation. This corresponds to a flow of 0.99 lb-moles/min. of nitrogen gas (see Appendix C-1).

The following assumptions were made for setting the parameter for nitrogen flow:

- The highest design flow rate would impart the greatest amount of lift to either the solids or liquids in the annulus bore.
- 90 psig nitrogen at 50 cfm is available at the drill bit.
- The pressure drop in the annulus bore will not adversely affect nitrogen flow in the bore (see Appendix C-2). The calculations considered only the nitrogen flow from the drill bit to the surface of the bore, beyond which the conditions change and the velocity value is effected.
- The highest design flow rate would cause the greatest turbulence in the tank air space, and cause the greatest mass of aerosol to enter the exhaust riser.
- The exhaust riser and modular exhauster system will be adequately sized to:
    - transport the 380 scfm of nitrogen at 1 atm pressure and about 70 °F
    - transport all in-leakage into the tank due to the restriction that the tank must be under negative pressure during operation
    - provide sufficient flow out the exhaust riser so the in-leakage paths will not become blocked.

Three points need to be made regarding the nitrogen flow through the system:

1) For a 20-ft deep bore hole, the pressure drop approaches 90 psi (Appendix C-2). Therefore it is recommended that a fluid dynamics study be performed from the nitrogen source to the surface of the bore hole to understand how the flow system functions as the depth of the bore hole increases.

2) For shallow bore holes, the velocity exiting the drill bit (v_1 in summary chart, Appendix C-2) is in the range of 400 ft/sec at a 2-ft depth. This steadily decreases to about 175 ft/sec at a 20-ft depth. Again, this assumes that 90 psig nitrogen at 50 cfm

was available at the drill bit. Consideration should be given to the potential for erosion in the waste as a result of these high gas velocities.

3) The smallest or "worst case" riser that would be available to exhaust the nitrogen flow and in-leakage flow is a 4-in. schedule 40 pipe. Pressure drop across an 8-ft section of 4-in. pipe was estimated for several exhaust gas flow rates that could reasonably be expected during drilling operations (Appendix C-3). An 8-ft section of pipe was considered a typical length of riser. For flow rates of 350 scfm to 4000 scfm, the pressure drop was 0.6 in. w.g. (.021 psi) to 69 in. w.g. (2.5 psi) respectively. For longer risers, the pressure drop would increase linearly with length, but even a 16-ft riser would have only a 5 psi drop at maximum flow. Design of the modular exhauster must include the pressure drop over the riser pipe when determining the vacuum requirements necessary to achieve these flow rates.

4.1.3.2 Particle Density

Density measurements were performed on the RBM#2 simulant. Three runs using an air pycnometer gave an average particle density of 2.36 g/cc (see Appendix C-4).

4.1.3.3 Solid Aerosol Generation Rate

The aerosol generation rate depends on the penetration rate (vertical drill bit speed), which may change according to waste hardness. As the penetration rate varies, the nitrogen purge flow and the particle generation rate also vary. When the drilling of one 19-in. sample is complete, the nitrogen purge flow is reduced to almost zero for at least one hour while the sampler is changed, giving the aerosol time to settle. It is assumed that there is no mass generation during this time period.

For the transient case runs, various mass generation rates will be used to determine the rate that causes the largest mass flow up the exhaust riser. A table of values to use in the transient case runs is in Appendix C-5.

4.1.3.4 Tank Air Space

To perform the aerosol simulations, it is necessary to know the air space of the tank dome and the minimum void space above the waste surface. With less dome space, there would be less exhaust flow required, although there would be more aerosol flow out the riser because of less settling space. There are three different sized tanks: 500K-, 750K- and 1,000K-gal. The dome dimensions were taken from WHC-EP-0210. An average dome air space of 31,374 ft^3 was calculated (see Appendix C-6). The following major assumptions were used:

- The cross section of the dome is parabolic.
- The dome thickness relative to the overall dome size is negligible.

The minimum void space will be in that tank which has the waste layer the closest to the top rim of the tank. This is valid because all three tank sizes are 75 ft in diameter. It was determined that tank 241-A-101 (a 1,000K-gal. tank) has the shortest distance, 1.34 ft, from the waste surface to the tank rim (see Appendix C-7). The major assumptions used were:

- The dimensional data found in WHC-EP-0210 was sufficiently accurate.
- The minimum overall tank air space will represent the condition where the maximum amount of aerosol dust can be carried up the exhaust riser and into the modular exhauster.

4.1.3.5 Drill Riser and Exhaust Riser Size and Location

It is necessary to understand the effect that the relative location of the drilling riser to the exhaust riser has on dust exhaustion rate. This factor came to light when it was noticed that small dust clouds would rise rapidly up the outside of drill string during test drilling. The test air velocity was great enough that a dust cloud would remain virtually intact as it rose up the drill string to heights of over 30 ft. From this observation it was realized that there could potentially be a "direct shot" of dust into the exhaust riser from the drilling process, effectively bypassing the particle deposition in the tank.

The assumed worst case is where the distance between the drilling riser and the exhaust riser is a minimum, and the risers are closest to the edge of the tank (nearest the surface of the waste). This center to center distance is 3 ft for a 4-in. schedule 40 pipe. Although this orientation is not likely to be selected, it is possible for the system operate with such close risers. The exhaust riser piping is assumed to truncate just inside the tank dome and thus does not protrude down into the dome space. The distance of the exhaust riser piping (flush with the inside surface of the dome) and the surface of the waste for the "worst case" is 3.13 ft (see Appendix C-8). This is the same for all three sizes of tanks, since the dome configuration is the same, and only the wall height changes. To determine the positions of the drill riser and exhaust riser, the following steps were used:

- In a plan view of the tank dome, there is a 75-ft diameter circle.
- Consider a point "A" at a distance of 32.5 ft from the center.
- Draw a chord through point A.
- The drill riser is located 4 ft from point A on this chord.
- The exhaust riser is located 7 ft from point A on this chord.

4.1.4 Estimate of Radionuclide Contents in SSTs

It was necessary to use a data base of information which estimates the radionuclide contents of the single-shell tanks. The data base used for this study was the TRAC (track radioactive components) computer model (Jungfleisch 1985). The data quality from TRAC has been questioned and recommended only

for scoping purposes. Since this study required only general scoping information, the data is believed to be reliable. Four radionuclide species were found to exist in quantities that could have an impact on HEPA filter design. These were Ba137m, Cs137, Sr90, and Y90. For each of these species, the single-shell tanks were identified which contained the highest and lowest concentration respectively. An average radionuclide content of all rotary mode SSTs was also determined.

The tanks that were used are listed below.

o High Ba137m	241-S-112
o High Cs137	241-S-112
o High Sr90	241-A-101
o High Y90	241-A-101
o Low Ba137m	241-B-101
o Low Cs137	241-B-101
o Low Sr90	241-B-101
o Low Y90	241-B-101
o Average Concentration	All Tanks

The total radionuclide inventory for the above listed cases is found in Appendix D.

4.1.5 Bounding Case Air Space Simulations

For the bounding case of aerosol generation, two separate simulation models were run for comparison. Both models used a lumped parameter model, which assumed a uniform particle concentration throughout the tank. In reality, the concentration of dust particles will probably be greater near the drill string. This is why it is important to know the relative position of the drill string to the exhaust riser. The following process was used to simulate a bounding case:

- The cases run by the first model used a nitrogen flow of about 350 scfm, and a mass generation rate of 777 g/min. This model has performance curves which show that the time needed to approach steady state is about two hours. No further work was done on this model due to resource restrictions. A draft report of the first model is in Appendix E.

- The cases run by the second model varied the air flow and particle density. The second model also incorporated a "direct shot" estimate of dust into the exhaust riser from the drill string bore hole, and it assumed cases where liquid droplets with dissolved solids would evaporate leaving airborne particles.

- The air flows used were 350, 850, and 1550 scfm. Although the velocities exiting the bore hole exceed the range of Stokes' Law, the period of dust jetting out was not considered for settling. The bypass fraction accounts for the particles that are at a high energy state and exit directly up the riser. Stokes' Law was not used until the particles either hit the tank dome or dispersed and slowed.

- Air flows were varied to model in-leakage from connecting tanks and potential fugitive in-leakage from equipment such as valve boxes, riser flanges, and riser/tank dome seals. The particle densities used were 2.3 and 2.4 g/cc. A draft report of this second model is in Appendix F.

- Comparison of the two models could only be done in part due to the limited case runs using the first model. There was only one data point that could be compared between the two models; however, this one data point was remarkably close (see Appendix G).

- Reviewing the summary of results from the second model, one item was apparent: "direct shot" entry into the exhaust riser greatly increases the load of dust that the modular exhauster will have to filter.

Due to the relatively large size of the tanks, there is a definite time lag before the aerosol generation, deposition, and exhaustion rates achieve steady state. The initial aerosol exhaustion rate is zero, and increases to a steady state value. Case runs show that aerosol needs to be generated consistently for about two hours before the mass generation rate, the aerosol deposition rate, and the exhauster aerosol flow rate are at steady state. In actual operation, the drilling time is limited to the collection of a 19-in. sample core segment. It is estimated that the drilling time for each segment will last about 15 to 20 min. Therefore, steady state will never be achieved in the tank air-space.

However, to set an upper limit (bounding case) of aerosol exhausting up the riser, these steady state case runs were performed. It must be emphasized that the simulation model indicates that steady state will never be achieved with the constraint of a 15- to 20-min. drilling time. Therefore, the exhaust rates produced from the steady state model were used to understand an upper limit of aerosol flow up the exhaust riser, and a model of transient case aerosol generation was developed for design purposes (see Section 4.1.8).

4.1.6 Bounding Case HEPA Filter Pressure Drop Loading

Filter loading simulations were run on a selected number of solid aerosol cases (see Appendix H). The density used was 2.3 g/cc. Three cases were run (at the three different flow rates) assuming no solid aerosol bypassed the tank air space settling. Three other cases were run assuming 6.35% of the generated dust was "directly shot" into the exhaust riser. This percentage of aerosol that bypasses the settling process was determined to be the worst case for the tanks under consideration. See Appendix C-9 for a complete explanation. These results indicate that any amount of dust bypassing the tank air space settling chamber and being directly shot up the exhaust riser can severely limit the HEPA filter life. This can in turn delay drilling operations on the tank being drilled. These results were only preliminary scoping runs to achieve a rough estimate for how long a filter may be expected to last in this "worst case" environment. Since the transient case model was to be used for the design basis, no further work was done in this area.

4.1.7 Bounding Case HEPA Filter Dose Rate Loading

Filter loading simulations were performed which targeted the four radionuclide species mentioned earlier in Section 4.1.4 (see Appendix I). Three cases were examined that considered the highest, lowest, and an average level of each of these radionuclides. A series of six runs was performed with variations of flow rate (350, 850, and 1550 scfm), operation time (5, 2.2, 1, .63, .35, .24 hours), and "direct shot" percentage (0 and 6.35%). The results are summarized in Appendix I. For the cases examined, the exposure rates for gamma emitters ranged from 700 to 38,556 mR/h, and the rates for beta emitters ranged from 167 to 21,600 mR/h.

4.1.8 Transient Case Air-Space Simulations on Solid Aerosol

A computer-assisted aerosol deposition model was developed that took into account the transient nature of the drilling process in the tank. Results from this transient model are intended to assist in the design of the modular exhauster. The model gives a more realistic view of the amounts of aerosol that can be expected to exit the exhaust riser during drilling operations. Documentation on the formulation and validation of the transient case model is located in Appendix F. The simulation can be run for both the solid and liquid aerosol cases; this section covers the aspects of the solid aerosol runs.

Five parameters are varied to determine the case of maximum dust flow up the exhaust riser for the transient case. The weight percent particle distribution will remain constant. The following parameters were varied during the various runs:

1) The total gas flow rate into the exhauster (scfm).

2) The solid aerosol generation rate due to drilling (g/min.).

3) The time to drill one 19-in. segment (min.).

4) The number of 19-in. segments drilled (#).

5) The tank air-space volume (ft^3).

6) The amount of solid aerosol (wt%) that bypasses the normal tank particle deposition process and is shot directly up the exhaust riser.

For each tank size, 100 cases were set up with different in-leakage, penetration rate, and waste height values. Explanation and details of the ranges for each of these parameters can be found as Appendix C-9. For these 300 cases, it is assumed that item #6, bypass fraction, is zero. After a review of some initial runs, it was deemed necessary to expand the parameters for more detailed results in the critical areas. A penetration rate of 0.5 in./min. was added, and the in-leakage value of 700 cfm was replaced with 500 cfm and 1000 cfm. These changes were made because the rotary mode system is more likely to operate in these ranges. Also, all waste heights were made multiples of 19 in., to facilitate data entry into the computer model.

The code transient aerosol computer model was developed by Science Applications International Corporation (Owczarski 1992). The technical basis and derivations are outlined in Appendix F. One major assumption is that the aerosol particles are immediately well-mixed into the tank air space, except for the "direct shot" portion. This allows for the use of Stokes' Law in the equations. In cases where Stokes' Law cannot be applied, because of particle size or velocity, empirical data was substituted in the calculations.

The results for the mass of aerosol lost out the riser are tabulated in Appendix J, Tables 1-3. The data for some of these runs can be found in Appendix K. The procedure used for running the transient case model can be understood in the explanation of this data.

In Appendix K, each run is separated by an identification page on which the total aerosol result is highlighted. The core drilling process was broken down into periods of drilling and change-out time. The time for drilling depends on the penetration rate, and the interval for changing the samplers is a constant 1 hr, during which there is little gas flow and no mass generation. On the printout, the parameters are listed first, followed by the conditions for each period. The output for each period is then listed in blocks that show the behavior of each of the twenty particle sizes and a summary of what mass is airborne, settled on the floor, or escaped out the riser. The key result for this study was the "total grams lost out the riser" after the last period of the run.

The results in Appendix J, Tables 1-3, show the total mass of aerosol dust flowing out the exhaust riser after one complete core is drilled. The maximum amount of dust expected to enter the exhaust riser with zero bypass fraction was 7236.0 g (in a 1 million gal. tank with parameters set at 2100 scfm, 0.5 in./min., 361 in. of waste).

Results from a study on tank in-leakage (Reddick 1992) have shown that the maximum expected in-leakage would be 240 scfm, requiring 855 scfm flow by the exhauster. Therefore, the results that used the 500 scfm in-leakage value (requiring 880 scfm flow from the exhauster) would be a more realistic worst case. For that in-leakage value, there would be only 2717.6 g lost out the riser, a 62% decrease.

It may also be desirable to know the results for a case that is most anticipated. The layers of hard salt cake will often be less than 200 in., and the penetration rate could easily be 1 in./sec due to possible moisture in the waste. With these parameters and an in-leakage of 500 scfm in a 1 million gal. tank, there would be 810.4 g of dust lost out the riser. It should be noted that this value would be less for the smaller tanks.

In the second set of runs, the bypass fraction was allowed to vary according to the formulas set forth in Appendix C-9. A series of the worst case conditions was selected from the first set of runs. Time did not allow for runs where penetration rate was 0.5 in./min. or in-leakage was 500 scfm, so the values used were PR=1 and IL=2100. The results for these runs are summarized in Appendix J, Table 4. The maximum amount of dust expected to enter the exhaust riser when it is in close proximity (3 ft, see Appendix C-8) to the drilling riser is 9917.4 g. With the lower anticipated in-leakage, this would decrease by about 62%, down to approximately 3500 g.

4.2 LIQUID AEROSOL

4.2.1 Estimate of Source Term

The liquid aerosol generation rate was estimated based upon the description found in Appendix F, page 4. To simulate a worst case scenario, the source term was estimated for a solid layer being drilled with a liquid layer on top of it, so that liquid is constantly pouring into the bore hole. In this situation, the generation rate of liquid aerosol depends solely on the purge gas flow, which was considered 50 cfm @ 90 psi (380 scfm). Penetration rate does not effect the source term, since the liquid is simply being blown out of the bore hole. The rate of liquid aerosol generated under these conditions was estimated at 1.2 kg/sec., or 72,000 g/min. (Appendix F, pages 1, 4, and 5). This source term value is used for all runs, since only cases with 380 scfm are considered.

4.2.2 Bounding Case Air-Space Simulations

To establish a bounding case for liquid aerosol generation, test runs were performed by drilling through a pool of liquid. It is assumed that the presence of liquid aerosol does not influence the behavior of solid aerosols, caused by forming a film on the tank wall to which the solid might stick or condensing and running off. For the bounding case, drilling through a pool of liquid yields liquid mass flow up the exhaust riser an order of magnitude greater than the mass for solids. Results are in Appendix F.

4.2.3 Transient Case Air-Space Simulations

The transient case model for liquid aerosols was expected to yield different results from the bounding case. Particular runs were chosen to limit unnecessary data. Parameters were chosen from the worst case results for the dry aerosol runs. Also, runs that used a 500 scfm in-leakage value were chosen, after the results from the tank in-leakage study were released, for a more realistic maximum. The first set of cases used a zero bypass fraction. In the second set of cases, the bypass fraction was set to the maximum 6.35%. The results for both runs are in Appendix J, Table 5. Compared to solid aerosols, the mass of liquid was well over an order of magnitude greater.

5.0 DISCUSSION OF RESULTS

The steady state model provided bounding values for the aerosol generation simulation. These values were not considered for design purposes, since a steady state condition can not be reached in the tanks in less than two hours, and the drilling operation will not last that long. The total dust accumulation through the riser after steady state has been reached was approximately 1300 g after one hour and 3100 g after two hours (Appendix E, Figure 3). For comparable conditions, the transient model fell well below that limit. At PR=4, IL=0, and WH=361, the maximum amount of dust generated was 677.8 g.

There is a considerable margin of uncertainty with the data gathered, because of the generalizations made for the conditions. The aerosol particles leaving the bore hole are assumed to immediately mix evenly with the tank air space, except for the bypass fraction. Yet, the purge gas will probably stay highly energergized for some time, rebounding off the walls until it slows. During this high energy state, particles may adhere to the walls or to each other, changing the mass distribution. Several assumptions simplified the model, though many were to provide a margin of safety, so the results are conservative. The quality of the data is good for the conditions that were specified for the model. When applying the data for designing the exhauster, the assumptions should be considered carefully.

Tables 1-3 in Appendix J show the general trends for the transient aerosol simulation. As waste height and in-leakage increase, the total mass lost out the riser increases. With deeper waste, a higher volume of dust is generated so the total mass out the riser increases. With greater in-leakage, a higher flow out the riser is required, so more aerosol is pulled through. Less aerosol escapes out the riser when the penetration rate decreases, because there is more time for the aerosol to escape out the riser.

The sensitivity to the data was most prominent in the penetration rate. In the range of 2-4 in./min., the values did not vary greatly. As the penetration rate decreases to 1 or 0.5 in./min., the differences between values is more pronounced. Since it is anticipated that penetration rates could fall in this low-end range, this could be a significant consideration.

Bypass fraction has the most influence when the tank waste is deepest. The results in Appendix J, Table 4, show that the amount of aerosol lost out the riser can increase over 30% compared to the zero bypass runs. By avoiding cases of a "direct shot," the anticipated loading on the riser can be reduced dramatically. As discussed in Section 4.1.8, the maximum expected mass of dry aerosol lost out the riser would be approximately 3.5 kg. With no bypass fraction and even mixing of the dust, this rating could be as low as 2.5 kg.

Also note that these values of aerosol mass lost out the riser describe the total mass over the whole period of core drilling. In deep tanks, there are 19 segments being drilled over a period of about 24 hours. The data of mass values should not be considered to be exiting the riser all at once.

The generation of a liquid aerosol showed results of larger masses than solid aerosol, mainly because the assumed conditions do not apply as well for liquids and force the results out of proportion. With no bypass, about 50

times more mass of liquid exits out the riser than a solid at the same conditions. With a "direct shot" of 6.35%, this increases at least another order of magnitude. Several assumptions were made for these runs that should be taken into consideration before using the results. The model used the case where liquid would continually flow into the bore hole, yet the hole is mostly filled with the drill string, with only a slight clearance around the edge. If the purge gas is flowing steadily at over 200 mph in shallow waste, that area will most likely stay clear of liquids. If the liquid waste above the salt cake is deep, it may suppress aerosol generation. Another assumption was that the liquid spray will not settle out by hitting the tank walls, but that is sure to be the case with such large volumes of aerosol being generated. It should also be noted that the presence of a liquid layer will make the salt cake moister and softer, so purge gas flow can decrease while penetration rate can increase, causing less spray. These possibilities are quite likely, but their analysis goes beyond the scope of this study.

The effect of settling time influenced the amount of airborne particles. In the one hour that was estimated for changing samplers, almost all the aerosol generated in the operating period settles out of the air, and a very small amount of aerosol escapes out the riser (see Appendix K). The mass of dust settling out is about the same in each run, regardless of how many samples have been taken. The period when the sampler is replaced has significant effect on the amount of airborne particles.

The results in Appendix H concerning filter changes could hold an impact for exhauster design. The worst case situation considered 1550 scfm of gas flow out the exhaust riser. This run resulted in having to change the filter every 15 min., or approximately after each segment is drilled. A more realistic case would be 350 scfm, which leads to changing the filter every 2.2 hrs. It should be noted, as well, that these runs considered only a single filter, so they are conservative estimates.

The calculations for exposure rates from HEPA filter surfaces proved that exposure rate could be a limiting factor on operation time. The results in Appendix I showed exposure rates in excess of 1 R/h. Since the maximum allowable dose to a worker is 300 mR/week, this condition is important to consider. The primary uncertainty for this analysis was the inhomogeneity of the tank contents. Although the data was derived from TRAC data for rotary mode tanks, it is unknown to what certainty these can be considered representative samples. The exposure rate values using an average over all tanks are significantly lower than the worst case (tank S-112 and tank A-101) values, so actual exposure during operation may be lower than expected. Field measurements should be obtained to use as a comparison. Also, the values with a large bypass factor (6.35%) showed increases in exposure rates, so avoiding cases where there is a "direct shot" up the riser would help lower the level of exposure.

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*Other references are also located in the individual appendices

7.0 APPENDICES

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APP. A

APPENDIX A

I. S. Wong

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Simulant Analysis

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1.0 INTRODUCTION

Simulants to model the physical/mechanical properties of single-shell tank (SST) saltcake are needed for temperature envelope testing and verification of a new core sampler system. Because there is little physical/mechanical data available on actual SST saltcake, the Chemical Engineering Laboratory (CEL) will prepare and characterize synthetic saltcakes based on actual SST waste compositions. In addition, the CEL will characterize sulfur K-mag, a non-regulated simulant used in the past, and compare this simulant to the synthetic saltcakes. Once characterized, the CEL will prepare drum quantities of the mechanically strongest synthetic saltcake for temperature envelope testing by Engineering Testing (ET) and Mechanical Engineering.

2.0 OBJECTIVE & SCOPE

2.1 OBJECTIVE

The objectives of this activity are to:

- characterize physical and mechanical properties of synthetic SST saltcakes produced in FY 1991 and early FY 1992. These synthetics are composed primarily of sodium salts, and are based on the composition of samples obtained from selected single-shell tanks.

- characterize physical and mechanical properties of a synthetic saltcake composed of sulfur K-mag (a commercial fertilizer composed of magnesium sulfate and potassium sulfate) and water. This material has been and is currently being used as a hard saltcake simulant.

- prepare up to 30-gallon drum quantities of the mechanically strongest synthetic saltcake by batch boildown. This saltcake simulant will be used by Engineering Testing in temperature envelope testing of a newly-designed core sampling bit in the rotary mode. This envelope testing will also be conducted on drum quantities of sulfur K-mag, but the CEL is not responsible for preparing this material.

It must be noted that there are inherent limitations with the chemical saltcake simulants produced by batch boildown, and it is not known how closely the synthetics will behave (physically/mechanically) relative to actual SST wastes. Limitations include:

- The radioactive and extremely hazardous constituents have been omitted from the synthetic saltcake formulations to simplify handling and disposal. How this may affect the physical and mechanical properties of the saltcake is not known, but is assumed to be negligible.

- Much of the SST wastes were produced by concentration in large forced circulation evaporators operated under vacuum. In this test plan, the synthetic saltcakes will be produced by batch boildown at atmospheric pressure, resulting in crystallization at higher temperatures. How this may affect crystal growth and saltcake properties is not known, and because of economic and schedule constraints, cannot be accounted for in this activity.

- The effect of aging is also uncertain, and is not accounted for in this test plan. The SST saltcake wastes have been aging in underground storage tanks for decades, and the effect on the physical properties of the saltcake has never been characterized, and is not included in the scope of this activity.

The technical accuracy of the synthetics can be verified only when actual SST waste characterization data becomes available.

2.2 SCOPE

The deliverables for this activity are as follows:

1) One 30-gallon drum of synthetic saltcake (based on SST waste chemical composition) for preliminary core sampler tests,

2) Two 30-gallon drums of synthetic saltcake (based on SST waste chemical composition) for core sampler temperature envelope tests,

3) An interim report comparing physical/mechanical properties of three selected synthetic saltcakes and sulfur K-mag, and

4) A final report documenting all testing activities that the CEL is responsible for. This report will be issued at the completion of this task, and will include:

   - physical and mechanical data of three selected synthetic saltcakes,
   - physical and mechanical data of sulfur K-mag simulant,
   - specific procedures for preparing drum quantities of the synthetic saltcake selected as the mechanically strongest saltcake simulant,
   - material safety data sheets (MSDSs) for handling of the selected saltcake simulant materials,
   - waste disposal instructions for the selected saltcake simulant,

3.0 DESCRIPTION OF ENGINEERING TASKS

3.1 PREPARE THREE SYNTHETIC SST SALTCAKES FOR CHARACTERIZATION

Samples of three SST waste-based synthetic saltcakes were prepared in FY 1991 for various testing activities. The samples are still intact, and are contained in 20"W x 20"L x 10"H stainless-steel trays. The compositions of the three synthetic saltcakes are listed in Table 1 (Lucas, circa 1990, Wanner, February 1991, Wanner, May 1991, and Wanner, December 1991).

TABLE 1: SYNTHETIC SALTCAKE COMPOSITIONS

COMPONENT	TANK 104-BY SYNTHETIC (wt%)	EVAPORATOR BOTTOMS SYNTHETIC (wt%)	TANK 102-A SYNTHETIC (wt%)
sodium nitrate	82.9%	81.6%	27.0%
sodium nitrite		2.0%	49.1%
sodium aluminate	7.6%	2.1%	7.7%
sodium phosphate	0.7%	0.5%	1.5%
silicon dioxide			1.8%
ferric nitrate	1.0%		4.1%
sodium hydroxide	0.5%	1.7%	3.8%
calcium nitrate	0.4%		
sodium metasilicate	1.5%		
magnesium nitrate	0.2%		
manganese (II) nitrate	0.2%		
sodium carbonate		7.1%	
water	approx 5%	approx 5%	approx 5%

These synthetic saltcakes were prepared by batch boildown of liquid feed solutions, and subsequent drying at 80 to 100°C. The resulting material is a hard crystalline saltcake between 6 and 8 inches in depth. Samples will be obtained from these three synthetic saltcakes and will be physically and mechanically characterized. The moisture content of the synthetic saltcakes will be determined prior to physical/mechanical property testing. In addition, chemical analyses (ion chromatography (IC) and inductively-coupled plasma (ICP)) will be performed on the synthetic saltcake samples to verify composition.

3.2 PREPARE SULFUR K-MAG SALTCAKE SIMULANT FOR CHARACTERIZATION

Engineering Testing and Geotechnical Engineering (GE) are preparing and physically/mechanically characterizing sulfur K-mag samples. This work is being performed for Remote Systems Engineering (RSE) to support activities related to testing/verification of a large cone penetrometer. Data from these tests will be used to support this project; this eliminates the need to prepare additional samples.

3.3 DETERMINE PHYSICAL AND MECHANICAL PROPERTIES TO BE CHARACTERIZED

The physical and mechanical properties that need to be measured on the synthetic saltcakes and sulfur K-mag simulant are determined by their significance in affecting bit temperature during rotary-mode core sampler operation. The properties and measurement methods that have been specified include:

- Bulk Density - the weight of the saltcake material divided by the volume it occupies (including void spaces). Cylindrical or cubic samples will be weighed to determine bulk density.

- Uniaxial or Unconfined Compressive Strength - a measure of the mechanical strength of a material, the greatest strain that a specimen can maintain when subjected to stress in a single direction, usually in an axial direction in the case of a cylindrical specimen. Unconfined compressive strength is expressed in pounds per square inch (psi). Geotechnical Engineering can measure unconfined compressive strength with a triaxial shear tester located in the 2101-M Building/200 East Area. Engineering Testing can also measure unconfined compressive strength with a Satec Universal Testing System located in the 305 Building/300 Area.

- Triaxial Shear Strength - a measure of the mechanical strength of a material, is the greatest compressive stress that a specimen can maintain in the major principal stress direction when subject to confining minor and/or intermediate stresses. Shear strength is also expressed in psi. Geotechnical Engineering can measure triaxial shear strength with a triaxial shear tester located in the 2101-M Building/200 East Area. Right cylindrical samples are required for this test, with the height of the cylinder two to two and one-half times as long as the diameter.

- Direct Shear Strength - a measure of the mechanical strength of a material, also expressed in psi. Direct shear strength is measured by applying vertical and horizontal loads to a specimen, and measuring peak and residual direct shear strength as a function of stress normal to the sheared plane. Geotechnical Engineering is currently procuring a direct shear tester to perform these measurements.

- Penetrometer Resistance - a measure of the hardness/consistency of a material, is the force per unit area (psi) necessary to penetrate a material. Penetrometer resistance is a function of several material properties including shear strength, cohesion/cementation, and internal friction. Penetrometer resistance is typically used to correlate like materials with different mechanical strengths. For instance, the relative mechanical strength of similar type clays can be compared by measuring penetrometer resistances. However, penetrometer resistance measurements cannot provide a direct and quantitative comparison between the mechanical strength of a cement and the mechanical strength of a saltcake, two very dissimilar materials. The CEL has a Humboldt penetrometer with several cylindrical heads, but the penetrometer resistance of the saltcakes is out of the range of this instrument. To perform these measurements, Geotechnical Engineering is currently modifying a triaxial shear tester by attaching a flat-ended cylindrical penetrometer head to the instrument.

- Water Content - expressed in percent water by weight. The CEL has a moisture analyzer that measures total water content (free and hydrated). A thermogravimetric analysis (TGA) is needed to determine the percentage of free water and the percentage of hydrate water in a sample. The Process Chemistry Laboratory at 222-S Laboratory can perform this analysis.

- Particle Properties:

  - Particle Size Distribution (PSD) - the PSD of the sulfur K-mag will be determined by standard sieving/screening tests.

  - Particle Shape - the shape of the sulfur K-mag particles will be compared to the synthetic saltcake particles by optical microscopy. Photomicrographs will be taken for comparison.

  - Particle Density - the particle density of the separate salts that comprise the synthetic saltcake will be compared to the particle density of the sulfur K-mag material. Geotechnical Engineering has an air pycnometer in 2101-M Building/200 East Area that can accomplish these measurements.

  - Material Structure - photomicrographs of the synthetic saltcakes will be compared to those of the sulfur K-mag simulant.

- Hardness - a concept of material behavior rather than a fundamental material property. The quantitative measure of hardness depends on the type of test employed. For instance, three type of tests have been used to measure the hardness of rocks and minerals: indentation tests, dynamic or rebound tests,

and scratch tests. No hardness testing is included in the scope of this testing. Mechanical strength tests are intended to characterize this behavior.

- Porosity - the property of a solid which contains open or void spaces, and is expressed as the ratio of void space volume in a given volume of solid to the bulk volume of that solid. Geotechnical Engineering can perform porosity measurements using a pycnometer in the 2101-M Building/200 East Area. However, this instrument will not determine the effective porosity of a saltcake with void/air pockets, and Geotechnical Engineering is not currently set up to do this. Because of this, porosity measurements are not planned.

- Thermal Conductivity - the heat flow across a surface per unit area per unit time, divided by the negative of the rate of change of temperature with distance in a direction perpendicular to the surface. In this case, thermal conductivity would affect the heat transfer away from the core drill bit. Thermal conductivity measurements will be incorporated into this scope of testing if the proper testing method can be developed and implemented in a timely manner to support the schedule requirements. Engineering Testing is currently evaluating the CEL's request for this property measurement.

- Abrasiveness - a measure of the resistance of a material to wear. Abrasiveness tests can also measure the wear on metal components (e.g., core drill bit) as a result of contact with the material. No tests are planned to determine the abrasiveness of the synthetic saltcakes or sulfur K-mag.

All physical/mechanical characterization will be performed to ASTM procedures or other specified/approved procedures. If an ASTM or WHC-approved procedure does not exist, a specific test procedures will be developed, documented, and approved before proceeding with analysis.

3.4 CHARACTERIZE SYNTHETIC SST SALTCAKES

Once the important physical and mechanical properties are determined, synthetic saltcake samples produced previously by batch boildown methods will be physically and mechanically characterized.

Properties to be characterized include:

- Bulk Density - the bulk density of the synthetic saltcakes will be measured by weighing cubic or cylindrical samples. The estimated bulk density of these synthetic saltcakes are typically between 1.6 g/ml and 1.8 g/ml.

- Unconfined Compressive Strength - cubic samples of the synthetic saltcakes will be tested with the Satec tensile tester. However, it may not be possible to obtain cubic samples of the synthetic saltcakes without destroying their structural integrity.

- Direct Shear Strength - cubic or cylindrical samples of the synthetic saltcakes will be tested with a direct shear tester.

- Penetrometer Resistance - with a modified triaxial shear tester.

- Moisture Content - by both moisture analyzer and TGA.

Geotechnical Engineering has already attempted triaxial shear testing saltcake samples with the triaxial shear tester. The proper sample size (right cylinders) could not be obtained; there were too many void spaces in the saltcakes to obtain cores of the proper length. Therefore, triaxial shear strength determinations will not be made on the SST synthetic saltcakes.

3.5 CHARACTERIZE SULFUR K-MAG SALTCAKE SIMULANT

Sulfur K-mag samples will be characterized in the same manner as the synthetic saltcakes:

- bulk density
- unconfined compressive strength
- direct shear strength
- penetrometer resistance
- moisture content - by both moisture analyzer and TGA

The sample size of the sulfur K-mag simulant will be matched as closely as possible to the synthetic saltcake samples to eliminate potential sources of error when comparing results. Triaxial shear strength measurements have already been performed on sulfur K-mag samples (with no QC verification), but will not be included in this work scope because the shear strength measurements cannot be performed on the synthetic saltcake samples.

3.6 PREPARE DRUM QUANTITIES OF SYNTHETIC SALTCAKE

The mechanically strongest synthetic saltcake will be selected for core sampler temperature envelope testing. Three 30-gallon drums of synthetic saltcake based on the selected formulation will be prepared by batch boildown of liquid feed solutions. The procedure for this is as follows:

1) Feed chemicals will be mixed and completely dissolved in water. Sodium nitrate is the major constituent in most of the waste-based synthetic saltcakes, and is very soluble in water (approximately 90 g of sodium nitrate will dissolve in 100 g of water). However, the other constituents are less soluble, and the feed solution will need to be diluted to around 70 weight percent water to completely dissolve all of the chemicals.

2) The feed solution will be boiled down at atmospheric pressure in a 30-gallon carbon-steel drum. Band heaters and hot plates will be used to heat the solution. The operation will be carried out under the large fume hood in the 2703-E Building to remove any caustic vapors.

3) The material will be boiled to a density of 1.60 to 1.70 g/ml; the slurry must be able to be pumped out of the heating vessel. At this density, the saltcake slurry is around 50 percent solids (at room temperature). The saltcake slurry temperature at this point is typically 125°C to 135°C, and cannot be easily handled.

4) The saltcake slurry will be pumped out into a saltcake growth tank (30-gal drums) when the slurry has cooled to approximately 80°C. Any cooler, and the solids content becomes too high to handle with the centrifugal drum pumps.

5) The saltcake growth tank will be heated in an oven at 100°C or with band heaters to dry the saltcake slurry and form a hard saltcake.

6) Saltcake slurry will be periodically added to the growth tank to form a final saltcake depth of 25 to 30 inches. Periodical addition of saltcake slurry will hopefully minimize the amount of void spaces formed during saltcake growth. A minimum of 25 to 30 inches of saltcake material is needed in each drum so that the core sampling operation can simulate a full 19-inch core sampling operation.

7) When the saltcake depth is reached, the drum will be sealed and shipped immediately prior to testing. The saltcake material is hygroscopic, and will absorb water from the air.

8) Final moisture content will be determined before the material is shipped. Also a sample will be obtained for direct shear testing by Geotechnical Engineering.

The drums of synthetic saltcake will be shipped to Engineering Testing in the 305 Building/300 Area. Material safety data sheets (MSDSs) and any special handling instructions will accompany shipment of the synthetic saltcake.

4.0 ORGANIZATION

The engineering efforts and laboratory tasks referenced in this work plan will be performed by the CEL. Several organizations have been identified that will be needed to support this effort.

- Landlord Maintenance - render general CEL craft support.
- Waste Tank Equipment Technology - provide SST physical property data, and validate synthetic saltcake formulations. Support from Waste Tank Equipment Technology is funded separately, and is not included in this activity's cost estimate.
- Geotechnical Engineering - perform physical/mechanical characterization of sulfur K-mag and synthetic saltcakes. This includes triaxial shear, direct shear, penetrometer resistance, moisture content, and bulk and particle density tests.
- Process Chemistry Laboratory - perform TGA measurements on, and obtain photomicrographs of sulfur K-mag simulant and synthetic saltcakes.
- PUREX Laboratory - perform ion chromatography (IC) analysis of synthetic saltcake samples to verify composition.
- Inorganic Chemistry - perform inductively-coupled plasma (ICP) analysis of synthetic saltcake samples to verify composition.
- Engineering Testing - perform unconfined compression tests and thermal conductivity measurements on synthetic saltcakes and sulfur K-mag simulants.
- Quality Assurance - support QC hold point requirements.

5.0 COST AND SCHEDULE

5.1 COST

The total cost for this effort is estimated to be $55.0 K. The cost breakdown for this task is detailed in Table 2.

An internal work order has been received (E08328) to initiate this activity. A valid TPCN will be required to complete the planned activities. The CEL will open work orders necessary to obtain support from the organizations listed in the estimate.

TABLE 2: COST ESTIMATE		
COST ELEMENT	QUANTITY	COST
Exempt Time	7 manweeks ($45/hr)	$ 12.6 K
Non-Exempt Time	6 manweeks ($30/hr)	$ 7.2 K
Non-Bargaining Unit Time (Landlord Maintenance)	1 manweeks ($30/hr)	$ 1.2 K
Materials		$ 10.0 K
Analytical Support (Geotechnical Engineering)		$ 10.0 K
Analytical Support (Process Chemistry Laboratory)		$ 2.0 K
Analytical Support (PUREX Laboratory)		$ 1.5 K
Analytical Support (Inorganic Chemistry)		$ 1.5 K
Analytical Support (Engineering Testing)		$ 8.0 K
Quality Assurance Support		$ 1.0 K
TOTAL ESTIMATED COST		**$ 55.0 K**

5.2 SCHEDULE

This effort is expected to require 4 1/2 months to complete. Completion of this project on schedule can be delayed due to:

- o delays in procurement of characterization equipment
- o higher priority work

The planned milestones are listed in Table 3.

TABLE 3: MILESTONE LIST	
MILESTONE	COMPLETE DATE
1. Issue draft test plan for review.	December 2, 1991
2. Issue test plan.	January 9, 1992
3. Prepare saltcake samples.	December 10, 1991
4. Complete penetrometer measurements of synthetic saltcakes.	January 13, 1992
5. Prepare 30-gal drum of synthetic saltcake for preliminary testing.	January 13, 1992
6. Complete characterization of saltcakes.	February 15, 1992
7. Complete characterization of sulfur K-mag.	February 15, 1992
8. Prepare 2 30-gal drums of synthetic saltcake for temperature envelope testing.	February 28, 1992
9. Complete characterization/verification of drums of synthetic saltcake & sulfur K-mag.	March 9, 1992
10. Issue draft test report for review.	March 15, 1992
11. Issue final test report.	March 31, 1992

6.0 PROJECT CONTROL

6.1 COST REPORTING

The CEL will provide timely generation, reporting and control of cost and schedule performance data to Waste Tank Equipment Technology. Actual project progress (ACWP) will be tracked against the baseline cost estimates (BCWS) and schedule milestones on a monthly basis. Appropriate corrective action will be initiated to rectify cost and schedule variances as they are identified.

6.2 DOCUMENT CONTROL

A test plan will be issued prior to starting these tests and a test report will be issued once the tests are completed. In addition, meeting minutes will be distributed by the CEL to document all status meetings.

Documents will be identified and prepared in a format to meet Standard Engineering Practices, WHC-CM-6-1.

Documents will be issued for review and comment prior to issue for approval.

7.0 QUALITY ASSURANCE

The impact level 3 will be assigned to all documentation for this activity in accordance with WHC-CM-1-3, "Management Requirements and Procedures", MRP 5.43, "Impact Levels" and MRP 5.46, "Safety Classification of Systems, Components and Structures". Quality Assurance approval of the test plans and test reports will be required.

The Westinghouse Hanford Company policy statement, MRP 5.2, "Quality Assurance", shall be the basis document for this activity. This document establishes responsibilities and the authority of the Quality Assurance Department. The detailed procedures implement a Quality Assurance Program that meets the requirements of ANSI/ASME NQA-1(2) as required by DOE-RL Order 5700.6B.

Quality Control (QC) hold points have been developed for simulant mixing and analysis for envelope testing of the rotary mode bit (Esvelt, November 1991, Esvelt, December 1991). The hold points will be implemented in the steps during mixing, analysis, and testing for both samples and drums in which Mechanical Engineering has requested QC verification for proper traceability. The required hold points are listed below.

QC1. Verify the water content and bulk density of the drums of sulfur K-mag simulant by standard laboratory analytical methods. The samples to be analyzed will be obtained by Engineering Testing during core sampler testing. These drums will be being prepared by Engineering Testing, but the CEL will be responsible for analyzing core samples taken from these drums.

QC2. Verify the chemical composition of the synthetic saltcake mixtures by chemical analysis (ion chromatography (IC), inductively-coupled plasma (ICP) and moisture content). This includes both saltcake samples that have already been produced, and samples from the drums of waste-based saltcake that will be prepared for core sampler temperature envelope testing. Verify the analytical results on core samples from the saltcake drums correlate with analytical data on the small samples of synthetic saltcake already prepared.

QC3. Verify and approve the analytical methods per ASTM or other developed standards and procedures.

QC4. Verify the instrumentation to be used in the analysis of samples has been calibrated by initialing calibration logs.

All analyses need to be run in triplicate to increase the level of confidence in the results. QC verification will not be necessary during the analyses.

8.0 SAFETY

A Job Safety Analysis (JSA) will be written and approved prior to testing. Activities that will be included in this JSA are:

- o operation of a batch boildown apparatus
- o handling of all chemicals

MSDSs for all chemicals used will be attached to the JSA.

9.0 ENVIRONMENTAL

The waste-based synthetic saltcakes will be regulated materials, and will require special packaging and disposal. Predesignations of these synthetics will be requested from the Site Hazardous Waste Engineering Support (SHWES) organization to identify these requirements. All laboratory wastes will be disposed of in accordance with these requirements. The CEL is not responsible for disposal of drums of synthetic saltcake shipped to the 305 Building/300 Area for temperature envelope testing. MSDSs will accompany the material shipped to Engineering Testing.

10.0 REFERENCES

Esvelt, C. A., "QC Verification for Rotary Mode Waste Simulants," DSI to C. M. Keller, J. J. Wong, and T. M. Hohl, Westinghouse Hanford Company, dated November 21, 1991.

Esvelt, C. A., "QC Verification for Rotary Mode Waste Simulants (Supplemental)," DSI to J. J.Wong, Westinghouse Hanford Company, dated December 17, 1991

Lucas, G. E., "Waste Types in Hanford Single-Shell Tanks," draft Support Document #WHC-SD-ER-TI-001 Rev. 0, Westinghouse Hanford Company, circa 1990.

Shepard, D. G., "Letter of Instruction for Investigation and Make-up of Non-radioactive Waste Tank Material for Temperature Envelope Testing," Internal Memo to M. J. Schliebe, Westinghouse Hanford Company, dated November 4, 1991.

Wanner, D. D., "Ferrocyanide Crust Simulant," DSI to G. L. Borsheim, Westinghouse Hanford Company, dated May 2, 1991.

Wanner, D. D., "Preparation and Justification of Crust Simulants," Supporting Document #WHC-SD-WM-TI-471 Rev. 0, Westinghouse Hanford Company, dated February 7, 1991.

Wanner, D. D., "Crust Simulant for Rotary Mode Core Sampler Verification Testing," DSI to J. J. Wong, Westinghouse Hanford Company, dated December 10, 1991.

Wong, J. J., "Scope of Work - Geotechnical Engineering," DSI to P. J. Crane, Westinghouse Hanford Company, dated November 11, 1991.

Wong, J. J., "Statement of Work - Geotechnical Engineering Support for Characterization of Saltcake Simulants," Internal Memo #28130-91-130, Westinghouse Hanford Company, dated December 11, 1991.

Wong, J. J., "Statement of Work - Engineering Testing Support for Characterization of Saltcake Simulants," draft Internal Memo #28130-91-138, Westinghouse Hanford Company, dated December 18, 1991.

APP. B

DON'T SAY IT --- *Write It!*

DATE: 4/13/1992

TO: M. J. Minette

FROM: K. A. Giese

Telephone: 373-2428

cc: S. E. Kelly

SUBJECT: Particle Size Distribution Data Comparison and Reduction

Attached please find the results of interpreting the particle distribution data received from two labs. The recommended data set to use in the air space particle deposition simulations is the Plutonium Finishing Plant Laboratory results.

PARTICLE SIZE DISTRIBUTION DATA COMPARISON AND REDUCTION

4/11/1992

A particle distribution analysis was performed on a dust sample generated by the rotary mode core drilling test operations. The sample was a single-shell tank waste simulant RBM#2, prepared by the WHC Chemical Engineering Laboratory (CEL). Two labs performed the analysis using different techniques. Each lab was to calculate an overall size distribution, and a size distribution over the range of 0-30 microns only. The results of those two analyses are provided as attachments #1 and #2 respectively. The raw data was then reduced to a form where both analyses could be compared on an equal basis. The results of this data reduction analyses are provided as attachments #3 and #4 respectively. Following is an interpretation exercise aimed at developing a pariticle size distribution for use in a particle deposition simulation.

ANALYSIS METHODS

Method #1

Performed at the Metallography Lab at Batelle's Pacific Northwest Lab.

Technique employed: Scanning by an optical microscope with Automatic Image Analysis performed by a Dapple System.

The results were in number of particles counted in each size range. To display this in the form of wt% versus size range, an assumed particle shape was necessary. The assumed shape was spherical. The assumed diameter was calculated two ways. One, diameter=mean average size of range. Two, diameter=weighted average based upon overall size distribution. The cumulative weight percent fractions calculated using both of these diameter estimates were reasonably close.

Method #2

Performed at the laboratory at the Plutonium Finishing Plant (PFP).

Technique employed: Lasar Diffraction Analysis performed on a Brinkman Particle Size Analyzer.

The results were given in volume% versus size range. With the data given in this form, and with the reasonably valid assumption that the average particle density is constant, then the volume% values also become the weight percent values. This is the desired form for interpretation.

OBSERVATIONS

- Both sets show a size range between 0 and 150 microns.

- Table #1 below shows how both sets compare to several criteria

TABLE I		
Criteria	PFP	PNL
Overall wt% below 100 microns	98 wt%	62 wt%
Overall wt% below 50 microns	84 wt%	23 wt%
For the normalize fraction in the range of 0 - 30 uM, the wt% in the range of 0 - 10 uM	32 wt%	2 wt%
For the normalize fraction in the range of 0 - 30 uM, the wt% in the range of 0 - 20 uM	67 wt%	37 wt%
For the normalize fraction in the range of 0 - 30 uM, 50 wt% of the sample lies below	20 uM	22 uM

CONCLUSIONS

Due to the method of estimating weight percent for the PNL sample, this data could be suspect.

The PFP data was given in a form where only one assumption, namely uniform density, was used.

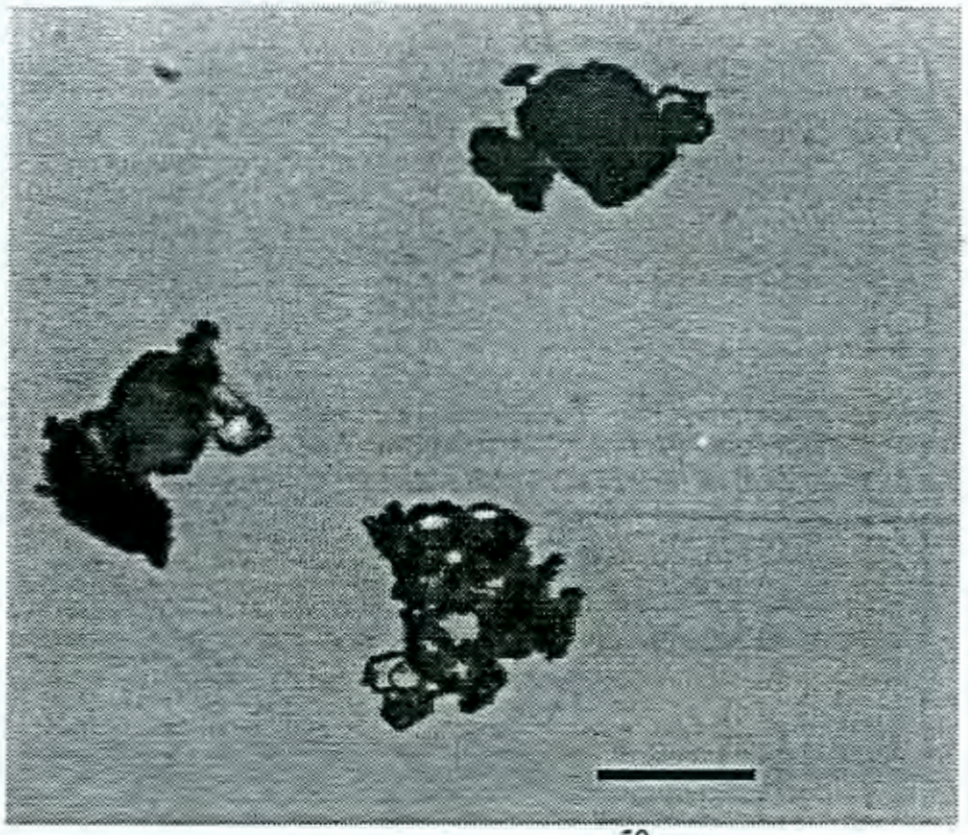
The PFP data also shows a larger wt% fraction in the smaller micron ranges. This gives a more conservative data set for the particle deposition simulation.

RECOMMENDATION

Use the PFP data set for the simulation.

Attachment #1
Pacific Northwest Laboratory Raw Data

$NaNO_3$ Simulant Powder
RBM #2



50 µm

X_1 : Equiv.Diam.(µm)

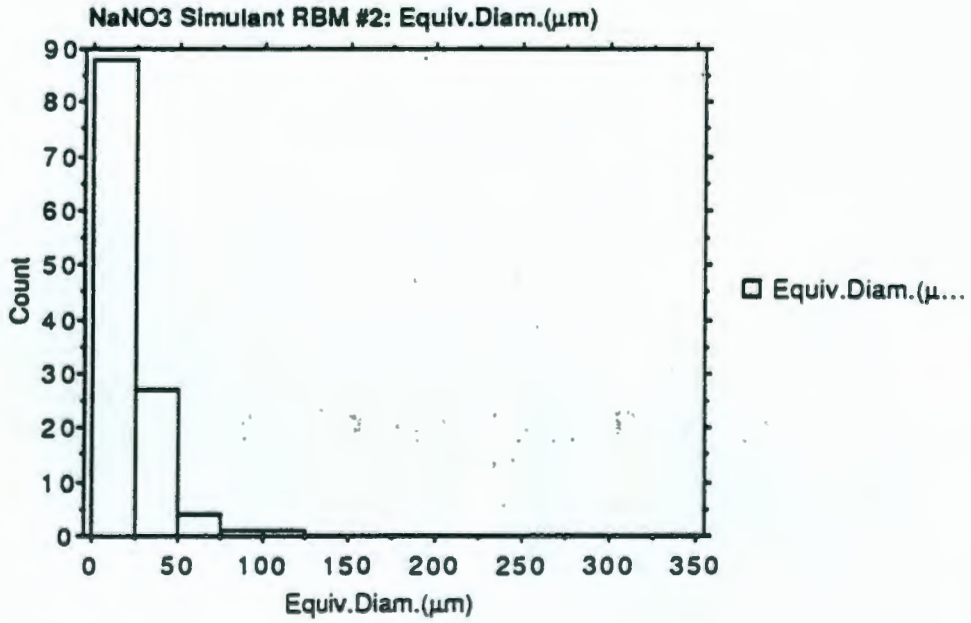
Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
18.412	18.105	1.646	327.783	98.333	121
Minimum:	**Maximum:**	**Range:**	**Sum:**	**Sum of Sqr.:**	**# Missing:**
.685	102.524	101.839	2227.807	80351.554	0

Metallography Sample #92M44
3/26/92

NaNO3 Simulant Powder
RBM #2

X_1 : Equiv.Diam.(µm)

Bar:	From: (≥)	To: (<)	Count:	Percent:	
1	0	25	88	72.727%	- Mode
2	25	50	27	22.314%	
3	50	75	4	3.306%	
4	75	100	1	.826%	
5	100	125	1	.826%	
6	125	150	0	0%	
7	150	175	0	0%	
8	175	200	0	0%	
9	200	225	0	0%	
10	225	250	0	0%	
11	250	275	0	0%	
12	275	300	0	0%	
13	300	325	0	0%	
14	325	350	0	0%	

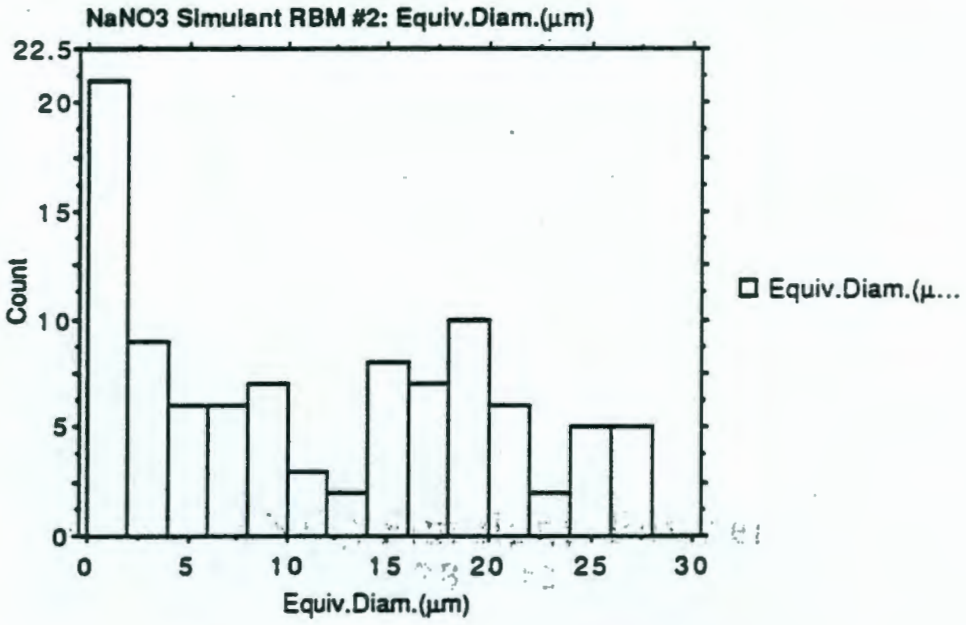


Metallography Sample #92M44
3/26/92

NaNO3 Simulant Powder
RBM #2

X_1 : Equiv.Diam.(µm)

Bar:	From: (≥)	To: (<)	Count:	Percent:	
1	0	2	21	17.355%	- Mode
2	2	4	9	7.438%	
3	4	6	6	4.959%	
4	6	8	6	4.959%	
5	8	10	7	5.785%	
6	10	12	3	2.479%	
7	12	14	2	1.653%	
8	14	16	8	6.612%	
9	16	18	7	5.785%	
10	18	20	10	8.264%	
11	20	22	6	4.959%	
12	22	24	2	1.653%	
13	24	26	5	4.132%	
14	26	28	5	4.132%	



Metallography Sample #92M44
3/26/92

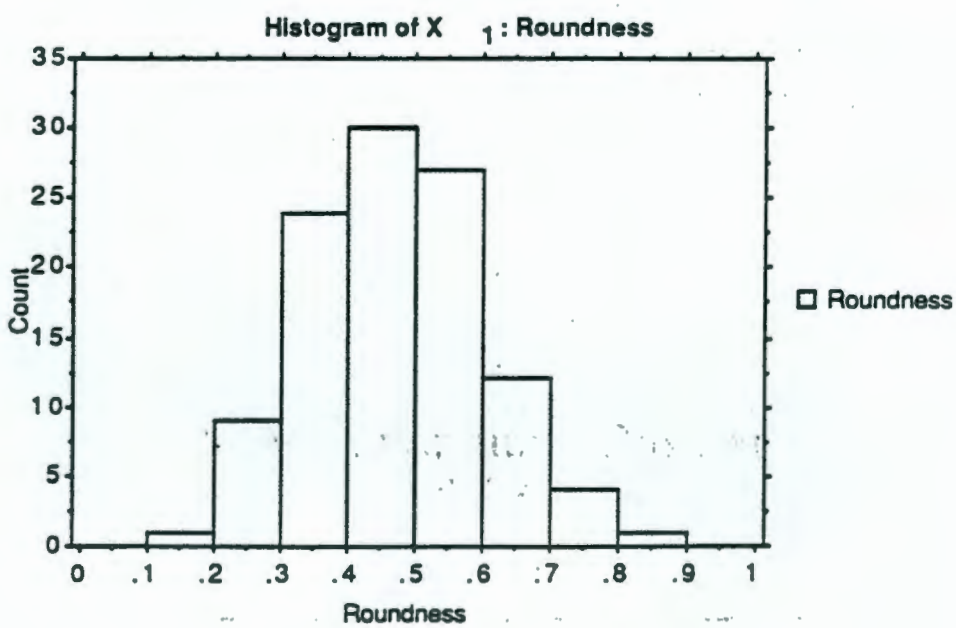
$NaNO_3$ Simulant Powder
RBM #2

X_1 : Roundness

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
.471	.128	.012	.016	27.207	108
Minimum:	**Maximum:**	**Range:**	**Sum:**	**Sum of Sqr.:**	**# Missing:**
.186	.813	.627	50.859	25.707	13

X_1 : Roundness

Bar:	From: (≥)	To: (<)	Count:	Percent:	
1	0	.1	0	0%	
2	.1	.2	1	.926%	
3	.2	.3	9	8.333%	
4	.3	.4	24	22.222%	
5	.4	.5	30	27.778%	- Mode
6	.5	.6	27	25%	
7	.6	.7	12	11.111%	
8	.7	.8	4	3.704%	
9	.8	.9	1	.926%	
10	.9	1	0	0%	



Metallography Sample #92M44
3/26/92

Attachment #2
Plutonium Finishing Plant Laboratory Raw Data

Brinkmann Particle Size Analyzer

SAMPLE NAME : SODIUM NITRATE
FILE NAME : Data Not Saved.

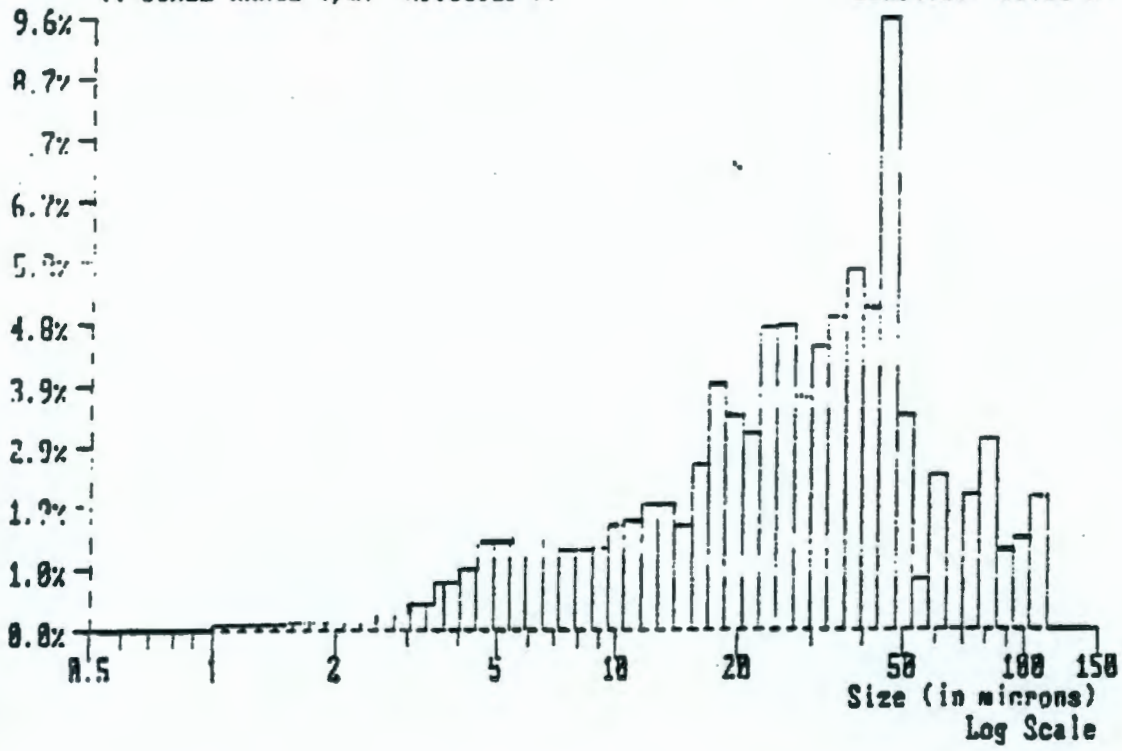
DATE	: 31/03/1992	ACQ. RANGE	: 0.5-150	COUNTS	: 170172
TIME	: 06:39	ACQ. MODE	: SAMPLE	S.N.F.	: 1.0
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 1223 SEC	S.D.U.	: 2005
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4%	CONCENTR.	: 8.3E+05 #/m
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 4.5E-03 %

PROBABILITY VOLUME DENSITY GRAPH

Name: SODIUM NITRATE
4.5E-05 cc/ml(100.0%)
Mode at 45.76 µm
<< SCALE RANGE (µm): ADJUSTED >>

Mean(nv): 4.75µm
S.D.(nv): 3.73µm

Median : 28.36µm
Mean(vm): 33.58µm
S.D.(vm): 24.67µm
Conf(vm): 99.63 %



VOLUME DISTRIBUTION TABLE (PERCENT)

SAMPLE NAME : SODIUM NITRATE
FILE NAME : Data Not Saved.

DATE	: 31/03/1992	ACQ. RANGE	: 0.5-150	COUNTS	: 170172
TIME	: 06:39	ACQ. MODE	: SAMPLE	S.N.R.	: 1.0
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 1223 SEC	S.D.U.	: 2005
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 8.3E+05 #/
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 4.5E-03 %

UNDER(%)	SIZE (microns)	OVER(%)
5	4.47	95
10	6.16	90
15	8.80	85
20	11.91	80
25	15.21	75
30	18.04	70
35	20.34	65
40	23.22	60
45	25.41	55
50	28.36	50
55	32.25	45
60	35.39	40
65	38.74	35
70	42.85	30
75	45.01	25
80	47.58	20
85	56.04	15
90	71.54	10
95	84.42	5
97	96.80	3
100	112.00	0

VOLUME DISTRIBUTION TABLE (RANGES)

SAMPLE NAME : SODIUM NITRATE
FILE NAME : Data Not Saved.

DATE	: 31/03/1992	ACQ. RANGE	: 0.5-150	COUNTS	: 170172
TIME	: 06:39	ACQ. MODE	: SAMPLE	S.N.F.	: 1.0
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 1223 SEC	S.D.U.	: 2005
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 8.3E+05 #/m
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 4.5E-03 %

RANGE (microns)	LOCAL (%)	UNDER(%)	-CUMULATIVE- OVER(%)
0.0 - 1.0	0.18	0.18	99.82
1.0 - 2.0	0.90	1.08	98.92
2.0 - 3.0	0.94	2.03	97.97
3.0 - 4.0	1.81	3.84	96.16
4.0 - 5.0	2.80	6.63	93.37
5.0 - 6.0	2.97	9.61	90.39
6.0 - 7.0	2.26	11.87	88.13
7.0 - 8.0	1.82	13.69	86.31
8.0 - 9.0	1.65	15.34	84.66
9.0 - 10.0	1.32	16.66	83.34
10.0 - 20.0	17.67	34.32	65.68
20.0 - 30.0	17.32	51.64	48.36
30.0 - 40.0	15.60	67.24	32.76
40.0 - 50.0	16.75	84.00	16.00
50.0 - 60.0	1.63	85.63	14.37
60.0 - 70.0	4.30	89.93	10.07
70.0 - 80.0	3.08	93.01	6.99
80.0 - 90.0	2.12	95.13	4.87
90.0 - 100.0	2.77	97.90	2.10
100.0 - 150.0	2.10	100.00	0.00

STATISTICS

SAMPLE NAME : SODIUM NITRATE
FILE NAME : Data Not Saved.

DATE	: 31/03/1992	ACQ. RANGE	: 0.5-150	COUNTS	: 170172
TIME	: 06:39	ACQ. MODE	: SAMPLE	S.N.F.	: 1.0
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 1223 SEC	S.D.U.	: 2005
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 8.3E+05 #/r
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 4.5E-03 %

		MEAN Diameter	S.D.
Number, Length	:	1.64 µm	2.10 µm
Number, Area	:	2.66 µm	2.33 µm
Number, Volume	:	4.71 µm	3.71 µm
Length, Area	:	4.32 µm	6.70 µm
Length, Volume	:	7.97 µm	7.63 µm
Area, Volume	:	14.71 µm	16.66 µm
Volume, Moment	:	33.58 µm	24.67 µm

		MEDIAN Diameter	MODE	CONFIDENCE
Number	:	1.05 µm	1.25 µm	100.00%
Area	:	7.49 µm	4.75 µm	94.41%
Volume	:	28.36 µm	45.76 µm	99.68%

Attachment #3
Pacific Northwest Laboratory Reduced Data

Solid Aerosol Pariticle Distribution

DENSITY USED FOR PARTICLES =		2.3	GRAM/CC			
METALLOGRAPHY SAMPLE#		92M44				
DESCRIPTION:	NaNO3 Simulant			DATE	3/26/92	
LABORATORY:	PNL- Metallography					
		SUMMARY				
EQUIVALENT DIAMETER (uM)		WEIGHTED	CUM		LINEAR	CUM
FROM	TO	AVERAGE	WEIGHT		AVERAGE	WEIGHT
(> =)	(<)	WT. %	WT. %		WT. %	WT. %
0	25	0.228855306	0.228855306		3.683549602	3.683549602
25	50	22.89	23.12		30.51	34.20
50	75	21.64	44.75		20.93	55.13
75	100	16.86	61.62		14.36	69.49
100	125	38.38	100.00		30.51	100.00
125	150	0.00	100.00		0.00	100.00
150	175	0.00	100.00		0.00	100.00
175	200	0.00	100.00		0.00	100.00
200	225	0.00	100.00		0.00	100.00
225	250	0.00	100.00		0.00	100.00
250	275	0.00	100.00		0.00	100.00
275	300	0.00	100.00		0.00	100.00
300	325	0.00	100.00		0.00	100.00
325	350	0.00	100.00		0.00	100.00
diameter calculated by:						
	••	linear average over range				
	•	weighted average over range				

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Par 3

Solid Aerosol Pariticle Distribution

DENSITY USED FOR PARTICLES =		2.3	GRAM/CC			
METALLOGRAPHY SAMPLE#		92M44				
DESCRIPTION:	NaNO3 Simulant			DATE	3/26/92	
LABORATORY:	PNL- Metallography					
DENSITY USED FOR PARTICLES =		2.3	GRAM/CC			
METALLOGRAPHY SAMPLE#		92M44				
DESCRIPTION:	NaNO3 Simulant			DATE	3/26/92	
LABORATORY:	PNL- Metallography					
		SUMMARY - SAMPLE IS NORMALIZED				
EQUIVALENT DIAMETER (uM)		WEIGHTED	CUM		LINEAR	CUM
FROM	TO	AVERAGE	WEIGHT		AVERAGE	WEIGHT
(> =)	(<)	WT. %	WT. %		WT. %	WT. %
0	2	0.000225917	0.000225917		0.005211138	0.005211138
2	4	0.03	0.03		0.06	0.07
4	6	0.13	0.17		0.19	0.25
6	8	0.42	0.58		0.51	0.76
8	10	1.11	1.70		1.27	2.03
10	12	0.91	2.60		0.99	3.02
12	14	1.03	3.63		1.09	4.11
14	16	6.46	10.09		6.70	10.81
16	18	8.36	18.45		8.53	19.34
18	20	16.88	35.33		17.02	36.36
20	22	13.82	49.15		13.79	50.15
22	24	6.10	55.26		6.04	56.19
24	26	19.73	74.99		19.39	75.58
26	28	25.01	100.00		24.42	100.00

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Attachment #4
Plutonium Finishing Plant Laboratory Reduced Data

WORK SHEET FOR TRANSLATING PFP LASAR LAB RAW DATA
TO A WEIGHT PERCENT BASIS (PARTICLE RANGE IS 0 - 350uM)

PARTICLE DENSITY =		2.3	GRAM/CC
LASAR SAMPLE #		-	
DESCRIPTION:	NaNO3 Simulant		
LABORATORY:	PFP Lasar Anlaysis		

DATE 3/31/92

DIAMETER RANGE (uM) FROM (>=)	TO (<)	WEIGHT WT. %	CUM WEIGHT WT. %	NEW DIA. RANGE (uM) FROM (>=)	TO (<)	WEIGHT WT. %	CUM WEIGHT WT. %	NORMALIZED WT. %	CUM WT. %
0	1	0.18	0.18	0	2	1.08	1.08	2.09	2.09
1	2	0.9	1.08	2	4	2.75	3.83	5.33	7.42
2	3	0.94	2.02	4	6	5.77	9.6	11.17	18.59
3	4	1.81	3.83	6	8	4.08	13.68	7.90	26.49
4	5	2.8	6.63	8	10	2.97	16.65	5.75	32.24
5	6	2.97	9.6	10	20	17.67	34.32	34.22	66.46
6	7	2.26	11.86	20	30	17.32	51.64	33.54	100.00
7	8	1.82	13.68			51.64		100	
8	9	1.65	15.33						
9	10	1.32	16.65						
10	20	17.67	34.32						
20	30	17.32	51.64						
30	40	15.6	67.24						
40	50	16.75	83.99						
50	60	1.63	85.62						
60	70	4.3	89.92						
70	80	3.09	93.01						
80	90	2.12	95.13						
90	100	2.77	97.9						
100	150	2.1	100						

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DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 1 of 1
(4) Building _____ (5) Rev. 0 (6) Job No. _____
(7) Subject Nitrogen Flow Specification
(8) Originator K. A. Giese Date 3/16/92
(9) Checker M. C. PRATHER Date 9/11/92

(10) Determine the maximum amount of Nitrogen gas flowrate that a modular exhauster system will have to process.

Vaporizing System

- The capacity of the vaporizing system will set the limit for the maximum nitrogen flowrate.
- Westinghouse Hanford Company Purchase Requisition # 249831 (12/19/91) specifys the capacity of the vaporizing system as:

must deliver nitrogen from

$0 \rightarrow 60$ CFM (cubic feet per minute)

at $0 \rightarrow 120$ psig

at $35°F \rightarrow 70°F$

The largest capacity condition is nitrogen flow at 60 CFM, 120 psig, 35°F.

Calculate Molar Flow - maximum

$PV = nRT$

$$n = \frac{PV}{RT} = \frac{(120 + 14.7 \text{ psia})(60 \frac{ft^3}{min})}{(10.73 \frac{psi\text{-}ft^3}{lbm\text{-}°R})(460 + 35)\ °R}$$

$= 1.52$ lb-moles/minute ←

anticipated Nitrogen flow

50 CFM at 90 psig and 35°F, to flow at 14.7 psia & 70°F

$$n = \frac{(90 + 14.7)(50)}{(10.73)(460 + 35)} = .99 \text{ lb-mol/Minute}$$

$$V = \frac{nRT}{P} = \frac{(.99)(10.73)(460 + 70)}{14.7} = 380 \text{ CFM} \leftarrow$$

BD-6400-060 (12/87)

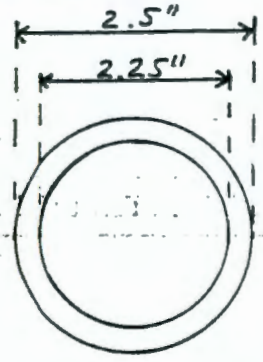
DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 1 of 5
(4) Building _____ (5) Rev. 0 (6) Job No. _____
(7) Subject Gas Velocity and Pressure Drop in Annulus
(8) Originator K.A. Giese K.A. Giese Date 8/5/92
(9) Checker M.C. PRATHER M.C. Prather Date 9/11/92

(10) For a given gas flow and annulus, determine pressure drop for various annulus lengths.

- annulus dimensions: 2.25" x 2.5"
- gas flow: 50 cubic feet/min, 104 psia, 495 °R (35°F)
  ~~14.7~~ (90 psig)
- annulus (bore hole) length can vary from 0 → 28.9 feet

Cross-sectional area of annulus



$$\text{Area} = \pi/4\,(2.5^2 - 2.25^2)$$
$$= .9327 \text{ in}^2$$
$$= 6.4768 \text{ E-3 FT}^2 \longleftarrow$$

Velocity at bore surface

- assume pressure at bore surface is ~~14~~ 14.7 psia, 70°F

$$(50\text{ CFM})\left(\frac{460+70°R}{460+35°R}\right)\left(\frac{90+14.7\text{psia}}{14.7}\right) = \cancel{398}\ 379 \text{ actual CFM}$$
$$= 6.31 \text{ FT}^3/\text{sec}$$

$$\text{velocity} = \frac{(6.31 \text{ FT}^3/\text{sec})}{(6.4768\text{ E-3 FT}^2)} = 975 \text{ FT/sec} \longleftarrow$$

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 2 of 5
(4) Building _____ (5) Rev. 0 (6) Job No. _____
(7) Subject Gas velocity and ΔP in annulus
(8) Originator K. A. Giese K A Giese Date 8/5/92
(9) Checker MC PRATHER MC Prather Date 9/11/92

(10)

Reynolds number and friction factor at bore hole surface

$$Re = \frac{D \rho v}{\mu}$$

where
D = diameter (FT)
ρ = density (lb/FT³)
v = velocity (FT/sec)
μ = viscosity (lb-FT/sec)

- equivalent diameter of annulus = $D_o - D_i$
  = 2.5 − 2.25
  = .25 in
  = .0208 FT

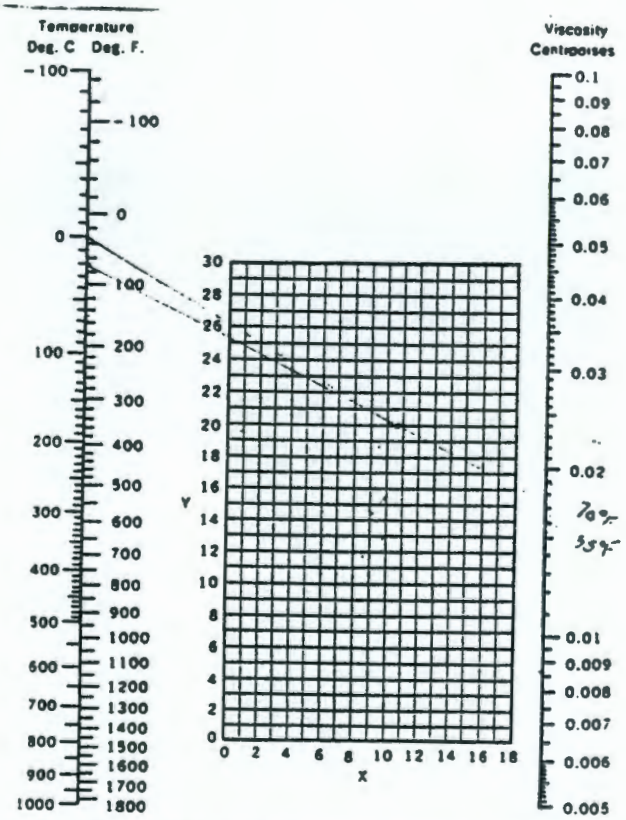
- viscosity at 70°F, 14.7 psia = .0174 cp
  = 1.1692 E-5 lb-FT/sec

- velocity = 975 ft/sec

- Density = $\frac{P M_w}{RT} = \frac{(14.7 \text{ psia})(28 \text{ lb/lb-mol})}{(10.731 \text{ psi-FT}^3/\text{lb mol-°R})(530°\text{R})}$
  = .0724 lb/FT³

Re = 1.25 E5

f ≈ .007 (from friction factor chart, in Appendix C-3, page 2)



'cosities of gases and vapors at 1 atm; for coordinates, see table on previous page.

APPENDIX 1

VISCOSITIES OF GASES†

No.	Gas	X	Y	No.	Gas	X	Y
1	Acetic acid	7.7	14.3	29	Freon-113	11.3	14.0
2	Acetone	8.9	13.0	30	Helium	10.9	20.5
3	Acetylene	9.8	14.9	31	Hexane	8.6	11.8
4	Air	11.0	20.0	32	Hydrogen	11.2	12.4
5	Ammonia	8.4	16.0	33	$3H_2 + N_2$	11.2	17.2
6	Argon	10.5	22.4	34	Hydrogen bromide	8.8	20.9
7	Benzene	8.5	13.2	35	Hydrogen chloride	8.8	18.7
8	Bromine	8.9	19.2	36	Hydrogen cyanide	9.8	14.9
9	Butane	9.2	13.7	37	Hydrogen iodide	9.0	21.3
10	Butylene	8.9	13.0	38	Hydrogen sulfide	8.6	18.0
11	Carbon dioxide	9.5	18.7	39	Iodine	9.0	18.4
12	Carbon disulfide	8.0	16.0	40	Mercury	5.3	22.9
13	Carbon monoxide	11.0	20.0	41	Methane	9.9	15.5
14	Chlorine	9.0	18.4	42	Methyl alcohol	8.5	15.6
15	Chloroform	8.9	15.7	43	Nitric oxide	10.9	20.5
16	Cyanogen	9.2	15.2	44	Nitrogen	10.6	20.0
17	Cyclohexane	9.2	12.0	45	Nitrosyl chloride	8.0	17.6
18	Ethane	9.1	14.5	46	Nitrous oxide	8.8	19.0
19	Ethyl acetate	8.5	13.2	47	Oxygen	11.0	21.3
20	Ethyl alcohol	9.2	14.2	48	Pentane	7.0	12.8
21	Ethyl chloride	8.5	15.6	49	Propane	9.7	12.9
22	Ethyl ether	8.9	13.0	50	Propyl alcohol	8.4	13.4
23	Ethylene	9.5	15.1	51	Propylene	9.0	13.8
24	Fluorine	7.3	23.8	52	Sulfur dioxide	9.6	17.0
25	Freon-11	10.6	15.1	53	Toluene	8.6	12.4
26	Freon-12	11.1	16.0	54	2,3,3-Trimethylbutane	9.5	10.5
27	Freon-21	10.8	15.3	55	Water	8.0	16.0
28	Freon-22	10.1	17.0	56	Xenon	9.3	23.0

Coordinates for use with figure overleaf.

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9/11/92

8/5/92

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 4 of 5
(4) Building _____ (5) Rev. 0 (6) Job No. _____
(7) Subject Gas velocity and ΔP in annulus
(8) Originator K.A. Giese K.A. Giese Date 8-5-92
(9) Checker M. C. PRATHER Date 9/11/92

(10) Calculation of Mach number at bore surface

- N_s (mach number at surface) = $\frac{V_s}{a_s}$,

  where V_s = velocity at surface = 975 FT/sec

  a_s = acoustical velocity at surface

- $a_s = \left(g_c \frac{\frac{c_p}{c_v} T \cdot R}{m} \right)^{1/2}$

  where $g_c = 32.174 \frac{lbm\text{-}ft}{lbf\text{-}sec^2}$ (gravitational constant factor)

  $\frac{c_p}{c_v}$ for N_2 = $\frac{.25 \text{ BTU/lb-°F}}{.25 \frac{BTU}{lb\text{-}°F} - \left(\frac{1.9869 \text{ BTU/lbmol-°R}}{28 \text{ lb/lbmol}} \right)}$

  = 1.39

- T = 70 + 460 = 530 °R

- R = 1545 lbf-ft/lbmol-°R (Gas constant)

- M = 28 lb/lbmol

Substituting,

a_s = 1143 ft/sec

and

$N_s = \frac{975}{1143} = .85$ ←

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 5 of 5

(4) Building _____ (5) Rev. 0 (6) Job No. _____

(7) Subject Gas Velocity and ΔP in annulus

(8) Originator K.A. Gicle K.A. Gicle Date 8-5-92

(9) Checker M.C. PRATHER Date 9/11/92

(10) Calculation of Mach # at a bore depth of 28.9'

- assume adiabatic Frictional Flow
- Let $\Delta L = 28.9'$
- Let the average Friction Faction equal .007
- r_H, hydraulic radius $= \frac{D_o - D_i}{4} = \frac{.25}{4} = .0625'' = 5.208\ E\text{-}3$ FT.

The equation for adiabatic Frictional Flow is:

$$\frac{\bar{f}\,\Delta L}{r_H} = \frac{1}{\gamma}\left(\frac{1}{N_d^2} - \frac{1}{N_s^2} - \left(\frac{\gamma+1}{2}\right)\ln\left(\frac{N_s^2\{1+[(\gamma-1)/2]N_d^2\}}{N_d^2\{1+[(\gamma-1)/2]N_s^2\}}\right)\right)$$

where:

$\gamma = \frac{c_p}{c_v}$

N_d = mach # at 28.9'

N_s = mach# at surface

iterating,

$N_d = .1295$

$a_d = a_s = 1143$ ft/sec

$V_d = N_d * a_d$

$= 148$ ft/sec

ΔP, V, and Mach # as a function of depth (conduit length) is provided below.

SUMMARY								
Conduit length, ft	2	4	6	8	10	12	14	16
Vel (1), ft/sec	436	342	291	261	236	220	206	193
Vel (2), ft/sec	972	972	972	972	972	972	972	972
N(1)	0.38	0.30	0.25	0.23	0.21	0.19	0.18	0.17
N(2)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
P(1), psi	34.5	44.2	52.1	58.2	64.3	69.3	73.9	78.9
P(2), psi	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Delta P, psi	19.8	29.5	37.4	43.5	49.6	54.6	59.2	64.2
Conduit length, ft	18	20	22	24	26	28	30	32
Vel (1), ft/sec	183	175	167	161	155	151	146	141
Vel (2), ft/sec	972	972	972	972	972	972	972	972
N(1)	0.16	0.15	0.15	0.14	0.14	0.13	0.13	0.12
N(2)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
P(1), psi	83.2	86.8	91.1	94.3	98.2	101.2	104.6	108.2
P(2), psi	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Delta P, psi	68.5	72.1	76.4	79.6	83.5	86.5	89.9	93.5

BD-6400-060 1 (12/87)

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 1 of 3
(4) Building _____ (5) Rev. 0 (6) Job No. _____
(7) Subject Calculation of pressure drop Thru Tank dome riser
(8) Originator K.A Giese Date 8/27/92
(9) Checker M. C. PRATHER Date 9/11/92

(10) Determine the pressure drop necessary to exhaust nitrogen thru a riser pipe at 14.7 psia and 70°F

Base case is:

- 4" Sch. 40 pipe
- 8' long
- Flow = 350 SCFM at 14.7 psia & 70 °F.

Calculation of Reynolds number Re

$ID = 4.026''$
$= .3355\ FT$

Cross sectional area $= \dfrac{\pi/4\,(4.026)^2}{144} = .0884\ FT^2$

Velocity $= (350\ FT^3/min)\left(\dfrac{1\ min}{60\ sec}\right)\left(\dfrac{1}{.0884\ FT^2}\right)$

$= 66\ FT/sec$

Density, $\rho = \dfrac{P M_o}{RT} = \dfrac{(14.7\ psia)(28\ lb/lb\text{-}mol)}{\left(10.731\ \frac{psi\text{-}FT^3}{lb\,mol\text{-}°R}\right)(530°R)}$

$= .0724\ lb/FT^3$

viscosity, $\mu = 1.1692\ E\text{-}5\ lb\text{-}FT/sec$, 70°F, 14.7 psia

$Re = \dfrac{D\rho V}{\mu} = \dfrac{(.3355\ FT)(.0724\ lb/FT^3)(66\ FT/sec)}{1.1692\ E\text{-}5\ lb\text{-}FT/sec}$

$= 1.37\ E+5$

$\Rightarrow$ Friction Factor, $f \approx .006$ (from friction factor chart on next page)

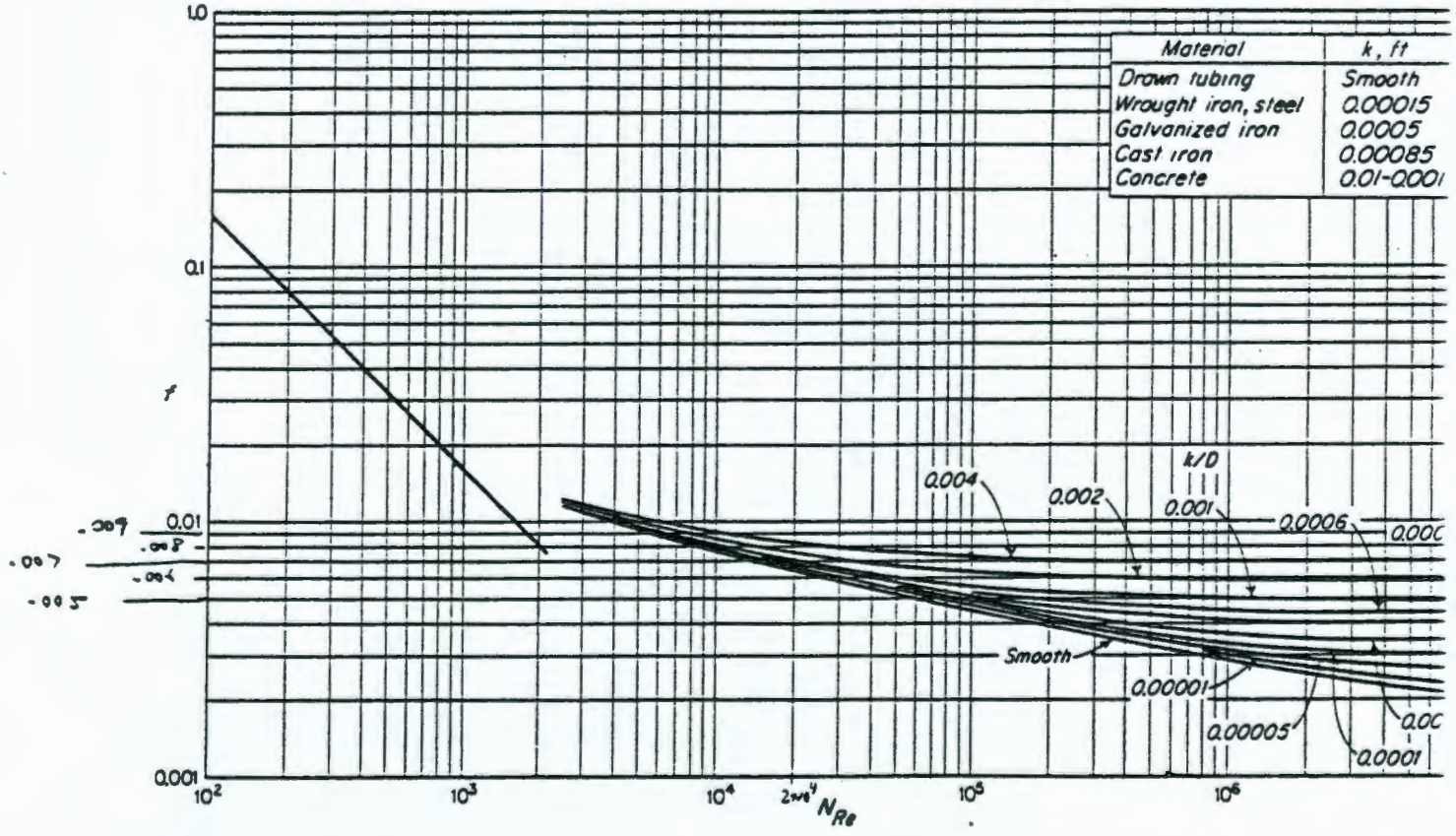

FIGURE 5-9
Friction-factor chart.

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9/24/92

8/07/92

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 3 of 3

(4) Building _____ (5) Rev. 0 (6) Job No. _____

(7) Subject Calculation of Pressure Drop Thru Tank dome riser

(8) Originator K.A. Gise Date 8/07/92

(9) Checker M. C. PRATHER Date 9/14/92

(10) Calculation of pressure drop in riser pipe

head loss $= (4f\frac{L}{D})(\frac{V^2}{2g_c})$ (feet)

Pressure drop = (head loss) $\frac{\rho}{144}$ (psi)

PRESSURE DROP IN TANK RISER								
enter								
Pipe data								
ID (ft)=	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01
Length (ft)=	8	8	8	8	8	8	8	8
Cross sec. area (ft2)=	8.8E-02	8.8E-02	8.8E-02	8.8E-02	8.8E-02	8.8E-02	8.8E-02	8.8E-02
k/D roughness factor=	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Gas Conditions								
Flow (acfm)=	350	500	750	1000	1250	1500	1750	2000
Temp (R)=	530	530	530	530	530	530	530	530
Press (psi)=	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Viscosity (lb-ft/sec)=	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05
Mole Weight (lb/lb-mol)=	28	28	28	28	28	28	28	28
Gas Constant (psi-ft3/(mol-R)=	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
calculated values								
density (lb/ft^3)=	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724
ave velocity (ft3/sec) =	66	94	141	189	236	283	330	377
Reynolds Number=	1.37E+05	1.96E+05	2.94E+05	3.92E+05	4.89E+05	5.87E+05	6.85E+05	7.83E+05
enter								
friction factor=	0.0065	0.006	0.006	0.006	0.006	0.006	0.006	0.006
calculated values								
Head loss (ft-LBf/LBm)=	41.9	79.0	177.8	316.1	493.9	711.2	968.1	1264.4
Head loss (psi)=	0.021	0.040	0.089	0.159	0.248	0.357	0.487	0.635
Head loss (inches H2O)=	0.6	1.1	2.5	4.4	6.9	9.9	13.5	17.6

PRESSURE DROP IN TANK RISER								
enter								
Pipe data								
ID (ft)=	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01
Length (ft)=	8	8	8	8	8	8	8	8
Cross sec. area (ft2)=	8.8E-02	8.8E-02	8.8E-02	8.8E-02	8.8E-02	8.8E-02	8.8E-02	8.8E-02
k/D roughness factor=	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Gas Conditions								
Flow (acfm)=	2250	2500	2750	3000	3250	3500	3750	4000
Temp (R)=	530	530	530	530	530	530	530	530
Press (psi)=	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Viscosity (lb-ft/sec)=	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05
Mole Weight (lb/lb-mol)=	28	28	28	28	28	28	28	28
Gas Constant (psi-ft3/(mol-R)=	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
calculated values								
density (lb/ft^3)=	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724
ave velocity (ft3/sec) =	424	471	518	566	613	660	707	754
Reynolds Number=	8.81E+05	9.79E+05	1.08E+06	1.17E+06	1.27E+06	1.37E+06	1.47E+06	1.57E+06
enter								
friction factor=	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.0059
calculated values								
Head loss (ft-LBf/LBm)=	1600.2	1975.6	2390.5	2844.9	3338.8	3872.2	4445.1	4973.3
Head loss (psi)=	0.804	0.993	1.201	1.430	1.678	1.946	2.234	2.499
Head loss (inches H2O)=	22.3	27.5	33.3	39.6	46.4	53.9	61.8	69.2

APP. C-4

BECKMAN AIR PYCNOMETER PARTICLE DENSITY 4/1/92

PAUL CRAW

BALANCE: 809-06-01-015 DUE:

PG 1/2

PYCNOMETER CHECK: ZERO = 0.01 cm^3 BALL = 289.4 cm^3 (289.6 cm^3)

TARE ON TEST CUP = 103.67 gm

SULFUR K-MAG

① WT SAMPLE + CUP: 121.61 gm
WT SAMPLE: 17.94 gm
SAMPLE VOL: 6.79 cm^3
Sg/DENSITY: 2.64 gm/cm^3

② WT SAMPLE + CUP: 121.63 gm
WT SAMPLE: 17.96 gm
SAMPLE VOL: 6.79 cm^3
Sg/DENSITY 2.65 gm/cm^3

Avg. Sg DENSITY = 2.65 gm/cm^3

RBm # 4

① WT SAMPLE + CUP: 123.80 gm
WT SAMPLE: 20.13 gm
SAMPLE VOL: 8.75 cm^3
Sg/DENSITY: 2.30 gm/cm^3

② WT SAMPLE + CUP: 123.79 gm
WT SAMPLE: 20.12 gm
SAMPLE VOL: 8.77 cm^3
PART. DENSITY: 2.29 gm/cm^3

③ WT SAMPLE + CUP: 123.84 gm
WT SAMPLE: 20.17 gm
SAMPLE VOL: 8.65 cm^3
PART. DENSITY: 2.33 gm/cm^3

Avg PARTICLE DENSITY = 2.31 gm/cm^3

RBm # 3

① WT SAMPLE + CUP: 123.65 gm
WT SAMPLE: 19.98 gm
SAMPLE VOL: 8.78 cm^3
PART. DENSITY: 2.28 gm/cm^3

② WT SAMPLE + CUP: 124.08 gm
WT SAMPLE: 20.41 gm
SAMPLE VOL: 8.93 cm^3
PART. DENSITY: 2.29 gm/cm^3

③ WT SAMPLE + CUP: 124.14 gm
WT SAMPLE: 20.47 gm
SAMPLE VOL: 9.02 cm^3
PART. DENS: 2.27 gm/cm^3

Avg PART. DENSITY: 2.28 gm/cm^3

RBm # 2

① WT SAMPLE + CUP: 121.94 gm
WT SAMPLE: 18.27 gm
SAMPLE VOL: 7.69 cm^3
PARTICLE DENSITY: 2.38 gm/cm^3

② WT. SAMPLE + CUP: 121.87 gm
WT. SAMPLE: 18.20 gm
SAMPLE VOL: 7.71 cm^3
PARTICLE DENSITY: 2.36 gm/cm^3

③ WT. SAMPLE + CUP: 121.80 gm
WT SAMPLE: 18.13 gm
SAMPLE VOL: 7.71 cm^3
PART. DENSITY: 2.35 gm/cm^3

Avg. PARTICLE DENSITY: 2.36 gm/cm^3

CLA # 1

(1) WT. SAMPLE + CUP : 120.99 gm
WT. SAMPLE : 17.32 gm
SAMPLE VOLUME : 7.64 cm^3
PARTICLE DENSITY : 2.27 gm/cm^3

(2) WT. SAMPLE + CUP : 120.83 gm
WT. SAMPLE : 17.16 gm
SAMPLE VOL : 7.64 cm^3
PART. DENSITY : 2.25 gm/cm^3

(3) WT. SAMPLE + CUP : 120.31 gm
WT. SAMPLE : 16.64 gm
SAMPLE VOL : 7.31 cm^3
PART. DENSITY : 2.28 gm/cm^3

Avg. PART. DENSITY : 2.27 gm/cm^3

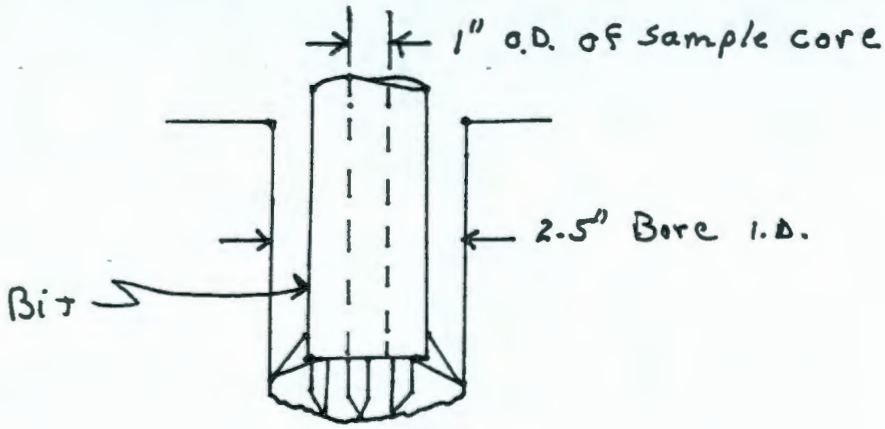
REMARKS :
- ALL SAMPLES WERE OVEN DRIED @ 100°C FOR >24 HOURS PRIOR TO TESTING.
- SAMPLES WERE CRUSHED TO A FINE POWDER BEFORE TESTING AND BETWEEN EACH TEST, THE SAMPLES WERE CRUSHED.
- SAMPLES WERE OBTAINED FROM TOP PORTION OF WASTE SIMULANT PANS.

APP C-5

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-CB-225 (3) Page 1 of 2
(4) Building _____ (5) Rev. 0 (6) Job No. _____
(7) Subject Aerosol Study - Maximum Particle Displacement / displacement vs speed
(8) Originator K.A. Giese K.A. Giese Date 3/16/92
(9) Checker M.C. PRATHER [signature] Date 9/11/92

(10) Determine the amount of material displaced by the action of core drilling into saltcake waste.



Basis:

- Rate of drill bit vertical movement is 2 ~ 3 in/min, with a maximum of 5 in/min.
- saltcake bulk density used is 2.3 g/cm³

Calculations

- convert g/cm³ to g/in³

$$(2.3\ g/cm^3)(2.54\ cm/in)^3 = 37.7\ g/in^3$$

- volume of material displaced per inch of depth

$$vol\left(\frac{in^3}{in}\right) = \pi/4(2.5^2 - 1^2)(1) = 4.12\ in^3/in$$

- mass of material displaced as a function of vertical bit speed

$$\text{mass rate } g/min = (\text{vertical speed } in/min)(4.12\ in^3/in)(37.7\ g/in^3)$$
$$= (\text{vertical speed } in/min)(155.3\ g/in)$$

- maximum particle displacement (5 in/min)

$$\text{mass rate} = (5\ in/min)(4.12\ in^3/in)(37.7\ g/in^3) = \underline{777\ g/min} \leftarrow$$

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 2 of 2

(4) Building _____ (5) Rev. 0 (6) Job No. _____

(7) Subject Aerosol Study - maximum particle displacement / displacement vs. speed

(8) Originator K.A. Giese K.A. Giese Date 3/16/92

(9) Checker M. C. PRATHER M. C. Prather Date 9/11/92

(10)

System Constraints

- Only 19" can be drilled at a time - This is the sampler length.
- After the sampler is full, the nitrogen flow is reduced to a rate to keep any liquids from contaminating underlying layers. This rate ~~will~~ should be an order of magnitude less than the drilling flowrate of 350 SCFM. For transient aerosol air-space deposition modeling, it is critical to know the times for drilling.
- Below is a table of ~~vertical~~ average vertical bit speed in inches/minute, mass generation rate, ~~and the~~ in grams/minute, and the time that the nitrogen purge rate of 350 SCFM is flowing. (Time that nitrogen is flowing is (19")/(average vertical drill bit speed)

PARTICLE MASS GENERATION RATE AND TIME AS A FUNCTION OF AVERAGE VERTICAL DRILL BIT SPEED		
AVERAGE VERTICAL BIT SPEED, (IN/MIN)	MASS GENERATION RATE, (GRAMS/MIN)	DURATION OF NITROGEN PURGE FLOW, (MINUTES)
0.5	78	38.0
1	155	19.0
1.5	233	12.7
2	311	9.5
2.5	388	7.6
3	466	6.3
3.5	544	5.4
4	621	4.8
4.5	699	4.2
5	777	3.8

APP. C-6

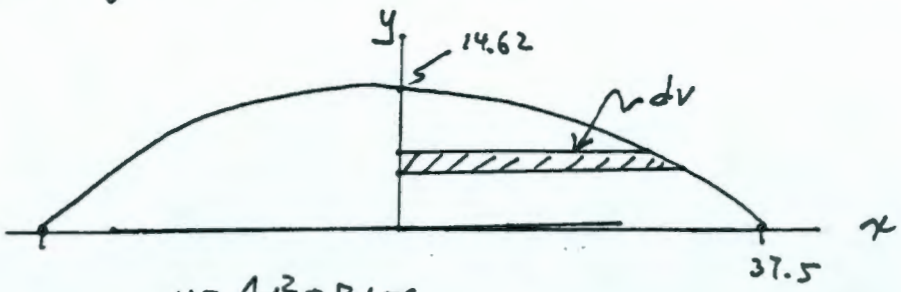
DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-CS-225 (3) Page 1 of 5
(4) Building _____ (5) Rev. 0 (6) Job No. _____
(7) Subject Aerosol Study - Dome air space volume
(8) Originator K. A. Giese Kathino Date 3/11/92
(9) Checker M. C. PRATHER Date 4/11/92

(10) Determine the dome air space of a 75-foot diameter single-shell tank. Dimensional information is taken from Fig A-8 of WHC-EP-0210 (attached)

500,000 gal Tank Sizes, (B, Bx, C, T, & Farms)

- shell diameter = 75 ft
- Shell volume $= (500{,}000\ gal)\left(\frac{ft^3}{7.48\ gal}\right) = 66{,}845\ ft^3$
- Shell height = (volume)/(tank cross-sectional area)
  $= (66{,}845\ ft^3)/(\pi/4(75)^2) = 15.13\ ft$
- Dome buried depth = 7 ft, 3 in
- estimate dome height by: (Total depth) - (Buried Depth) - (shell height)
- estimate parabolic curve to fit center-cut profile of dome. (Neglect dome thickness).
- Dome Total depth = 37 ft, 0 in
- dome height = (37') - (7.25') - (15.13') = 14.62'



$y = Ax^2 + Bx + C$

vertex coordinates $= x, y$
$= 0, 14.62$
$= \frac{-B}{2A}, C - \frac{B^2}{4A}$

$x = 0 = \frac{-B}{2A}$

$\Rightarrow B = 0$

BD-6400-060.1 (12/87)

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 2 of 5
(4) Building _____ (5) Rev. 0 (6) Job No. _____
(7) Subject Aerosol Study - Dome air space volume
(8) Originator K. A. Giese KGiese Date 3/11/92
(9) Checker M. C. PRATHER [signature] Date 9/11/92

(10) $y = 14.62 = C - \frac{0^2}{4A}$

$\Rightarrow C = 14.62$

$y = Ax^2 + 14.62$

$0 = A(37.5)^2 + 14.62$

$\Rightarrow A = -1.04E-2$

$\Rightarrow y = -.0104x^2 + 14.62$

and

$x^2 = 1406.25 - 96.19y$

determine volume by integrating dv from 0 to 14.62

$dv = \pi x^2 dy$

$$V = \int_0^v dv = \int_0^{14.62} \pi x^2 dy$$

$$= \frac{\pi}{.0104} \int_0^{14.62} (-y + 14.62)\, dy$$

$$= 302.18 \left[-\tfrac{1}{2} y^2 + 14.62y \right] \Big/_0^{14.62}$$

$$= 302.18 \left[-\tfrac{1}{2}(14.62)^2 + 14.62 \times 14.62 \right]$$

$$V = \underline{32{,}294 \text{ FT}^3} \longleftarrow$$

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 3 of 5

(4) Building _____ (5) Rev. 0 (6) Job No. _____

(7) Subject Aerosol Study - Dome Air Space volume

(8) Originator K.A. Giese Date 3/11/92

(9) Checker M.C. PRATHER Date 9/11/92

(10) 750,000 gal Tank Sizes, (BY, S, TX, TY Farms)

- Dome Total Depth = 45.0833'
- Shell volume $= (750{,}000\,gal)\left(\frac{FT^3}{7.48\,gal}\right) = 100{,}267\ FT^3$
- Shell height $= (100{,}267)/(4{,}418\ FT^2) = 22.70\ FT$
- Dome buried depth = 8 FT, 1 in
- estimated dome height $= (45.0833') - (8.0833') - (22.7') = 14.3'$

using same process as before,

$$y = Ax^2 + C$$

$$\Rightarrow C = 14.3$$

$$y = Ax^2 + 14.3$$

$$0 = A(37.5)^2 + 14.3$$

$$\Rightarrow A = -1.02E-2$$

$$\Rightarrow y = -.0102E-2\,x^2 + 14.3$$

and

$$x^2 = 1406.3 - 98.3y$$

$$dv = \pi x^2 dy$$

$$V = \int_0^{14.3} \pi x^2 dy$$

$$= \frac{\pi}{.0102} \int_0^{14.3} (-y + 14.3)\, dy$$

$$= 308\left[-\tfrac{1}{2}(14.3)^2 + 14.3 \times 14.3\right]$$

$$\underline{V = 31{,}491\ FT^3} \longleftarrow$$

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 4 of 5

(4) Building _____ (5) Rev. 0 (6) Job No. _____

(7) Subject Aerosol Study - Dome Air Space Volume

(8) Originator K.A. Giese Date 3/11/92

(9) Checker M.C. PRATHER Date 9/11/92

(10) 1,000,000 gal tank sizes (A, AX, SX Farms)

Dome total depth = 50', 0"

Shell volume = (1,000,000)(FT³/7.48 gal) = 133,690 FT³

Shell height = (133,690 FT³)/(5,418 FT²) = 30.26 FT

Dome Buried depth = 6', 0"

dome height = (50') - (6') - (30.26') = 13.74'

using same process as before,

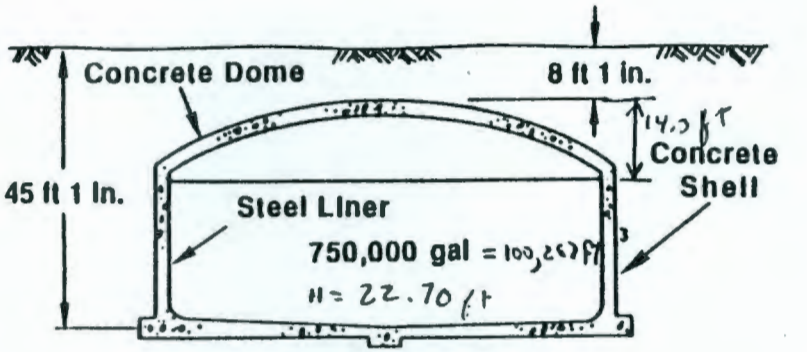
$$y = Ax^2 + C$$

$$\Rightarrow C = 13.74$$

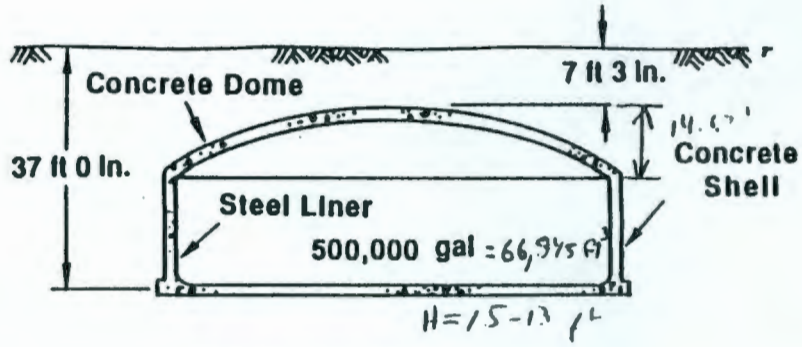
$$\Rightarrow A = \frac{-13.74}{(37.5)^2} = -.0098$$

$$V = 102.3\pi \left[13.74 \times 13.74 - .5(13.74)^2\right]$$

$$V = 30,386 \text{ ft}^3 \leftarrow$$



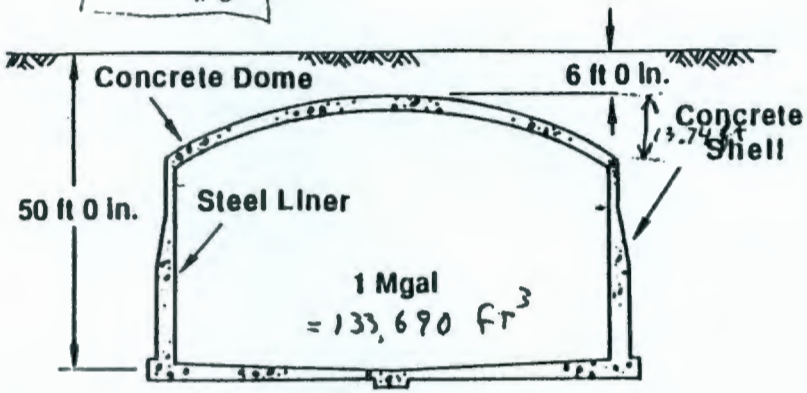
75-ft-Diameter Single-Shell Tank
(241-BY, -S, -TX, and -TY Tank Farms)



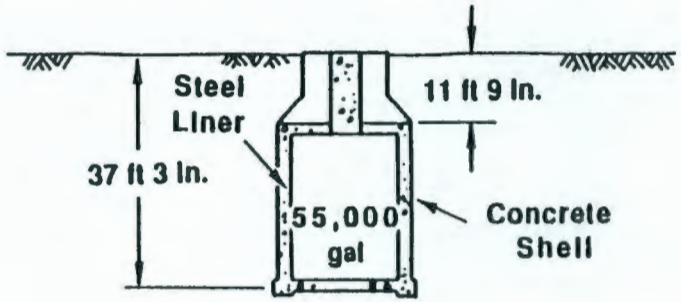
75-ft-Diameter Single-Shell Tank
(241-B, -BX, -C, -T, and -U Tank Farms)

$V = \pi r^2 H$

$$H = \frac{4V}{\pi D^2}$$



75-ft-Diameter Single-Shell Tank
(241-A,-AX, and -SX Tank Farns)
H = 30.26 ft



20-ft-Diameter Single-Shell Tank (200 Series)
(Four Each in Tank Farms 241-B, -C, -T, and -U)

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Figure A-8. Various Single-Shell Tanks (typical dimensions).

WHC-SD-WM-TC-[illegible] Rev. 0
– FROM WHC-EP-0210

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3/11/92

OWNER'S REPRESENTATIVE 9/11/92

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 1 of 7

(4) Building _____ (5) Rev. 0 (6) Job No. _____

(7) Subject Aerosol Study - minimum Tank Airspace of all Salt cake Tanks

(8) Originator K.A. Gieze K.A. Gieze Date 3/16/92

(9) Checker MC PRATHER MC Prather Date 9/11/92

(10) Determine the minimum air space between the waste surface and the rim of all SST's to be sampled by rotary mode.

Tank Size (gal)	Shell height (FT)	Waste height - Maximum - (Inch)	(Feet)	Tank	Distance From Top of Rim (Feet)	
500K	15.13	165"	13.75'	241-U-103	1.38'	
750K	22.7	252"	21.00'	241-S-110	1.70'	
1,000K	30.26	347"	28.9	241-A/101	1.34	← worst case

Used WHC-EP-0210, pg A-27 → A-31

500K tank farms are 241-B, BX, C, T, U

750K tank farms are 241-BY, S, TX, TY

1,000 K Tank farms are 241-A, AX, SX

DETERMINE THIS MINIMUM HEIGHT FOR ALL SSTS.

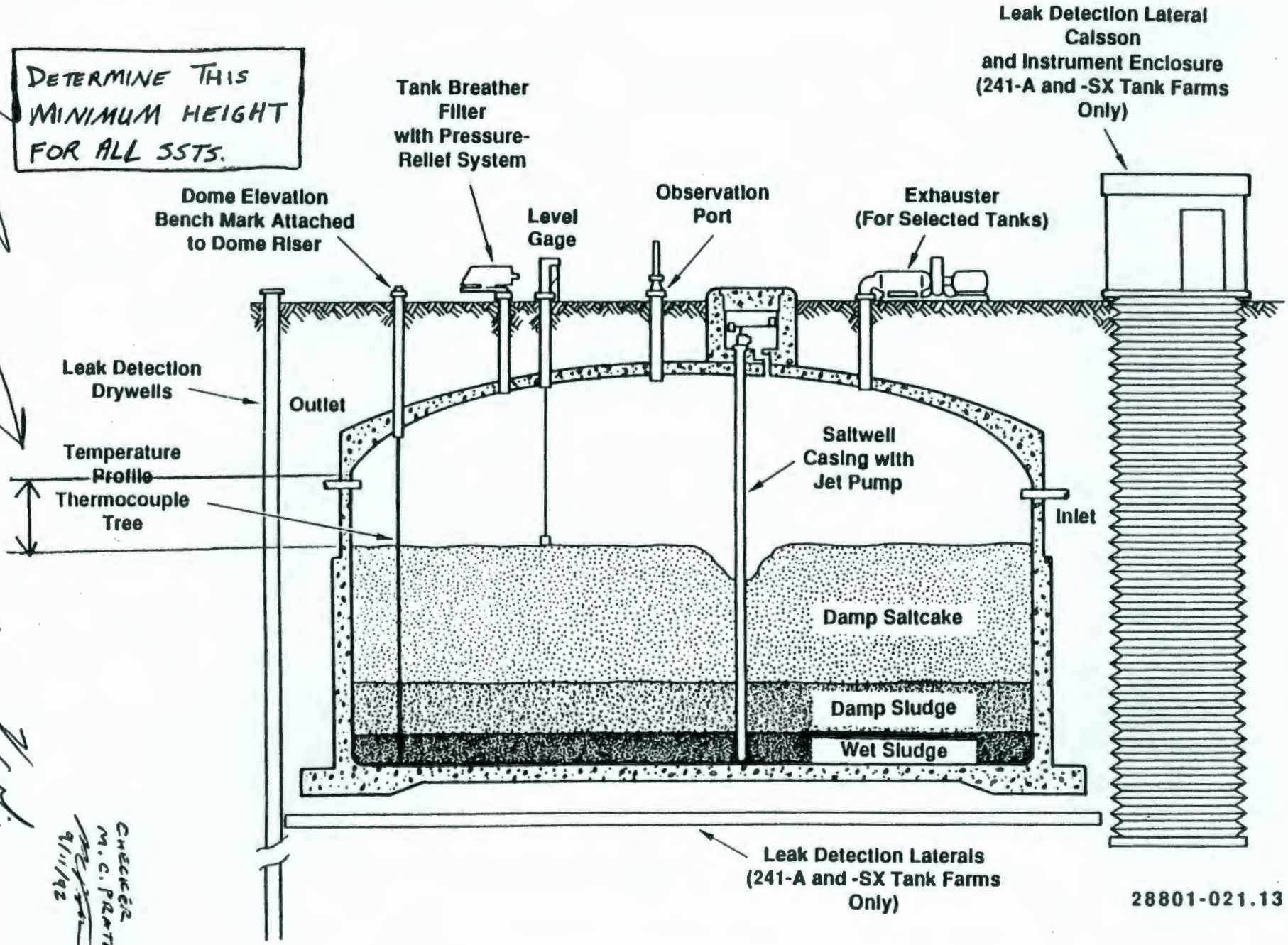

Figure A-9. Typical Single-Shell Tank.

C.7-2

3/14/92

CHECKER M.C. PRATHER 9/11/92

WHC SD-WM-ES-225 Rev. 0

WHC-EP-0210

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[redacted] - 500K

[redacted] - 750K

[redacted] - 1000K

Table A-4. Single-Shell Tank Information. (Sheet 1 of 5)

Tank	Stabilization status	Riser quantity[b]	Sampled[c]	Waste status summary[d]	
				Saltcake (in.)	Total (in.)
241-A-101	1995[a]	6		345	347
241-A-102	1989[a]	5	Yes	4	7
241-A-103	IS, II	5	Yes	0	133
241-A-104	IS, II	7		0	10
241-A-105	IS, II	6		0	7
241-A-106	IS, II	8	Yes	0	45
241-AX-101	1995[a]	9		271	272
241-AX-102	IS, II	8		9	12
241-AX-103	II	11		40	41
241-AX-104	IS, II	9		0	3
241-B-101	IS, II	6		0	41
241-B-102	IS, II	2		4	10
241-B-103	IS, II	6		0	21
241-B-104	IS, II	4		25	135
241-B-105	IS, II	5		97	111
241-B-106	IS, II	5		0	42
241-B-107	IS, II	6		0	60
241-B-108	IS, II	5		0	34
241-B-109	IS, II	4		0	46
241-B-110	IS, II	5		0	89
241-B-111	IS, II	5		0	86
241-B-112	IS, II	5		0	11
241-B-201	IS, II	5		0	112
241-B-202	IS, II	6		0	104
241-B-203	IS, II	6		0	196
241-B-204	IS, II	5		0	196
241-BX-101	IS, II	3		0	15
241-BX-102	IS, II	2		0	35
241-BX-103	IS, II	3		0	23
241-BX-104	1992[a]	3	Yes	0	32
241-BX-105	IS, II	3	Yes	1	17

1000

500

PST89-1095-A-4

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CHECKER M.C. PRATHER 9/11/92

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Table A-4. Single-Shell Tank Information. (Sheet 2 of 5)

Tank	Stabilization status	Riser quantity[b]	Sampled[c]	Waste status summary[d]	
				Saltcake (in.)	Total (in.)
241-BX-106	1990[a]	3		0	11
241-BX-107	1990[a]	7		0	131
241-BX-108	IS, II	4		0	9
241-BX-109	1994[a]	6		0	72
241-BX-110	IS	4		3	71
241-BX-111	1990[a]	4		52	77
241-BX-112	1992[a]	5		0	57
241-BY-101	IS	2		101	141
241-BY-102	1990[a]	4		152	152
241-BY-103	[e]	5		147	149
241-BY-104	IS	5		133	148
241-BY-105	1991[a]	4		167	183
241-BY-106	1991[a]	5		199	233
241-BY-107	IS, II	5		75	97
241-BY-108	IS	7		27	83
241-BY-109	1991[a]	5		129	160
241-BY-110	IS	4		107	145
241-BY-111	IS	5		159	167
241-BY-112	IS	9		104	106
241-C-101	IS, II	3		0	32
241-C-102	1994[a]	2		0	154
241-C-103	1993[a]	3	Yes	0	64
241-C-104	1994[a]	3	Yes	0	107
241-C-105	1996[a]	2	Yes	0	55
241-C-106	1996[a]	3	Yes	0	72
241-C-107	1994[a]	5		0	123
241-C-108	IS, II	6		0	24
241-C-109	IS, II	7		0	23
241-C-110	1993[a]	7		0	71
241-C-111	IS, II	5		0	21
241-C-112	1994[a]	7		0	40

PST89-1095-A-4

500

750

500

CHECKER M.C. PRATHER

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Table A-4. Single-Shell Tank Information. (Sheet 3 of 5)

Tank	Stabilization status	Riser quantity[b]	Sampled[c]	Waste status summary[d]	
				Saltcake (in.)	Total (in.)
241-C-201	IS, II	3		0	8
241-C-202	IS, II	3		0	4
241-C-203	IS, II	3		0	20
241-C-204	IS, II	3		0	12
241-S-101	1992[a]	4		62	151
241-S-102	1991[a]	7		198	200
241-S-103	1991[a]	6		80	84
241-S-104	IS	6		0	107
241-S-105	IS	7		165	166
241-S-106	1991[a]	6		186	197
241-S-107	1991[a]	7		25	132
241-S-108	1991[a]	6		218	220
241-S-109	1992[a]	7		202	207
241-S-110	1991[a]	8		204	252
241-S-111	1992[a]	6		163	213
241-S-112	1992[a]	7		229	232
241-SX-101	1989[a]	4		125	165
241-SX-102	1992[a]	3		155	197
241-SX-103	1995[a]	4		190	231
241-SX-104	1989[a]	5		179	229
241-SX-105	1995[a]	5		222	248
241-SX-106	1995[a]	5		169	173
241-SX-107	IS, II	4		0	38
241-SX-108	IS, II	4		0	42
241-SX-109	IS, II	1		0	91
241-SX-110	IS, II	3		0	23
241-SX-111	IS, II	4		0	45
241-SX-112	IS, II	2		0	33
241-SX-113	IS, II	4		0	9
241-SX-114	IS, II	3		0	66
241-SX-115	IS, II	2		0	4

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CHECKER M.C. PRATHE

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Table A-4. Single-Shell Tank Information. (Sheet 4 of 5)

Tank	Stabilization status	Riser quantity[b]	Sampled[c]	Waste status summary[d]	
				Saltcake (in.)	Total (in.)
241-T-101	1989[a]	3		0	37
241-T-102	1992[a]	3		0	7
241-T-103	IS, II	3		0	8
241-T-104	1990[a]	4		0	160
241-T-105	IS	7		0	36
241-T-106	IS, II	8		0	7
241-T-107	1989[a]	7		0	62
241-T-108	IS, II	8		0	16
241-T-109	IS	7		0	21
241-T-110	1994[a]	4		0	137
241-T-111	1994[a]	4		0	166
241-T-112	IS, II	7		0	22
241-T-201	IS, II	5		0	112
241-T-202	IS, II	5		0	84
241-T-203	IS, II	4		0	140
241-T-204	IS, II	3		0	152
241-TX-101	IS, II	1		0	31
241-TX-102	IS, II	1		41	41
241-TX-103	IS, II	0		0	57
241-TX-104	IS, II	1		23	23
241-TX-105	IS, II	2		221	221
241-TX-106	IS, II	1		165	165
241-TX-107	IS, II	1		13	13
241-TX-108	IS, II	1		49	49
241-TX-109	IS, II	5		140	140
241-TX-110	IS, II	5		168	168
241-TX-111	IS, II	6		135	135
241-TX-112	IS, II	4		236	236
241-TX-113	IS, II	4		221	221
241-TX-114	IS, II	5		195	195
241-TX-115	IS, II	3		233	233

PST89-1095-A-4

500

750

CHECKED M.C. PRATHER 4/11/92

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Table A-4. Single-Shell Tank Information. (Sheet 5 of 5)

Tank	Stabilization status	Riser quantity[b]	Sampled[c]	Waste status summary[d]	
				Saltcake (in.)	Total (in.)
241-TX-116	IS, II	3		229	229
241-TX-117	IS, II	4		228	228
241-TX-118	IS, II	8		126	126
241-TY-101	IS, II	5	Yes	0	43
241-TY-102	IS, II	4	Yes	23	23
241-TY-103	IS, II	4	Yes	0	59
241-TY-104	IS, II	6	Yes	0	16
241-TY-105	IS, II	7	Yes	0	84
241-TY-106	IS, II	7	Yes	0	6
241-U-101	IS, II	2		0	8
241-U-102	1993[a]	4		114	129
241-U-103	1993[a]	3		154	165
241-U-104	IS, II	4		0	44
241-U-105	1993[a]	3		127	139
241-U-106	1993[a]	4		67	77
241-U-107	1994[a]	4		131	136
241-U-108	1993[a]	5		151	161
241-U-109	1993[a]	5		144	161
241-U-110	IS	6		0	68
241-U-111	1993[a]	6		110	120
241-U-112	IS, II	5		0	16
241-U-201	IS, II	4		0	16
241-U-202	IS, II	5		0	16
241-U-203	IS, II	4		0	8
241-U-204	IS, II	4		0	8

II = Tank is interim isolated.
IS = Tank is interim stabilized.
[a]Year tank is scheduled to be interim stabilized.
[b]Number of risers expected to allow access for sampling.
[c]Sampled during previous effort (Weiss and Adams 1986).
[d]Waste volumes from Thurman (1989).
[e]Interim stabilization approval is in progress.

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CHECKER M.C. PRATHER 9/11/92

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 1 of 2

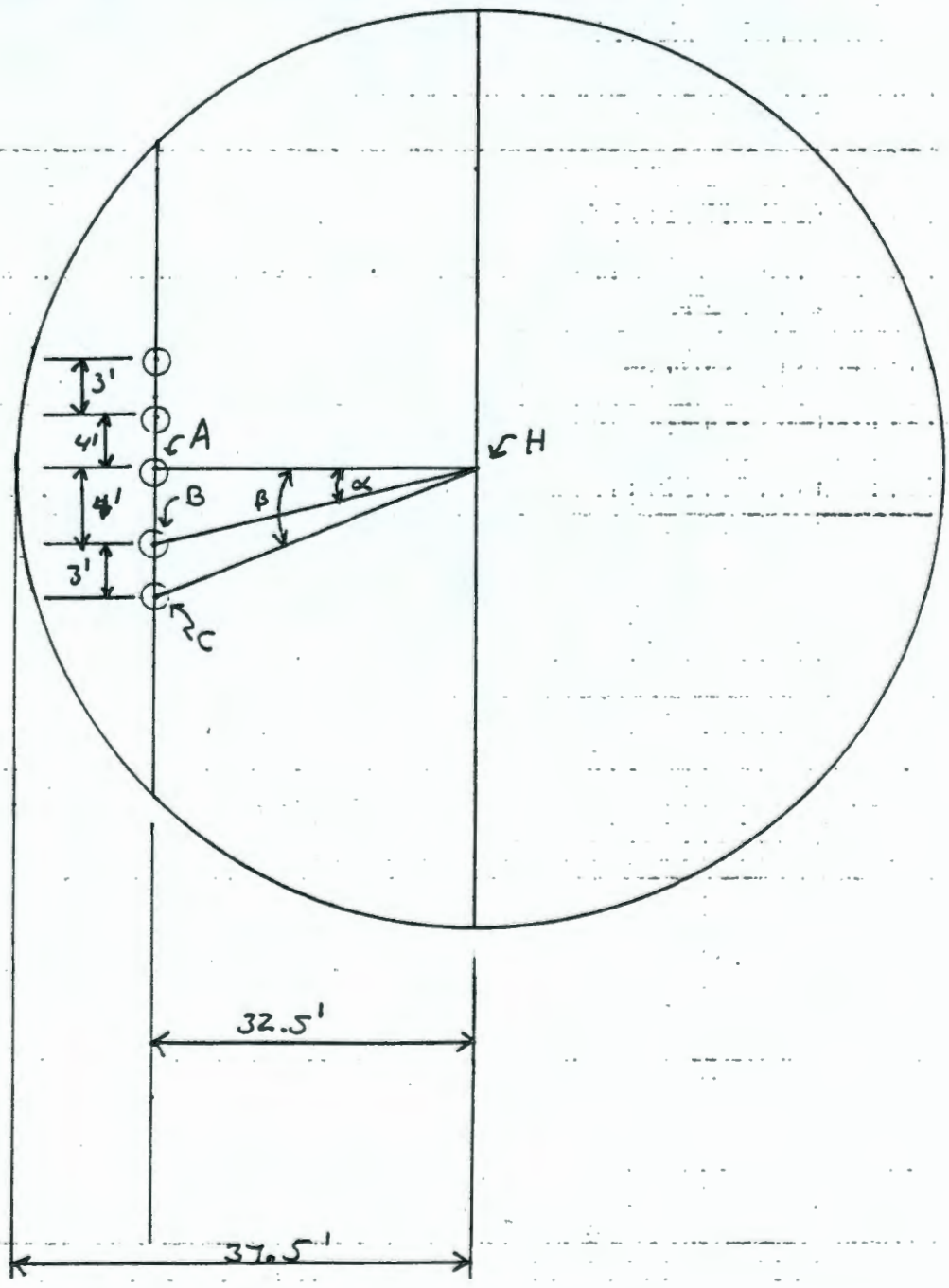
(4) Building _____ (5) Rev. 0 (6) Job No. _____

(7) Subject Determination of vertical distance from exhaust riser to waste surface

(8) Originator K.A. Giese K.A. Giese Date 3/14/92

(9) Checker M.C. PRATHER M.C. Prather Date 9/11/92

(10) Determine the riser location which is closest to the surface of the waste, and closest to the drill riser.



DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 2 of 2
(4) Building _____ (5) Rev. 0 (6) Job No. _____
(7) Subject Determination of vertical Distance from exhaust riser to waste surface
(8) Originator K. A. Grise Date 3/14/92
(9) Checker M.C. PRATHER Date 9/11/92

(10) - equation of parabola through the center of the dome is about: $y = 14.62 - .0104x^2$. - (from calculations in appendix C-7).

* At point H

- For $x=0$, $y = 14.62$, which is the center height in the tank dome above shell rim.

- ~~for~~

* At point A

- For $x = 32.5$, $y = 3.64$, which is the height (3.64 ft) at point A above the rim of the tank.

* At point B

length of segment $\overline{BH} = (\overline{AH}^2 + \overline{BA}^2)^{1/2}$

$= (32.5^2 + 4^2)^{1/2}$

$= 32.75$

For $x = 32.75$, $y = 3.47$ feet above tank rim

* At point C

length of segment $\overline{CH} = (32.5^2 + 7^2)^{1/2}$

$= 33.25$ feet

for $x = 33.25$, $y = 3.13$ feet above shell rim.

Summary

Assume the worst case conditions for drilling, and exhausting dust is to:

- Drill at point B
- Exhaust at point C

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 1 of 10

(4) Building _____ (5) Rev. 0 (6) Job No. _____

(7) Subject Input parameter ranges for the TRAC-TE Transient Model Aerosol simulation

(8) Originator K. A. Giese Date _____

(9) Checker _____ Date _____

EXPLANATION OF PARAMETERS TO USE IN THE AEROSOL SIMULATION

There are six parameters which will be varied during the simulation runs. These are:

1) The total gas flowrate into the exhauster (cubic feet per minute (CFM) at 14.7 psia and 70°F).
2) The solid aerosol (dust) generation rate due to drilling (grams per minute).
3) The time to drill one 19-inch segment (minutes).
4) The number of 19-inch segments drilled (#).
5) The tank air-space volume (cubic feet).
6) The amount of solid aerosol (wt%) that bypasses the normal tank particle deposition process and is shot directly up the exhaust riser.

Each of these input parameters is explained below.

1) Total gas flowrate

For a tightly sealed tank, the gas flow into the exhauster will be the design nitrogen gas flow of 380 CFM at 14.7 psia and 70°F (see appendix C-1).

To account for in-leakage, the gas flow into the exhauster will increase above the 380 CFM rate. The total amount of in-leakage estimated will be 2100 CFM.

The relationship between in-leakage and total gas flow up the exhaust riser is:

Total gas flowrate (CFM) = 380 + (in-leakage)

2) Dust generation rate

The mass generation rate is a function of the penetration speed (inches/minute) of the drill bit (appendix C-5). The relationship is:

Mass generation (grams/minute) = (Penetration speed)*(155.3 grams/inch)

3) Time to drill one 19-inch segment

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 2 of 10

(4) Building _____ (5) Rev. 0 (6) Job No. _____

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(8) Originator K. A. Giese Date _____

(9) Checker _____ Date _____

The drilling time is a function of the penetration speed (inches/minute) of the drill bit (appendix C-5). The relationship is:

Drill time (minutes) = (19)/(Penetration speed)

4) Number of 19-inch segments to drill

The number of segments to drill is a function of the waste height (WH, inches) of the tank. The relationship is:

# of segments = WH/19

5) Tank air-space volume

The tank air-space volume is a function of the waste height, (WH, inches) and the size of tank. The average dome volume for all 75-foot diameter single shell tanks is 31,374 cubic feet (CF) (appendix C-7).

The cross sectional area of a 75-foot diameter cylinder is (3.14159)*(.25)*(75)^2, which is 4418 square feet.

The shell height for the 500K, 750K and 1,000K tanks is 15.13 feet, 22.7 feet and 30.3 feet respectively. The tank air-space is then the dome space plus the void space in the shell above the waste surface. The relationship is:

Air-space volume of 500K gallon tank (CF) = 31,374 + (15.13 - WH/12)*4418

Air-space volume of 750K gallon tank (CF) = 31,374 + (22.7 - WH/12)*4418

Air-space volume of 1000K gallon tank (CF) = 31,374 + (30.3 - WH/12)*4418

6) The amount of solid aerosol (wt%) that bypasses the normal tank particle deposition process and is shot directly up the exhaust riser.

An equation was used to estimate the amount of aerosol that could be directly shot into the exhaust riser (appendix F, page 8). This relationship is:

Bypass fraction = (0.06062)/X

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-CS-225 (3) Page 3 of 10

(4) Building _____ (5) Rev. 0 (6) Job No. _____

(7) Subject Input parameter ranges for the TRAC-TE Transient Model Aerosol simulation

(8) Originator K. A. Giese Date _____

(9) Checker _____ Date _____

where X (meters) = Distance from source term (bore hole surface) to exhaust riser port

for X in feet, the Bypass fraction = 0.018482/X
The equation in this form is valid only for those cases where there is no in-leakage.

Converting the variable X to make it a function of Waste Height (inches):

X= [((Shell Height)-(Waste Height, inches)/(12in/ft)) + (Minimum distance from tank dome to top of shell)]

Where:

- o Shell Height will be 15.13 feet, 22.7 feet, and 30.3 feet for the 500K gallon, 750K gallon, and 1,000K gallon tanks respectively.
- o The minimum distance from tank dome to top of shell is that distance calculated in Appendix C-8.

For the three tank sizes, X (feet) is:

X = ((15.13 - WH/12) + 3.13) for 500K gallon tanks
X = ((22.7 - WH/12) + 3.13) for 750K gallon tanks
X= ((30.3 - WH/12) + 3.13) for 1000K gallon tanks

The bypass fraction will vary in a linear manner with in-leakage flow. The design flow of nitrogen is 380 CFM (appendix C-1).

Therefore Bypass fraction with in-leakage is:

(Bypass fraction with no in-leakage)*(380/(380+inleakage))

The final form of the working equation for the simulation model is then:

For 500K gallon tanks:

Bypass fraction = (0.018482/((15.13 - WH/12) + 3.13))*(380/(380+inleakage))

For 750K gallon tanks:

Bypass fraction = (0.018482/((22.7 - WH/12) + 3.13))*(380/(380+inleakage))

For 1000K gallon tanks:

Bypass fraction = (0.018482/((30.3 - WH/12) + 3.13))*(380/(380+inleakage))

The bypass fraction is not a true parameter in the classical aerosol deposition, but is rather a condition that needs to be addressed. The bypass fraction will undoubtedly skew the results of the particle deposition.

The bypass fraction will initially be set to zero for the first set of runs to examine the effect that the air-space deposition model will have on the total particle stream.

It will should be used only in subsequent runs where all other parameters are constant. In this way it will provide a means of to see if there is a need for a shielding device to prevent "line of sight" contact between the exhaust riser inlet and the drilling bore hole.

DETERMINATION OF THE INDEPENDENT AND DEPENDENT VARIABLES

All six of the input parameters to the model are defined in terms of one of three independent variables. These are:

In-leakage flow (CFM)
Penetration speed of the drill bit (inches/minute)
Waste height (inches) for 500K, 750K, and 1000K tanks

Therefore, by defining the range of the three independent variables for each tank size, the range of operation for the six input parameters will be set. The ranges for the independent variables, and a summary of the funtional relationship between the independent variables and the input parameters are summarized in the following two tables.

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 5 of 10

(4) Building _____ (5) Rev. 0 (6) Job No. _____

(7) Subject Input parameter ranges for the TRAC-TE Transient Model Aerosol simulation

(8) Originator K. A. Giese Date _____

(9) Checker _____ Date _____

RANGE OF INDEPENDENT VARIABLES	
Independent Variable	Minimum , Maximum, Range
In-leakage flow, CFM	0, 2100, 0 - 2100
Drill bit penetration speed, inches/minute	1, 4, 1 - 4
Waste height for 500K gallon tanks (inches)	10, 165, 10 - 165
Waste height for 750K gallon tanks (inches)	13, 250, 13 - 250
Waste height for 500K gallon tanks (inches)	4, 347, 4 - 347

DESIGN CALCULATION

(1) Drawing _____ (2) Doc. No. SD-WM-ES-225 (3) Page 6 of 10

(4) Building _____ (5) Rev. 0 (6) Job No. _____

(7) Subject Input parameter ranges for the TRAC-TE Transient Model Aerosol simulation

(8) Originator K. A. Giese Date _____

(9) Checker _____ Date _____

FUNCTIONAL RELATIONSHIP BETWEEN THE INDEPENDENT VARIABLES AND THE VALUES FOR THE INPUT PARAMETERS TO THE MODEL

Input parameter	Functional Relationship to the independent variable(s)
Total gas flowrate up the exhaust riser (CFM)	380 + I
Mass generation rate (grams/minute)	155.3 * S
Time to drill one segment (minutes)	19 / S
Number of segments to drill for each tank size	W / 19
The tank air-space volume for 500K tanks (cubic feet)	31,374 + (15.13 - WH/12)*4418
The tank air-space volume for 750K tanks (cubic feet)	31,374 + (22.7 - WH/12)*4418
The tank air-space volume for 1000K tanks (cubic feet)	31,374 + (30.3 - WH/12)*4418
Weight fraction bypass for 500K tanks	[(0.018482/((15.13 - WH/12) + 3.13))*(380/(380+inleakage))]
Weight fraction bypass for 750K tanks	[(0.018482/((22.7 - WH/12) + 3.13))*(380/(380+inleakage))]
Weight fraction bypass for 1000K tanks	[(0.018482/((30.3 - WH/12) + 3.13))*(380/(380+inleakage))]

INPUT PARAMETERS FOR AEROSOL STUDY

In-leak'g (CFM)	Pen. Speed (in/min)	Waste hgt (in)	Tot. gas flowrate (CFM)	Mass gen rate (g/min)	Drilling period (min)	Number of segments to drill	Tank air-space vol (m^3)
500K tank							
0	1	19	380.00	155.30	19.00	1	2582.76
0	1	76	380.00	155.30	19.00	4	1988.61
0	1	114	380.00	155.30	19.00	6	1592.51
0	1	171	380.00	155.30	19.00	9	998.35
0	2	19	380.00	310.60	10.00	1	2582.76
0	2	76	380.00	310.60	10.00	4	1988.61
0	2	114	380.00	310.60	10.00	6	1592.51
0	2	171	380.00	310.60	10.00	9	998.35
0	3	19	380.00	465.90	6.00	1	2582.76
0	3	76	380.00	465.90	6.00	4	1988.61
0	3	114	380.00	465.90	6.00	6	1592.51
0	3	171	380.00	465.90	6.00	9	998.35
0	4	19	380.00	621.20	5.00	1	2582.76
0	4	76	380.00	621.20	5.00	4	1988.61
0	4	114	380.00	621.20	5.00	6	1592.51
0	4	171	380.00	621.20	5.00	9	998.35
700	1	19	1080.00	155.30	19.00	1	2582.76
700	1	76	1080.00	155.30	19.00	4	1988.61
700	1	114	1080.00	155.30	19.00	6	1592.51
700	1	171	1080.00	155.30	19.00	9	998.35
700	2	19	1080.00	310.60	10.00	1	2582.76
700	2	76	1080.00	310.60	10.00	4	1988.61
700	2	114	1080.00	310.60	10.00	6	1592.51
700	2	171	1080.00	310.60	10.00	9	998.35
700	3	19	1080.00	465.90	6.00	1	2582.76
700	3	76	1080.00	465.90	6.00	4	1988.61
700	3	114	1080.00	465.90	6.00	6	1592.51
700	3	171	1080.00	465.90	6.00	9	998.35
700	4	19	1080.00	621.20	5.00	1	2582.76
700	4	76	1080.00	621.20	5.00	4	1988.61
700	4	114	1080.00	621.20	5.00	6	1592.51
700	4	171	1080.00	621.20	5.00	9	998.35
1400	1	19	1780.00	155.30	19.00	1	2582.76
1400	1	76	1780.00	155.30	19.00	4	1988.61
1400	1	114	1780.00	155.30	19.00	6	1592.51
1400	1	171	1780.00	155.30	19.00	9	998.35
1400	2	19	1780.00	310.60	10.00	1	2582.76
1400	2	76	1780.00	310.60	10.00	4	1988.61
1400	2	114	1780.00	310.60	10.00	6	1592.51
1400	2	171	1780.00	310.60	10.00	9	998.35
1400	3	19	1780.00	465.90	6.00	1	2582.76
1400	3	76	1780.00	465.90	6.00	4	1988.61
1400	3	114	1780.00	465.90	6.00	6	1592.51

1400	3	171	1780.00	465.90	6.00	9	998.35
1400	4	19	1780.00	621.20	5.00	1	2582.76
1400	4	76	1780.00	621.20	5.00	4	1988.61
1400	4	114	1780.00	621.20	5.00	6	1592.51
1400	4	171	1780.00	621.20	5.00	9	998.35
2100	1	19	2480.00	155.30	19.00	1	2582.76
2100	1	76	2480.00	155.30	19.00	4	1988.61
2100	1	114	2480.00	155.30	19.00	6	1592.51
2100	1	171	2480.00	155.30	19.00	9	998.35
2100	2	19	2480.00	310.60	10.00	1	2582.76
2100	2	76	2480.00	310.60	10.00	4	1988.61
2100	2	114	2480.00	310.60	10.00	6	1592.51
2100	2	171	2480.00	310.60	10.00	9	998.35
2100	3	19	2480.00	465.90	6.00	1	2582.76
2100	3	76	2480.00	465.90	6.00	4	1988.61
2100	3	114	2480.00	465.90	6.00	6	1592.51
2100	3	171	2480.00	465.90	6.00	9	998.35
2100	4	19	2480.00	621.20	5.00	1	2582.76
2100	4	76	2480.00	621.20	5.00	4	1988.61
2100	4	114	2480.00	621.20	5.00	6	1592.51
2100	4	171	2480.00	621.20	5.00	9	998.35
750K tank							
0	1	19	380.00	155.30	19.00	1	3529.66
0	1	95	380.00	155.30	19.00	5	2737.45
0	1	171	380.00	155.30	19.00	9	1945.25
0	1	266	380.00	155.30	19.00	14	954.99
0	2	19	380.00	310.60	10.00	1	3529.66
0	2	95	380.00	310.60	10.00	5	2737.45
0	2	171	380.00	310.60	10.00	9	1945.25
0	2	266	380.00	310.60	10.00	14	954.99
0	3	19	380.00	465.90	6.00	1	3529.66
0	3	95	380.00	465.90	6.00	5	2737.45
0	3	171	380.00	465.90	6.00	9	1945.25
0	3	266	380.00	465.90	6.00	14	954.99
0	4	19	380.00	621.20	5.00	1	3529.66
0	4	95	380.00	621.20	5.00	5	2737.45
0	4	171	380.00	621.20	5.00	9	1945.25
0	4	266	380.00	621.20	5.00	14	954.99
700	1	19	1080.00	155.30	19.00	1	3529.66
700	1	95	1080.00	155.30	19.00	5	2737.45
700	1	171	1080.00	155.30	19.00	9	1945.25
700	1	266	1080.00	155.30	19.00	14	954.99
700	2	19	1080.00	310.60	10.00	1	3529.66
700	2	95	1080.00	310.60	10.00	5	2737.45
700	2	171	1080.00	310.60	10.00	9	1945.25
700	2	266	1080.00	310.60	10.00	14	954.99
700	3	19	1080.00	465.90	6.00	1	3529.66
700	3	95	1080.00	465.90	6.00	5	2737.45
700	3	171	1080.00	465.90	6.00	9	1945.25
700	3	266	1080.00	465.90	6.00	14	954.99

700	4	19	1080.00	621.20	5.00	1	3529.66
700	4	95	1080.00	621.20	5.00	5	2737.45
700	4	171	1080.00	621.20	5.00	9	1945.25
700	4	266	1080.00	621.20	5.00	14	954.99
1400	1	19	1780.00	155.30	19.00	1	3529.66
1400	1	95	1780.00	155.30	19.00	5	2737.45
1400	1	171	1780.00	155.30	19.00	9	1945.25
1400	1	266	1780.00	155.30	19.00	14	954.99
1400	2	19	1780.00	310.60	10.00	1	3529.66
1400	2	95	1780.00	310.60	10.00	5	2737.45
1400	2	171	1780.00	310.60	10.00	9	1945.25
1400	2	266	1780.00	310.60	10.00	14	954.99
1400	3	19	1780.00	465.90	6.00	1	3529.66
1400	3	95	1780.00	465.90	6.00	5	2737.45
1400	3	171	1780.00	465.90	6.00	9	1945.25
1400	3	266	1780.00	465.90	6.00	14	954.99
1400	4	19	1780.00	621.20	5.00	1	3529.66
1400	4	95	1780.00	621.20	5.00	5	2737.45
1400	4	171	1780.00	621.20	5.00	9	1945.25
1400	4	266	1780.00	621.20	5.00	14	954.99
2100	1	19	2480.00	155.30	19.00	1	3529.66
2100	1	95	2480.00	155.30	19.00	5	2737.45
2100	1	171	2480.00	155.30	19.00	9	1945.25
2100	1	266	2480.00	155.30	19.00	14	954.99
2100	2	19	2480.00	310.60	10.00	1	3529.66
2100	2	95	2480.00	310.60	10.00	5	2737.45
2100	2	171	2480.00	310.60	10.00	9	1945.25
2100	2	266	2480.00	310.60	10.00	14	954.99
2100	3	19	2480.00	465.90	6.00	1	3529.66
2100	3	95	2480.00	465.90	6.00	5	2737.45
2100	3	171	2480.00	465.90	6.00	9	1945.25
2100	3	266	2480.00	465.90	6.00	14	954.99
2100	4	19	2480.00	621.20	5.00	1	3529.66
2100	4	95	2480.00	621.20	5.00	5	2737.45
2100	4	171	2480.00	621.20	5.00	9	1945.25
2100	4	266	2480.00	621.20	5.00	14	954.99

1,000K tank

0	1	19	380.00	155.30	19.00	1	4480.30
0	1	133	380.00	155.30	19.00	7	3291.99
0	1	247	380.00	155.30	19.00	13	2103.69
0	1	361	380.00	155.30	19.00	19	915.38
0	2	19	380.00	310.60	10.00	1	4480.30
0	2	133	380.00	310.60	10.00	7	3291.99
0	2	247	380.00	310.60	10.00	13	2103.69
0	2	361	380.00	310.60	10.00	19	915.38
0	3	19	380.00	465.90	6.00	1	4480.30
0	3	133	380.00	465.90	6.00	7	3291.99
0	3	247	380.00	465.90	6.00	13	2103.69
0	3	361	380.00	465.90	6.00	19	915.38
0	4	19	380.00	621.20	5.00	1	4480.30

0	4	133	380.00	621.20	5.00	7	3291.99
0	4	247	380.00	621.20	5.00	13	2103.69
0	4	361	380.00	621.20	5.00	19	915.38
700	1	19	1080.00	155.30	19.00	1	4480.30
700	1	133	1080.00	155.30	19.00	7	3291.99
700	1	247	1080.00	155.30	19.00	13	2103.69
700	1	361	1080.00	155.30	19.00	19	915.38
700	2	19	1080.00	310.60	10.00	1	4480.30
700	2	133	1080.00	310.60	10.00	7	3291.99
700	2	247	1080.00	310.60	10.00	13	2103.69
700	2	361	1080.00	310.60	10.00	19	915.38
700	3	19	1080.00	465.90	6.00	1	4480.30
700	3	133	1080.00	465.90	6.00	7	3291.99
700	3	247	1080.00	465.90	6.00	13	2103.69
700	3	361	1080.00	465.90	6.00	19	915.38
700	4	19	1080.00	621.20	5.00	1	4480.30
700	4	133	1080.00	621.20	5.00	7	3291.99
700	4	247	1080.00	621.20	5.00	13	2103.69
700	4	361	1080.00	621.20	5.00	19	915.38
1400	1	19	1780.00	155.30	19.00	1	4480.30
1400	1	133	1780.00	155.30	19.00	7	3291.99
1400	1	247	1780.00	155.30	19.00	13	2103.69
1400	1	361	1780.00	155.30	19.00	19	915.38
1400	2	19	1780.00	310.60	10.00	1	4480.30
1400	2	133	1780.00	310.60	10.00	7	3291.99
1400	2	247	1780.00	310.60	10.00	13	2103.69
1400	2	361	1780.00	310.60	10.00	19	915.38
1400	3	19	1780.00	465.90	6.00	1	4480.30
1400	3	133	1780.00	465.90	6.00	7	3291.99
1400	3	247	1780.00	465.90	6.00	13	2103.69
1400	3	361	1780.00	465.90	6.00	19	915.38
1400	4	19	1780.00	621.20	5.00	1	4480.30
1400	4	133	1780.00	621.20	5.00	7	3291.99
1400	4	247	1780.00	621.20	5.00	13	2103.69
1400	4	361	1780.00	621.20	5.00	19	915.38
2100	1	19	2480.00	155.30	19.00	1	4480.30
2100	1	133	2480.00	155.30	19.00	7	3291.99
2100	1	247	2480.00	155.30	19.00	13	2103.69
2100	1	361	2480.00	155.30	19.00	19	915.38
2100	2	19	2480.00	310.60	10.00	1	4480.30
2100	2	133	2480.00	310.60	10.00	7	3291.99
2100	2	247	2480.00	310.60	10.00	13	2103.69
2100	2	361	2480.00	310.60	10.00	19	915.38
2100	3	19	2480.00	465.90	6.00	1	4480.30
2100	3	133	2480.00	465.90	6.00	7	3291.99
2100	3	247	2480.00	465.90	6.00	13	2103.69
2100	3	361	2480.00	465.90	6.00	19	915.38
2100	4	19	2480.00	621.20	5.00	1	4480.30
2100	4	133	2480.00	621.20	5.00	7	3291.99
2100	4	247	2480.00	621.20	5.00	13	2103.69
2100	4	361	2480.00	621.20	5.00	19	915.38

APP. D

RADIONUCLIDE CONCENTRATIONS FOR ROTARY MODE MODULAR EXHAUSTER DESIGN CRITERIA DEVELOPMENT

Total (1/1/90)	Average for all Rotary Mode Tanks	High Ba137m and Cs137 (Tank S-112)	High Sr90 and Y90 (Tank A-101)	Low Ba137m and Cs137 (Tank B-101)	Low Sr90 and Y90 (Tank B-101)
	Ci/gram	Ci/gram	Ci/gram	Ci/gram	Ci/gram
1. Ac225	2.53E-17	3.77E-17	1.01E-16	2.13E-17	2.13E-17
2. Ac227	4.39E-14	1.51E-13	2.52E-15	3.19E-14	3.19E-14
3. Am241	7.61E-08	1.89E-07	1.26E-07	1.06E-07	1.06E-07
4. Am242	1.00E-10	3.77E-10	1.13E-10	9.56E-40	9.56E-40
5. Am242m	1.00E-10	3.77E-10	1.13E-10	9.56E-40	9.56E-40
6. Am243	3.97E-11	1.70E-10	3.78E-11	3.19E-40	3.19E-40
7. At217	2.52E-17	3.77E-17	1.01E-16	2.13E-17	2.13E-17
8. Ba135m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9. Ba137m	8.39E-05	7.54E-04	0.00E+00	1.06E-34	1.06E-34
10. Bi210	8.86E-20	1.51E-20	3.78E-20	3.19E-19	3.19E-19
11. Bi211	4.39E-14	1.51E-13	2.52E-15	3.19E-14	3.19E-14
12. Bi213	2.61E-17	3.77E-17	1.01E-16	2.13E-17	2.13E-17
13. Bi214	3.72E-19	3.81E-20	2.52E-19	2.13E-18	2.13E-18
14. C14	3.04E-08	1.89E-07	0.00E+00	5.31E-09	5.31E-09
15. Cm242	8.01E-11	1.89E-10	1.01E-10	7.44E-40	7.44E-40
16. Cm244	1.82E-10	9.43E-10	0.00E+00	2.13E-39	2.13E-39
17. Cm245	1.11E-14	5.66E-14	0.00E+00	1.06E-43	1.06E-43
18. Cs135	4.48E-10	3.77E-09	0.00E+00	3.19E-40	3.19E-40
19. Cs137	9.02E-05	9.43E-04	0.00E+00	1.06E-34	1.06E-34
20. Fr221	2.53E-17	3.77E-17	1.01E-16	2.13E-17	2.13E-17
21. Fr223	6.47E-16	1.89E-15	3.78E-17	5.31E-16	5.31E-16
22. I129	9.64E-11	7.54E-10	0.00E+00	3.19E-40	3.19E-40
23. Nb93m	6.08E-09	5.67E-09	5.04E-08	3.19E-08	3.19E-08
24. Ni59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
25. Ni63	5.22E-07	5.28E-07	5.04E-06	3.19E-07	3.19E-07
26. Np237	1.28E-10	7.54E-10	5.04E-13	5.31E-13	5.31E-13
27. Np239	3.85E-11	1.70E-10	3.78E-11	3.19E-40	3.19E-40
28. Pa231	8.32E-14	1.89E-13	1.13E-14	1.06E-13	1.06E-13
29. Pa233	1.28E-10	7.54E-10	5.04E-13	5.31E-13	5.31E-13
30. Pa234m	1.51E-09	3.77E-12	8.82E-10	7.44E-09	7.44E-09
31. Pb209	2.53E-17	3.77E-17	1.01E-16	2.13E-17	2.13E-17
32. Pb210	8.21E-20	1.51E-20	3.78E-20	3.19E-19	3.19E-19
33. Pb211	4.39E-14	1.51E-13	2.52E-15	3.19E-14	3.19E-14
34. Pb214	3.73E-19	3.81E-20	2.52E-19	2.13E-18	2.13E-18
35. Pd107	1.65E-10	1.13E-09	0.00E+00	4.25E-40	4.25E-40
36. Po210	8.18E-20	1.51E-20	3.78E-20	3.19E-19	3.19E-19
37. Po213	2.51E-17	3.77E-17	1.01E-16	2.13E-17	2.13E-17
38. Po214	4.46E-19	5.69E-20	3.78E-19	3.19E-18	3.19E-18
39. Po215	4.39E-14	1.51E-13	2.52E-15	3.19E-14	3.19E-14
40. Po218	3.73E-19	3.81E-20	2.52E-19	2.13E-18	2.13E-18

RADIONUCLIDE CONCENTRATIONS FOR ROTARY MODE MODULAR EXHAUSTER DESIGN CRITERIA DEVELOPMENT

Total (1/1/90)	Average for all Rotary Mode Tanks	High Ba137m and Cs137 (Tank S-112)	High Sr90 and Y90 (Tank A-101)	Low Ba137m and Cs137 (Tank B-101)	Low Sr90 and Y90 (Tank B-101)
	Ci/gram	Ci/gram	Ci/gram	Ci/gram	Ci/gram
41. Pu238	2.91E-09	5.66E-11	1.01E-08	3.19E-08	3.19E-08
42. Pu239	4.80E-08	1.89E-10	2.52E-07	5.31E-07	5.31E-07
43. Pu240	1.12E-08	3.88E-11	7.56E-08	2.13E-07	2.13E-07
44. Pu241	1.31E-07	1.89E-10	7.56E-07	3.19E-06	3.19E-06
45. Ra223	4.39E-14	1.51E-13	2.52E-15	3.19E-14	3.19E-14
46. Ra225	2.54E-17	3.77E-17	1.01E-16	2.13E-17	2.13E-17
47. Ra226	3.73E-19	3.81E-20	2.52E-19	2.13E-18	2.13E-18
48. Ru106	5.72E-11	7.54E-14	5.04E-11	4.25E-09	4.25E-09
49. Sb126	1.26E-09	1.89E-10	3.78E-09	8.50E-09	8.50E-09
50. Sb126m	1.26E-09	1.89E-10	3.78E-09	8.50E-09	8.50E-09
51. Se79	1.83E-09	1.32E-08	0.00E+00	5.31E-39	5.31E-39
52. Sm151	1.55E-06	1.89E-07	5.04E-06	7.44E-06	7.44E-06
53. Sn126	1.25E-09	1.89E-10	3.78E-09	7.44E-09	7.44E-09
54. Sr90	1.02E-04	1.89E-04	3.78E-04	5.31E-35	5.31E-35
55. Tc99	6.33E-08	3.77E-07	0.00E+00	2.13E-37	2.13E-37
56. Th227	4.24E-14	1.51E-13	2.52E-15	3.19E-14	3.19E-14
57. Th229	2.54E-17	3.77E-17	1.01E-16	2.13E-17	2.13E-17
58. Th230	7.45E-17	7.35E-19	1.01E-16	6.38E-16	6.38E-16
59. Th231	6.41E-11	1.32E-13	3.78E-11	3.19E-10	3.19E-10
60. Th233	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
61. Th234	1.51E-09	3.77E-12	8.82E-10	7.44E-09	7.44E-09
62. Tl207	4.39E-14	1.51E-13	2.52E-15	3.19E-14	3.19E-14
63. U233	1.89E-14	3.77E-14	7.56E-14	7.44E-15	7.44E-15
64. U234	4.47E-13	2.07E-15	1.01E-12	5.31E-12	5.31E-12
65. U235	6.42E-11	1.32E-13	3.78E-11	3.19E-10	3.19E-10
66. U238	1.51E-09	3.77E-12	8.82E-10	7.44E-09	7.44E-09
67. Y90	1.05E-04	1.89E-04	3.78E-04	6.38E-35	6.38E-35
68. Zr93	7.68E-09	3.77E-11	8.82E-08	4.25E-08	4.25E-08
Total	3.84E-04	2.08E-03	7.68E-04	1.20E-05	1.20E-05
Assumed Density=	2.2	gram/cc			

APP. E

Westinghouse Hanford Company — **Internal Memo**

From: Waste Characterization Analysis — 23230-92-SWC-005
Phone: 6-8171 HO-34
Date: May 1, 1992
Subject: DUST TRANSPORT DURING WASTE TANK CORE DRILLING (TASK WCA-92-027)

* uses a 2-D model
* solid particle deposition on filter of 3050 grams in two ho
* Does not consider "direct shot."

To: K. A. Giese (2) R2-14

cc:	H. Babad	R2-08	J. N. Papenfuss	L5-07
	F. C. Han	L5-07	D. N. Price	R2-18
	W. L. Knecht	HO-34	S. A. Wood	HO-34
	T. B. McCall	HO-33	W. F. Zuroff	R2-14
	R. L. Miller	HO-34	SWC File/LB	
	D. M. Ogden	HO-34		

References: (1) DSI, K. A. Giese to W. L. Knecht, "Data to Perform the Aerosol Air Space Modeling Study," dated March 16, 1992.

(2) Wiles, L. E., "GOTHIC Containment Analysis Package Qualification Report," NAI 8907-09, Numerical Applications, Inc., Richland, Washington.

(3) Claybrook, S. W., "Core Drilling Dust Transport Model Task Record," Task No. WCA-92-026, April 1992.

(4) FAX, K. A. Giese to S. W. Claybrook, "Data to Use for Final 2-D Simulations," dated April 14, 1992.

Reference (1) requested that a modeling study be performed to determine the amount of particulate matter that might be carried into the exhauster system during rotary core drilling operations in Hanford waste tanks. This memo documents results of core drilling dust transport calculations that were performed with the GOTHIC computer code. The calculations were performed according to Impact Level 4 and have not been independently reviewed. An independent review will be performed and this memo will then be issued as an Impact Level 3 Supporting Document and approved by an EDT.

GOTHIC is a computer code designed to model multi-component, two-phase flows [(Reference (2)]. It includes both lumped parameter and multi-dimensional capabilities. A flexible nodalization scheme and models for numerous system components make GOTHIC well suited to a wide range of problems. The current version of GOTHIC does not include models for dust particles, but it does include a water drop field. For this project, a special version of GOTHIC was developed using the drop field to model solid dust particles. Modifications made to the code included using the correct solid particle density, turning off drop evaporation and condensation models, and applying appropriate correlations to calculate settling velocities for solid particles. Details of all code modifications are available in Reference (3).

Figure 1 shows a schematic of the GOTHIC model used for waste tank core drilling calculations. Primary input data for the model were obtained from Reference (1). Reference (4) provided laboratory measurements of the particle size distribution for the waste tank crust simulant ($NaNO_3$).

The tank is represented by volume 1 in Figure 1, which is shown as a dashed rectangle. This is a lumped parameter cell with a total volume of 37,000 ft^3 and a floor area of 4418 ft^2. Two boundary conditions, labeled 1P and 2P, represent the outside atmosphere. The boundary conditions are connected to the tank through flow paths 1 and 2, which represent the 4-inch risers that are part of the exhaust system. A volumetric fan, labeled 1Q, provides a constant exhaust flow of 356 cfm. Boundary condition 3F and flow path 3 inject dust particles into the tank.

Dust enters the tank at the rate of 777 g/min, which represents the maximum particle displacement from the annulus during core drilling. The dust density is 2.3 g/cc and the size distribution is shown in Table 1 below.

Table 1. Particle Size Distribution for Sodium Nitrate (NaNO3) Crust Simulant.

Size range (microns)	Mass fraction
0-1	0.0018
1-2	0.0090
2-3	0.0094
3-4	0.0181
4-5	0.0280
5-6	0.0297
6-7	0.0226
7-8	0.0182
8-9	0.0165
9-10	0.0132
10-20	0.1767
20-30	0.1732
30-40	0.1560
40-50	0.1675
50-60	0.0163
60-70	0.0430
70-80	0.0309
80-90	0.0212
90-100	0.0277
100-150	0.0210

Since GOTHIC calculates the transport of only one particle size at a time, a total of twenty separate runs were made with the model to simulate the dust source represented by the above distribution.

Figure 4 shows filter deposition rates for each particle size after two hours of drilling. These rates represent steady-state values for all but the smallest particles sizes (less than 5 microns). Figure 4 shows that most of the dust that reaches the filter is in the 5 micron range or smaller.

Figure 5 provides a comparison of dust generation rates and two-hour filter deposition rates. This figure shows that most of the dust entering the tank is in the 10 to 50 micron range. Those large particles settle very rapidly, however, so only a small fraction of them actually reaches the exhaust filter. The smaller particles settle more slowly and a much larger fraction is carried into the exhaust system. Figure 6 contains the same data as Figure 5, but it is displayed on a semi-log scale.

Figures 7 through 46 show dust deposition rate and accumulation as a function of time for each of the twenty particle size ranges used in the model. These figures support the comment made previously that filter deposition rates for particles larger than 5 microns reach steady-state values in two hours or less.

The results presented above are for a lumped parameter model, which assumes a uniform particle concentration throughout the tank. In reality, there will be a higher concentration of particles near the drill string. Therefore, if the drill string and the exhaust riser are in close proximity, the quantity of dust entering the filter could be higher than the amount calculated by this model. GOTHIC has the capability to subdivide the tank using a three-dimensional mesh, which would account for non-uniform particle concentrations. Development of a subdivided model is beyond the scope of these calculations.

S. W. Claybrook

S. W. Claybrook
Consultant

bab

CONCURRENCE BY:

Walter L. Knecht

Date: 5/4/92

W. L. Knecht, Manager
Waste Characterization Analysis

Attachments: Figures 1-46

Figure 1. GOTHIC Model for Waste Tank Core Drilling.

core1 - Core drill dust transport (0-25 micron)
S.W. Claybrook
00:47:53 07-APR-92
GOTHIC Version 3.4 - April 1991

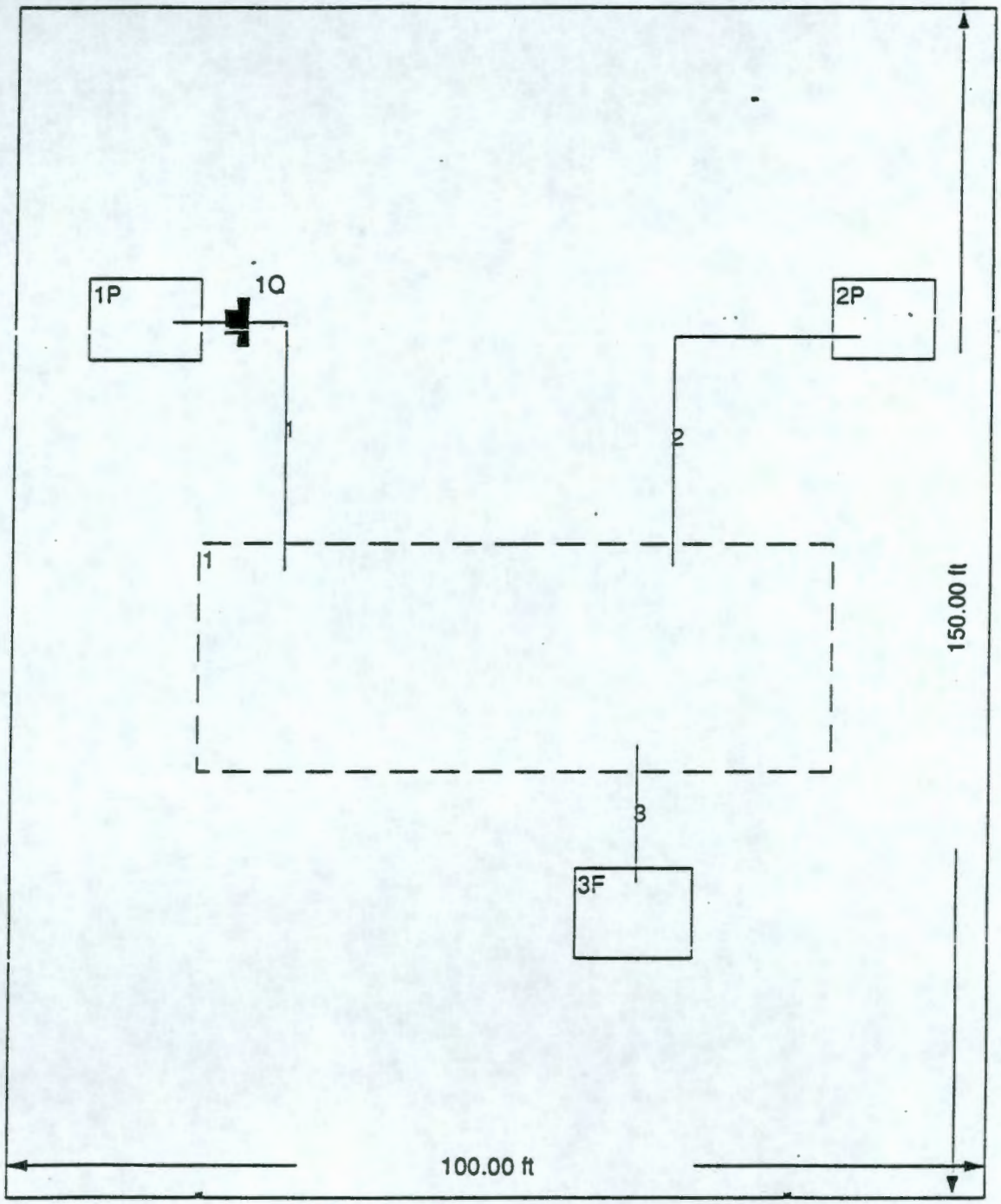


Figure 2. Total Dust Deposition Rate on Filter.

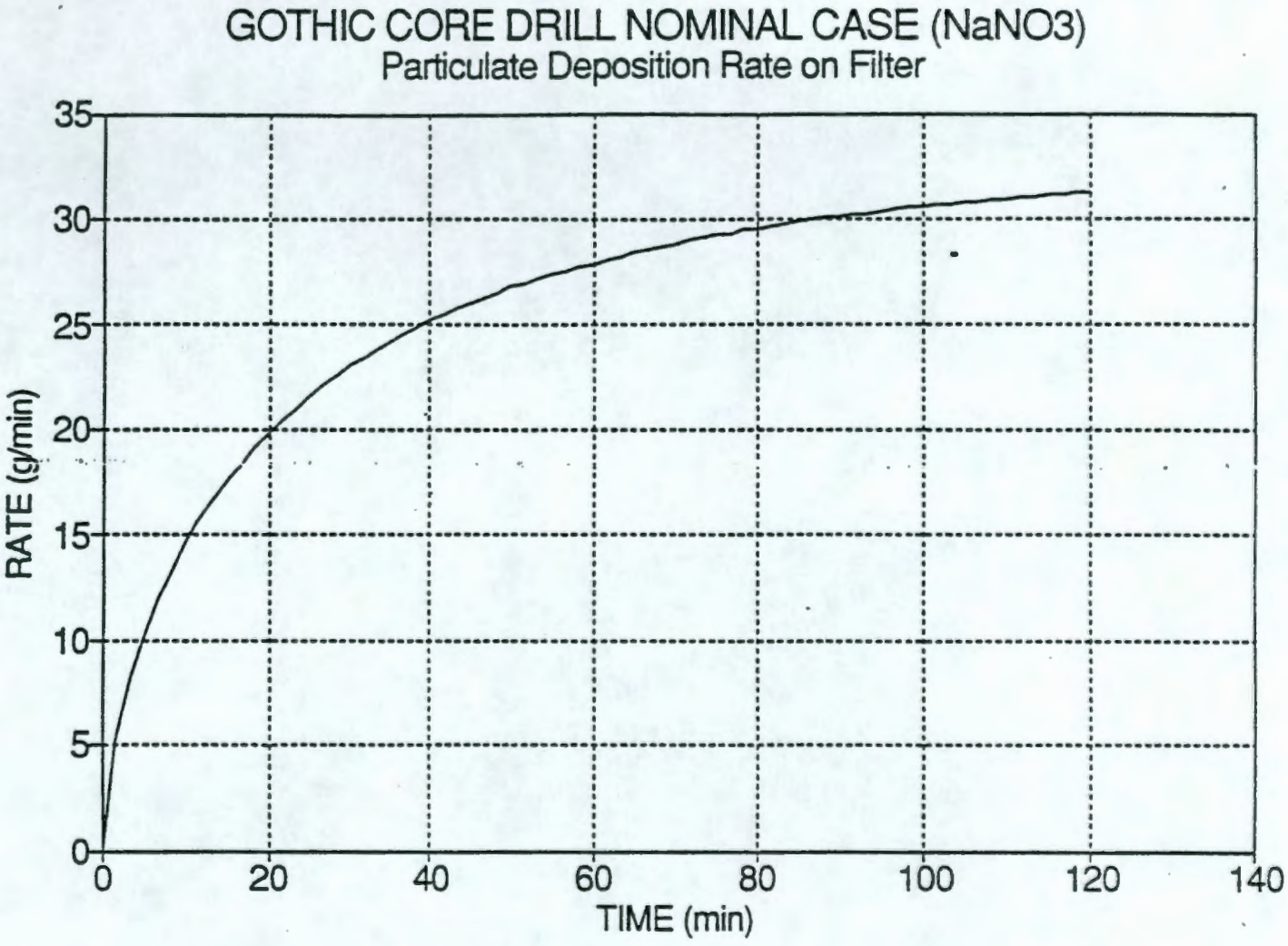


Figure 3. Total Dust Accumulation on Filter.

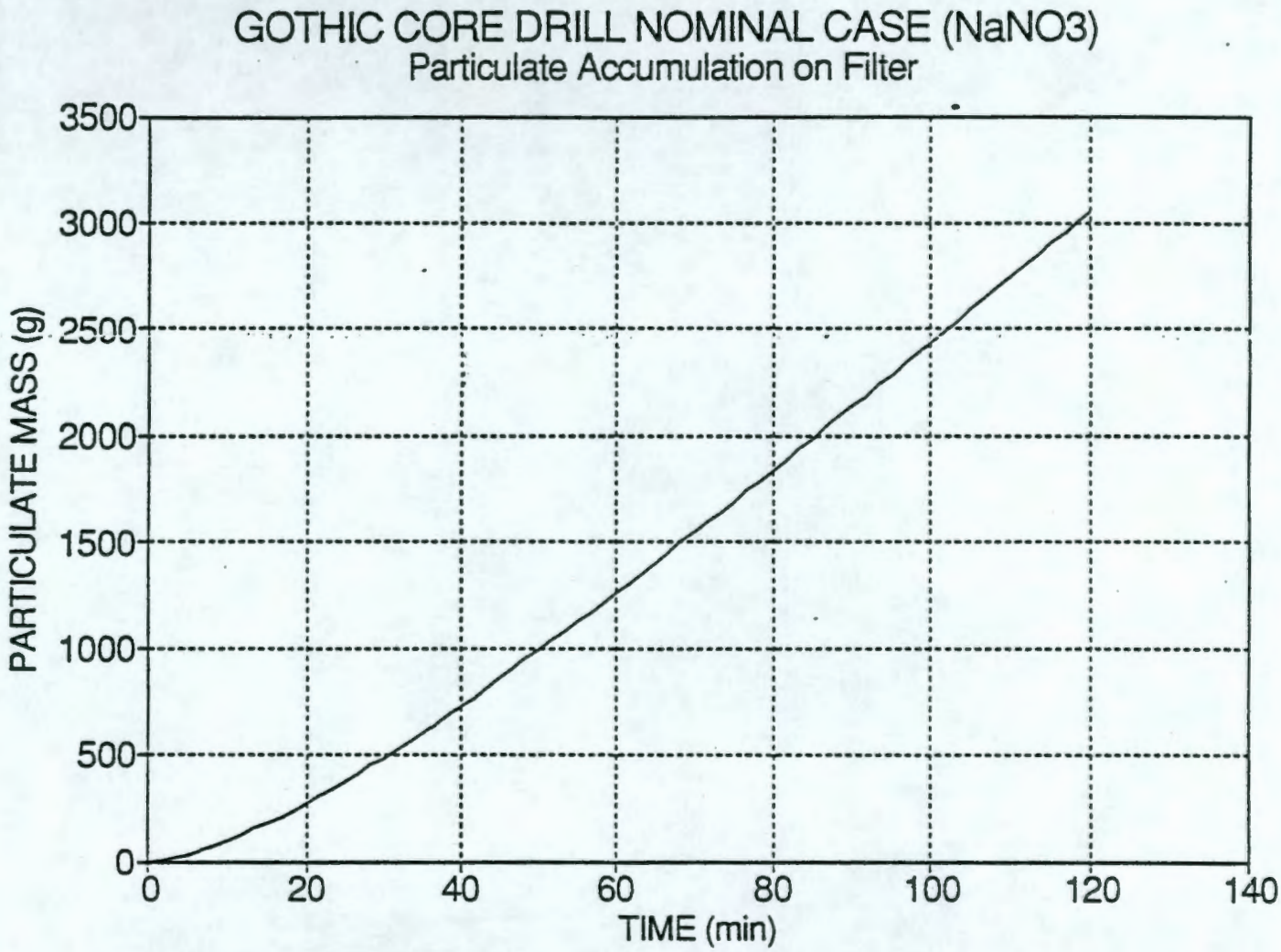


Figure 4. Filter Deposition Rates after 2 Hours.

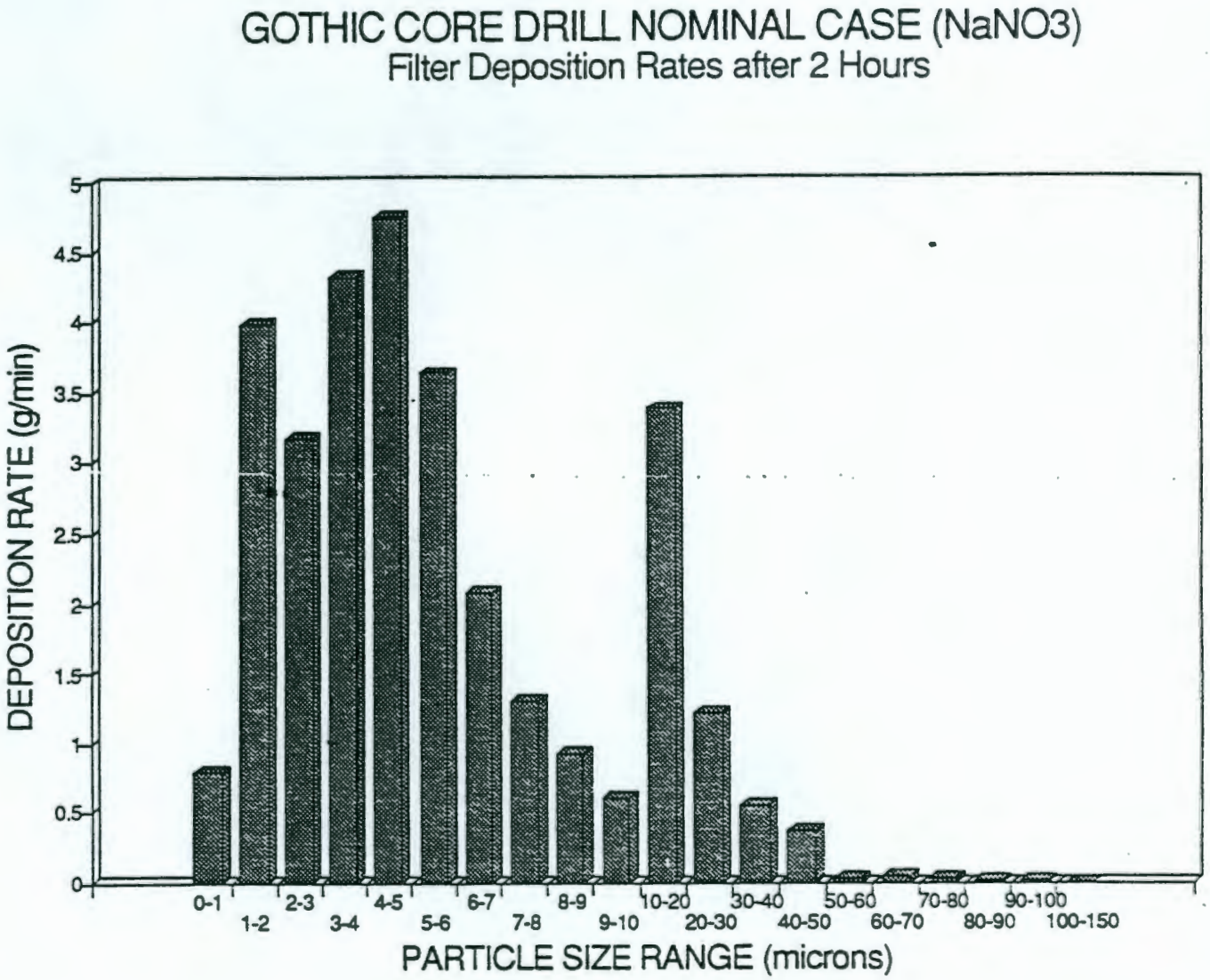


Figure 5. Comparison of Source and Filter Deposition Rates.

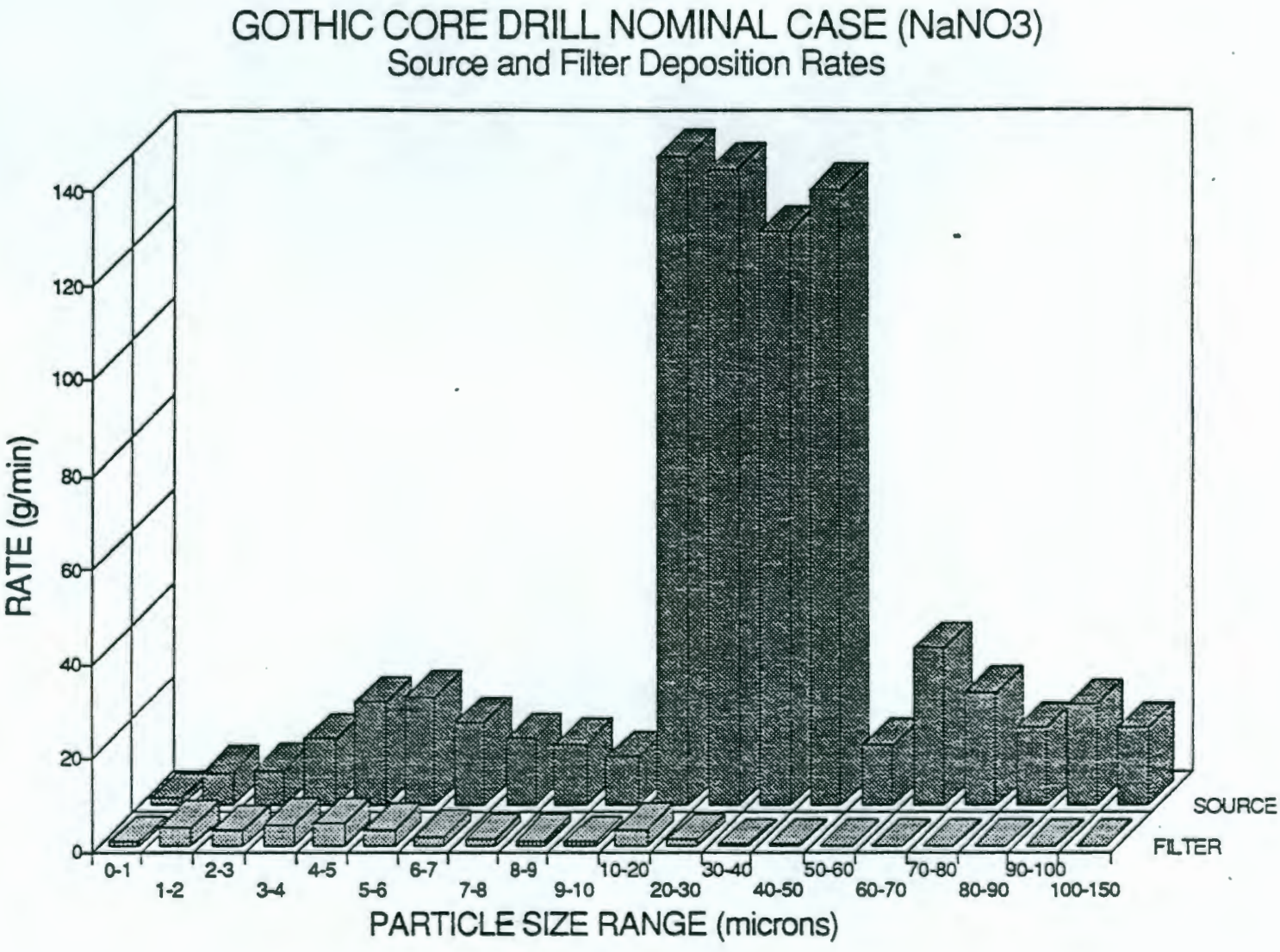
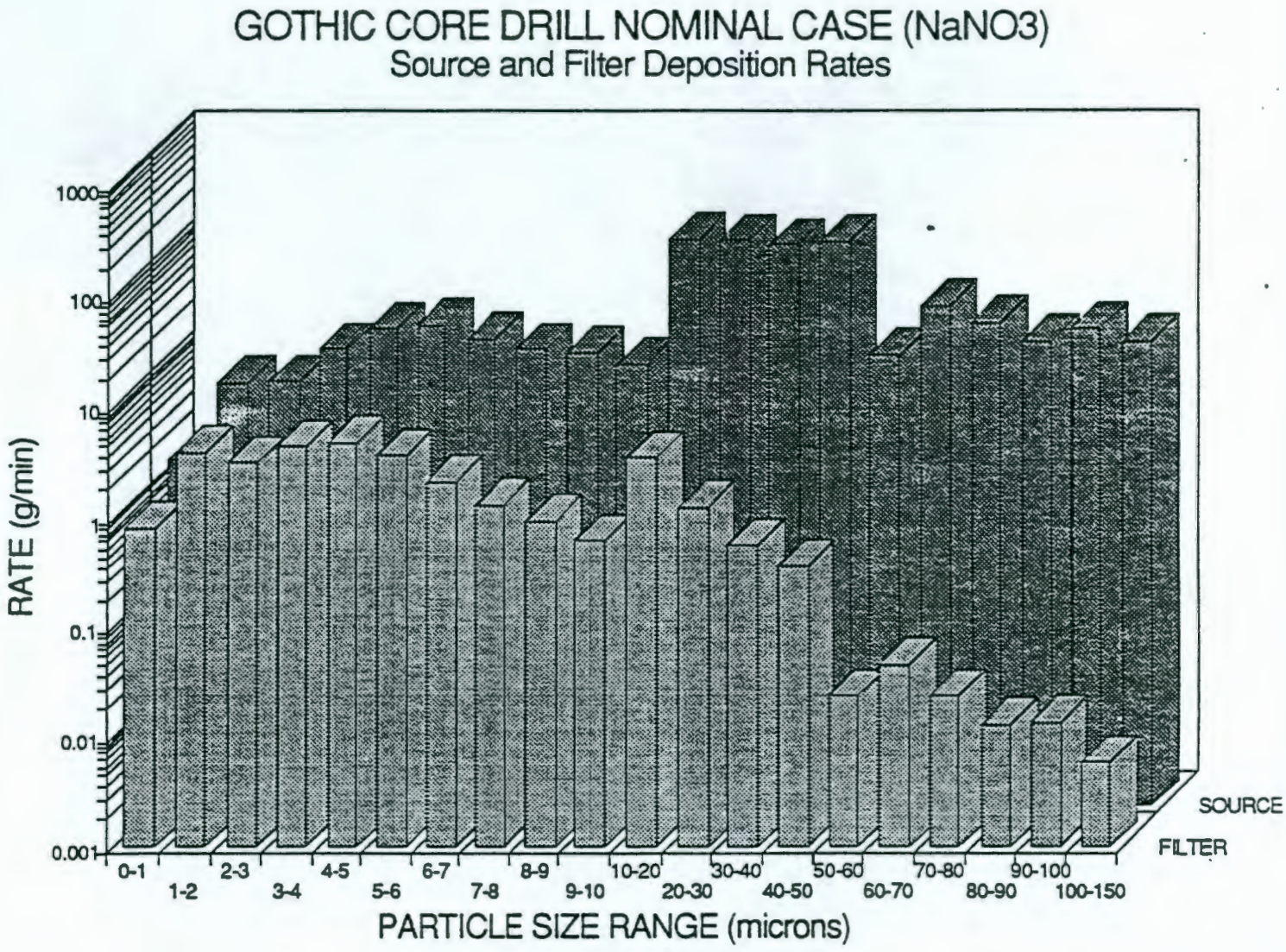


Figure 6. Comparison of Source and Filter Deposition Rates (semi-log scale).



APP. F

MODELING STUDY OF AEROSOL AIR SPACE

LETTER REPORT

September 30, 1992

Prepared For:

Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352

Prepared By:

Science Applications International Corporation
1845 Terminal Drive
Richland, WA 99352

WHC Purchase Order MLW-SVV-073750
Task S-92-25

SUMMARY

During the operation of rotary core drills in waste tanks, it is anticipated that both liquid and solid aerosols can be produced. The air-cooled rotary drill produces a dust aerosol when grinding through dry solid waste and a liquid aerosol when the drill and coolant gas enter liquid pockets. Tank exhauster filtration systems will be expected to trap these aerosols. To contribute to the design of effective filtration systems, this study was undertaken by Science Applications International Corporation (SAIC) to answer three questions. First, what is the nature of the liquid aerosol produced (rate of formation and droplet size distribution)? Second, how much of this liquid aerosol will challenge the exhaust system? Third, how much of the solid aerosol will challenge the exhaust system? A "worst case" scenario complicating the answers to the last two questions is the proximity of the exhaust riser to the drill string. If the exhaust riser entrance is above and close to the aerosol source plume, can a significant amount of the source aerosols be immediately exhausted up the riser without further mixing in the bulk gas? Also, can evaporation of water from the liquid droplets affect their fate in the tank?

A summary of the answers for a cylindrical waste tank, with a diameter of 75 feet, and a bore nitrogen gas flow rate of 50 cfm at 90 psig and 35°F, follows.

The liquid aerosol formed during core drilling was estimated using relationships obtained from two phase flow studies in liquid pools. This aerosol is formed at a rate of 1.2 kg/s (867 cc/s). The spherical droplets are saturated $NaNO_3$ (47 weight%), have a density of 1.383 g/cc at 20°C, and range in diameter from 1 to 260 micrometers. Details of the size distribution as formed and dried are found in the section SOURCE TERM FOR LIQUID AEROSOLS. The results here are considered to be an upper bound on the source term; that is, a conservative estimate.

The liquid aerosol as formed was assumed to become well mixed in the tank airspace. There the individual particles either settled to the tank floor (gravitational settling) or were swept out the exhaust riser. The overall decontamination (depletion) factor (DF) for these aerosols depended strongly on the tank exhaust flow rate. These DFs were 265, 125, and 78 at 350, 850 and 1550 cfm outflow, respectively. This case was further bounded by assuming the droplets evaporated from 47 weight% $NaNO_3$ to dryness (100% $NaNO_3$, density 2.3 g/cc). For the dried aerosols, the corresponding overall DFs were 203, 99, and 63. Individual particle diameter DFs and details of the exhausting particle size distributions are found in the section TRANSPORT AND DEPOSITION OF IN-TANK AEROSOLS.

Solid dust aerosol particles (density 2.3 g/cc) experiencing the same settling as the liquid droplets had corresponding DFs of 24, 13, and 9. Raising the particle density to 2.4 g/cc had only a small effect on the DFs.

The "worst case" scenario for settling bypass was calculated by assuming that the source term jet could be diluted by turbulent mixing as it approached the tank ceiling. No further dilution was assumed. A "worst case" of 6.35% of the original source aerosol was calculated to bypass the well-mixed settling process. A significant reduction in the overall DFs was caused by this bypass step. The DFs for the liquid, dried liquid, and solid aerosol are 15, 14 and 13; 15, 14, and 13; and 10, 7, and 6, respectively, at the three flow rates. These DFs and the individual particle DFs are tabulated in the section EFFECTS OF EXHAUST RISER PLACEMENT.

INTRODUCTION

SAIC has produced this report in response to the letter of instruction (LOI) attached to this report as Appendix 5. The LOI has requested three separate letter reports. In order to eliminate duplication of material, SAIC has combined all three reports into this single report. The LOI contains all the source information needed for the study.

This report has three major sections corresponding to the topics of the three requested letter reports of the LOI. These sections are entitled SOURCE TERM FOR LIQUID AEROSOLS, TRANSPORT AND DEPOSITION OF IN-TANK AEROSOLS, and EFFECTS OF EXHAUST RISER PLACEMENT. These sections are supported by a bibliography and Appendices.

SOURCE TERM FOR LIQUID AEROSOLS

Without any apparent supporting experimental data for a gas-cooled core drill encountering liquid pockets, we based our calculations on a studied system that most closely represented the drilling situation. This system was a two-phase gas/liquid pool. Entrainment of aerosol droplets from this system has been summarized and a complete system of entrainment correlations provided in a document by Kataoka and Ishii (1983). Although the drill gas fluxes go beyond reported data by one to two orders of magnitude, this section provides the bases for our source term estimate. First, the results of the estimate are given below. Then a brief summary of the technical basis is given for this estimate which should be an upper bound; that is, it cannot be exceeded and is therefore conservative.

The flow rate of gases and entrained liquid droplets from the drill-waste solid wall annulus (1/8 in. gap with 1.125 in. inner diameter) includes the specified source nitrogen gas of 50 cfm delivered at 35°F and 90 psig, but also the calculated 1.2 kg/s saturated $NaNO_3$ solution at 20°C, containing 47% by weight of dissolved salt and density of 1.383 g/cc (Handbook of Chemistry and Physics, 59th Edition, 1978-79). The entrained particles have the size distribution contained in Table 1.

The magnitude of the droplet source term should be an upper bound for several reasons:

1. In a water pool the amount of water carried upward by the rising gas seems to be an automatic natural maximum without forced metering of joining phases.
2. The high gas flux specified led to extrapolation with the correlations beyond known data, perhaps beyond physical possibility, resulting in entrainment fluxes beyond known values.
3. The entrainment correlations used were those for the pool surface before any droplets could return by gravitational settling.
4. Calculations of a water jet through the flow annulus shaped as a sharp edged orifice forced by 90 psig could not give as large a liquid flow as mentioned above.
5. The gas flow rate specified is the maximum possible. A thorough analysis of possible two-phase flows for the given pressure drop of 90 psig would attenuate the gas flow specified and thus reduce the liquid entrainment rate.

The actual calculations are not repeated in this report; we used equations 1, 3, 40, and 119 from the Kataoka document. Equation 40 gave the particle size distribution function. The resulting mass fraction distribution function is $f(D)=357.793D^{1/2}$, where D is the spherical droplet diameter in centimeters. The integral of f(D) from D=0 to D=260 micrometers is 1.0, so the maximum droplet diameter is 260.

Table 1. Droplet Size Distribution for Initial $NaNO_3$ Solution Aerosol

Diameter (cm)			
From	To	Average	Mass % of Range
0.000000E-00	1.300000E-03	6.500000E-04	1.184737
1.300000E-03	2.600000E-03	1.950000E-03	2.052025
2.600000E-03	3.900000E-03	3.250000E-03	2.649152
3.900000E-03	5.200000E-03	4.550000E-03	3.134520
5.200000E-03	6.500000E-03	5.850000E-03	3.554211
6.500000E-03	7.800000E-03	7.150000E-03	3.929328
7.800000E-03	9.100000E-03	8.450001E-03	4.271630
9.100000E-03	1.040000E-02	9.750000E-03	4.588467
1.040000E-02	1.170000E-02	1.105000E-02	4.884796
1.170000E-02	1.300000E-02	1.235000E-02	5.164149
1.300000E-02	1.430000E-02	1.365000E-02	5.429146
1.430000E-02	1.560000E-02	1.495000E-02	5.681798
1.560000E-02	1.690000E-02	1.625000E-02	5.923685
1.690000E-02	1.820000E-02	1.755000E-02	6.156074
1.820000E-02	1.950000E-02	1.885000E-02	6.380003
1.950000E-02	2.080000E-02	2.015000E-02	6.596336
2.080000E-02	2.210000E-02	2.145000E-02	6.805796
2.210000E-02	2.340000E-02	2.275000E-02	7.008998
2.340000E-02	2.470000E-02	2.405000E-02	7.206473
2.470000E-02	2.600000E-02	2.535000E-02	7.398679

TRANSPORT AND DEPOSITION OF IN-TANK AEROSOLS

This section discusses the well-mixed settling process and the effect of this process on the aerosol particles entering the tank during drilling. Those particles that do not settle on the floor of the tank enter the exhaust riser. A "well-mixed" tank assumes that the components of the tank airspace have the same concentration throughout the volume. This assumption allows for a simple analysis of the aerosol processes within the tank. The results are neither conservative nor non-conservative and represent the best we can do with the present study resources. A poorly mixed volume requires much more detailed flow information and much greater analytical effort. Such an expenditure of effort is not justified here, since the positions and velocities of all leakage inflows are not known. We have also ignored droplet/particle agglomeration, all but gravity settling as a depletion mechanism, and the dynamic evaporation of droplets. We have looked at evaporation of droplets only at the end points of the evaporation process, i.e., the original "wet" droplets and completely dried droplets. The depletion of dried droplets by gravity settling alone represents a most conservative approach.

The solution of the differential equation for airborne mass concentration of droplet size "i" in the tank can be shown to give the following steady-state solution:

$$DF_i = m(in)_i / m(out)_i = 1 + Vs_i Af / F \qquad (1)$$

DF_i is the settling decontamination factor, $m(in)_i$ and $m(out)_i$ are the mass flow rates into and out of the tank, and Vs_i is the gravitational settling velocity for particle size "i". Af is the floor area of the tank and F is the gas volumetric flow rate out of the tank. By weighting each of these individual particle DFs according to their mass fraction in the inlet aerosol, we can easily arrive at the exiting mass fraction of each particle size and the overall decontamination factor DFov. Details of settling velocity computations can be found in NUREG/CR-5658 (Owczarski 1991).

The results of the calculations for this report are tallied in the appendices. Four different aerosol situations were studied, each for three different tank gas outflow rates (F): 350, 850, and 1550 cfm. The four aerosol situations examined are: Settling of Original Droplets in Waste Tanks (Appendix 1A), Settling of "Dried" Droplets in Waste Tanks (Appendix 1B), Settling of $NaNO_3$ Particles in Waste Tanks - Low Density Case (Appendix 2A), and Settling of $NaNO_3$ Particles in Waste Tanks - High Density Case (Appendix 2B). Individual particle size DFs will not be discussed in these 12 cases. The general observation is that as particle diameter increases, DF increases, since the settling velocity is a strong function of diameter (proportional to diameter^2 for diameters less than approximately 100 micrometers).

The usual need for DFs and the mass distribution functions in the appendices is as follows:

$$m(out) = \text{overall mass rate up riser} = \text{overall mass input rate}/DFov \qquad (2)$$

$$m(out)_i = m(out) \cdot FRnew_i \quad (3)$$

$FRnew_i$ is the mass fraction of particle size "i" in the exiting aerosol at the overall mass flow rate of aerosol particles out the riser m(out).

The overall DFs of the original and dried aerosol droplets are contrasted to determine the effects of drying. The dried droplets are assumed to be dried spheres at density 2.3 g/cc formed from the original droplets at 47 weight% solids and density 1.383 g/cc. Each dried droplet diameter is smaller than the original by the factor $(0.47 \times 1.383/2.3)^{1/3}=0.656$. Because of the reduction in weight by evaporation of the water, each dried droplet will settle slower than its wet predecessor. The DFs wet are 265, 125, and 78, and the DFs dry are 203, 99, and 63, respectively, for the three values of F. The downward trend in DF as F increases is expected from equation (1). The reduction in settling velocities is responsible for the lower dry DFs.

There are two sets of settling DFs for the dry (dust) aerosol. The two sets reflect the range in measured particle densities of dust produced in drilling experiments. Appendices 2A and 2B are the results for two densities (2.3 and 2.4 g/cc) for the three Fs. The differences in density had little effect on the DFs. The three Fs showed the same trend as above. However, the dust aerosol DFs were significantly smaller than the dried droplets. The reason for this behavior is that the dust aerosol is made up of much smaller particles. The mass median diameter (mmd) of the dust is just under 25 micrometers, whereas the dried liquid aerosol mmd is approximately 100 micrometers.

EFFECT OF EXHAUST RISER PLACEMENT

This last section of this report examines the impact on decontamination factors when a certain fraction of the drilling aerosols bypasses the settling process. Since the drilling aerosol enters the tank with considerable upward momentum, this momentum could carry the source particles into the vicinity of the exhaust riser to be sucked up the riser without the benefit of being well-mixed and allowed to settle. This bypass might be considered as the "worst case" scenario.

A simple mixing model was used to describe the source plume on its rise from the drill annulus at the waste surface to the ceiling of the tank. No additional mixing was credited as this partially mixed plume spread across the ceiling, nor was any credit taken for any aerosol loss from the plume. The mixing of a turbulent circular jet is described by Schlichting (1968). The average aerosol concentration of the jet as it spreads from the source to the ceiling defines the degree of mixing of a plume that is diluted as it rises. We have taken the velocity components of the jet and obtained the average aerosol concentration by integrating the Schlichting equations. The resulting equation is obtained from the flow conditions specified:

$$C_{av} = 0.06062/X \qquad (4)$$

where C_{av} is the normalized initial concentration (equal to 1 at the source) and X is the distance above the jet source in meters. Equation (4) has no meaning for small (< 0.1 meter) X. The specified ceiling minimum was 0.954 meters. For this X, C_{av} is 0.0635. This number is assumed to be the bypass fraction of the aerosol plume that immediately enters the exhaust riser. This assumption is based on equal gas flow rates for the drill source and the nearby exhaust riser. For leakage inflows in addition to the drill gas inflow, we assume that additional exhaust risers are available to handle the extra flow and are placed so they do not directly exhaust the source plume. The bypass fraction can be increased to accommodate more direct exhausting of the source plume. An increase will certainly further lower all DFs.

Using 0.0635 as the bypass fraction, we have recomputed the DFs for all 12 cases in the previous section. These recomputed cases with bypass are found in Appendices 3A, 3B, 4A, and 4B in the same order as in 1A, 1B, 2A, and 2B. The blending of the 6.35% of the aerosol where all the DF_is are 1 with 93.65% with the settled DF_is of the previous section substantially reduces the final DFs. The change (without/with bypass) in the twelve overall DFs are: 265/15, 125/14, 78/13, 203/15, 99/14, 63/13, 24/10, 13/7, 9/6, 24/10, 13/7, and 9/6. The liquid aerosols, both original and dried, show the most change. This is due to the smaller size of the dust aerosol particles, which have smaller DF_is.

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TRAC-TE CODE VALIDATION/VERIFICATION

October 1, 1992

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F-10

TRAC-TE Code Validation/Verification

The TRAC-TE code was developed to calculate aerosol escape from a tank through a tank riser. The scenario for which the code has been developed is the injection of aerosol into a waste tank atmosphere that results from drilling inside the tank; however, the aerosol calculations are generic. The code calculates the rate of aerosol escape and the total amount of aerosol escape. Aerosol is introduced into the tank atmosphere at a constant rate for each period in a series of time periods.

This document presents the validation of the TRAC-TE code. The validation process follows several steps: 1) explanation of the technical bases of the code, which include the assumptions and the differential equations and their solutions for the time periods of particle generation and dilution; 2) comparison of settling velocities reported in the literature with settling velocities calculated by TRAC-TE; and 3) comparison of code calculations and hand calculations for two sample cases. Two additional cases are attached as benchmarks for comparison with any desired parametric or input changes.

Technical Bases

The following assumptions are made in the code calculations:

1. The aerosol particles are immediately well-mixed into the tank air space except for a certain fraction that immediately bypasses mixing and proceeds directly to the outlet riser.

2. The airborne aerosol particles (as spheres) remain unchanged in mass, diameter, or density. No adsorption onto, agglomeration of, or evaporation from particles occurs.

3. For given exit flow or particle generation periods, the exit flow and generation rates are constant over each period.

4. The only airborne particle removal mechanism is gravitational settling; the rate of settling is constant for a given particle diameter, density, and air pressure and temperature.

With the above assumptions, we write the following differential equation for the mass airborne (m_{ij}) of particle size i, in the tank of volume V and floor area A during time period j:

$$dm_{ij}/dt = \underline{m}_{ij} - m_{ij}\,(Av_i + F_j)/V = \underline{m}_{ij} - \frac{m_{ij}}{\tau_{ij}} \tag{1}$$

Here, v_i is the settling velocity of particle size i, $\underline{m}_{ij}$ is the generation rate of new airborne particles of size i in period j. F_j is the exit flow rate, and $\tau_{ij} = V/(Av_i + F_j)$, a time constant. The solution for m_{ij} during the period $o \leq t < t_j$ is:

$$m_{ij} = \underline{m}_{ij}\,\tau_{ij}\,(1 - \exp(-t/\tau_{ij})) \tag{2}$$

The level of m_{ij} at t_j is:

$$m_{ij}(tj) = \underline{m}_{ij}\,\tau_{ij}\,(1 - \exp(-t_j/\tau_{ij})) \tag{3}$$

If $\underline{m}_{ij} = 0$ for $t_j < t < t_k$, and if F_j changes to F_k, then equation 1 is solved to get

$$m_{ij} = m_{ij}(tj)\,\exp\,(-t/\tau_{ik}) \tag{4}$$

where $\tau_{ik} = V/(v_iA + F_k)$.

To get the integrated amount lost out of the tank by the exit flow stream, equations 2 and 4 are integrated over the appropriate time periods, e.g.:

$$M_i(\text{out}) = \int_o^{t_j} m_{ij}\,\frac{F_j}{V}\,dt + \int_{t_j}^{t_k} m_{ij}\,\frac{F_k}{V}\,dt \tag{5}$$

or

$$M_i(\text{out}) = F_j\underline{m}_{ij}\,\tau_{ij}\,[t_i - \tau_{ij}(1 - \exp\,(-_{tj}/\tau_{ij}))]/V + m_{ij}(tj)\,F_k\,\tau_{ik}\,(1 - \exp(_{tk} - _{tj})/\tau_{ik}))/V \tag{6}$$

Equation 6 will have additional terms for additional time periods.

Comparison of Literature-Reported and Code-Caluculated Settling Velocities

The simplest way to show validation for the settling velocities is to compare those calculated by the code and those easily found in the literature. Table 1 is such a comparison. One can see that for all 7 particle diameters, the calculated vs. literature

Table 1. Comparison of Settling Velocities for Spheres of Unit Density ($1\ g/cm^3$)[1]

d, micron	settling velocity, cm/s	literature value[2]
0.500000	1.021411646089176E-003	0.0010
1.000000	3.532081487540130E-003	0.0035
2.000000	1.305372442956574E-002	0.0128
3.000000	2.856619874695275E-002	0.0275
5.000000	7.756238155486984E-002	0.078
10.000000	3.048850147183015E-001	0.30
15.000000	6.819678994902950E-001	0.68
20.000000	1.208811035870851	1.2
25.000000	1.885414423859968	1.9
30.000000	2.711778063457647	2.7
50.000000	7.514835137933984	7.2
100.000000	24.961954386198440	25.0
150.000000	46.923073015577840	46.0
200.000000	71.108479785872930	70.0
300.000000	112.677396002385000	115.0
500.000000	199.376914833381800	200.0
1000.000000	381.775500317023900	385.0

1 TRAC-TE Calculated Settling Velocities at 20 Celsius & 1 atm air Compared to Literature values at Same Conditions.

2 C.N. Davies. 1966. Aerosol Science. Academic Press Inc. Ltd., London.

V_i values do not disagree by more than 2%. This is certainly adequate. We cannot be assured that any given real particle is a sphere or whether the designated particle diameter truly represents all the particles in the group of that size.

Comparison of Hand-Calculated and Code-Calculated Results

The comparison of hand calculations and code calculations is performed for two parameters: particle settling alone and settling plus flow rate out. The first case, called QA Check #1, used the parameters as listed in Table 2, the output for a single particle size (0.5 micrometers). This QA check only involves particle settling (no outflow), so the time constant, τ, is the same for both periods (0 to 0.1 minutes and 0.1 to 600.1 minutes). Thus,

$$\tau_{ij} = \tau = V/(v_i A) = 1000/(1.02141165E\text{-}05 \times 100)$$
$$= 9.79037E{+}05 \text{ seconds}$$
$$= 16317.3 \text{ minutes}$$

Table 2. QA Check #1

```
ADDITIONAL PARAMETERS:

  particle density, g/cc =        1.000000000000000
  tank temperature, degK =      293.200000000000000
  tank pressure, abs atm =        1.000000000000000
  tank floor area,m**2 =      100.000000000000000
  tank volume, m**3 =     1000.000000000000000
  bypass fraction =   0.000000000000000E+000

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000


Flow out @    0.000000E+00 min =        2.164252 cfm &    10000.000000g/m
Flow out @    1.000000E-01 min =        2.164252 cfm &    0.000000E+00g/m
Flow out @      600.100000 min =    0.000000E+00 cfm &    0.000000E+00g/m

d, micron=    5.000000E-01
deposition vel, m/s=   1.021411646089176E-005
deposition fraction=   5.000000350875575E-001
flow out fraction=   4.999999649124425E-001
time constant, min =     8158.643921902572000


**** OUTPUT @   1.000000000000000E-001 minutes ****

  diam     airborne    outflow    totalout    totalflr    source
  mcrn        g          g/s         g           g          g

    .5     1.00E+03   1.02E-03   3.06E-03    3.06E-03   1.00E+03

   999.993896484375000 total grams airborne in tank
 1.021405216306448E-003 total g/s out riser
 3.064222168177366E-003 total grams lost out riser
 3.064222401008010E-003 total grams settled on floor
  1000.000000000000000 total grams made airborne
 0.000000000000000E+000 total grams bypassed


**** OUTPUT @      600.100000000000000 minutes ****

  diam     airborne    outflow    totalout    totalflr    source
  mcrn        g          g/s         g           g          g

    .5     9.29E+02   9.49E-04   3.55E+01    3.55E+01   1.00E+03

   929.091796875000000 total grams airborne in tank
 9.489850490354002E-004 total g/s out riser
    35.454113006591800 total grams lost out riser
    35.454116821289060 total grams settled on floor
  1000.000000000000000 total grams made airborne
 0.000000000000000E+000 total grams bypassed
```

is the time constant (16317.286697 . . . in Table 2). From equation 3, the amount airborne after 0.1 minutes (generation period where $\underline{m}_{11}$ = 10,000 g/min),

$$m_{11}(.1) = 10{,}000\ (16317.3)(1\text{-}\exp(-600.1\text{-}0.1)/16317.3))\ \text{grams}$$
$$= 963.895\ (963.894\ \text{in Table 2}).$$

These values are easily within the roundoff error of the hand calculator. Thus, QA Check #1 verifies the equivalence of the code versus hand calculator plus equations for settling only.

The last step (QA Check #2 in Table 3) in the hand calculation involves flow out plus settling. The flow rate out picked here was "exactly" the same as the settling rate v_iA = 1.0214116-3 m^3/s = 2.164252 cfm, so that the time constant is now half of QA Check #1, or

$$\tau = 1000/(1.0214116\text{-}3 \times 2)$$
$$= 4.89519E{+}05\ \text{seconds}$$
$$= 8158.64\ \text{minutes (same as Table 3).}$$

Now to repeat the calculations for m_{ij} as before:

$$m_{11}(.1) = 10{,}000.(8158.64)(1\text{-}\exp(-0.1/8158.64))$$
$$= 999.994\ (999.93896\ \ldots\ \text{in Table 3})$$

$$m_{12}(600.1) = 999.994\ \exp\ (-(600.1\text{-}.1)/8158.64)$$
$$= 929.092\ (929.09179\ \ldots\ \text{in Table 3}).$$

We can also check the integrated loss from the tank using equation 6. Hence,

$$M(\text{out}) = (1.0214116\text{-}3\ m^3/s)(10{,}000\ g/\text{min})(8158.64\ \text{min})[0.1\text{-}8158.64$$
$$(1\text{-}\exp(-0.1/8158.64))]\ \text{min} \times 60s/\text{min}/1000\ m$$
$$= 3.0513E\text{-}3\ g\ \text{lost out riser in first 0.1 min (3.064E-3 in Table 3)}$$

$$M(\text{out}) = 999.994\ (1.0214116\text{-}3)(8158.64)(1\text{-}\exp(-600/8158.64)) \times 60/1000$$
$$= 35.451\ g\ \text{in period 0.1 to 600.1 min}$$

$$M(\text{out})\ (\text{total}) = 35.454\ g\ \text{(same as Table 3).}$$

Again, agreement is very good.

Benchmark Cases

Attached are two sets of input/output files from TRAC-TE that can serve as comparisons for setting up other files.

Table 3. QA Check #2

```
ADDITIONAL PARAMETERS:

  particle density, g/cc =          1.000000000000000
  tank temperature, degK =        293.200000000000000
  tank pressure, abs atm =          1.000000000000000
  tank floor area,m**2 =        100.000000000000000
  tank volume, m**3 =       1000.000000000000000
  bypass fraction =    0.000000000000000E+000

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000


Flow out @    0.000000E+00 min =    0.000000E+00 cfm &    10000.000000g/m
Flow out @    1.000000E-01 min =    0.000000E+00 cfm &    0.000000E+00g/m
Flow out @      600.100000 min =    0.000000E+00 cfm &    0.000000E+00g/m

d, micron=    5.000000E-01
deposition vel, m/s=   1.021411646089176E-005
deposition fraction=        1.000000000000000
flow out fraction=   0.000000000000000E+000
time constant, min =    16317.286698737670000


**** OUTPUT @   1.000000000000000E-001 minutes ****

  diam     airborne    outflow    totalout    totalflr    source
  mcrn        g          g/s         g           g          g

    .5     1.00E+03   0.00E+00   0.00E+00   3.06E-03   1.00E+03

    999.996948242187500 total grams airborne in tank
 0.000000000000000E+000 total g/s out riser
 0.000000000000000E+000 total grams lost out riser
 3.064228687435389E-003 total grams settled on floor
   1000.000000000000000 total grams made airborne
 0.000000000000000E+000 total grams bypassed


**** OUTPUT @      600.100000000000000 minutes ****

  diam     airborne    outflow    totalout    totalflr    source
  mcrn        g          g/s         g           g          g

    .5     9.64E+02   0.00E+00   0.00E+00   3.61E+01   1.00E+03

    963.894104003906200 total grams airborne in tank
 0.000000000000000E+000 total g/s out riser
 0.000000000000000E+000 total grams lost out riser
     36.105937957763670 total grams settled on floor
   1000.000000000000000 total grams made airborne
 0.000000000000000E+000 total grams bypassed
```

```
DA3.DAT
Example 1: TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS
2.4,294.3,1.,410.433,2548.52,0.
2
   0.,0.,500.
1000.,10.,50.
1000.,100.,0.
2.
1.
20
.5,.0018
1.5,.009
2.5,.0094
3.5,.0181
4.5,.028
5.5,.0297
6.5,.0226
7.5,.0182
8.5,.0165
9.5,.0132
15.,.1767
25.,.1732
35.,.156
45.,.1675
55.,.0163
65.,.043
75.,.0309
85.,.0212
95.,.0277
[illegible]5.,.021
```

DA3.OUT

Example 1: TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

ADDITIONAL PARAMETERS:

```
particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     2548.520000000000000
bypass fraction =   0.000000000000000E+000

Output divisions in Period        1.000000000000000 =        2.000000
Output divisions in Period        2.000000000000000 =        1.000000

Flow out @     0.000000E+00 min =     1000.000000 cfm &      500.000000g/m
Flow out @        10.000000 min =     1000.000000 cfm &       50.000000g/m
Flow out @       100.000000 min =     1000.000000 cfm &    0.000000E+00g/m
```

**** OUTPUT @ 5.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.37E+00	8.10E-04	1.23E-01	2.61E-03	4.50E+00
1.50	2.18E+01	4.04E-03	6.12E-01	9.62E-02	2.25E+01
2.50	2.26E+01	4.18E-03	6.36E-01	2.66E-01	2.35E+01
3.50	4.31E+01	7.97E-03	1.22E+00	9.77E-01	4.53E+01
4.50	6.57E+01	1.22E-02	1.86E+00	2.45E+00	7.00E+01
5.50	6.85E+01	1.27E-02	1.95E+00	3.81E+00	7.43E+01
6.50	5.11E+01	9.46E-03	1.47E+00	3.97E+00	5.65E+01
7.50	4.02E+01	7.44E-03	1.16E+00	4.18E+00	4.55E+01
8.50	3.54E+01	6.56E-03	1.04E+00	4.77E+00	4.12E+01
9.50	2.75E+01	5.10E-03	8.12E-01	4.66E+00	3.30E+01
15.00	2.98E+02	5.52E-02	9.44E+00	1.34E+02	4.42E+02
25.00	1.73E+02	3.20E-02	6.46E+00	2.54E+02	4.33E+02
35.00	8.90E+01	1.65E-02	3.87E+00	2.97E+02	3.90E+02
45.00	5.96E+01	1.10E-02	2.84E+00	3.56E+02	4.19E+02
55.00	4.17E+00	7.72E-04	2.08E-01	3.64E+01	4.07E+01
65.00	8.36E+00	1.55E-03	4.28E-01	9.87E+01	1.07E+02
75.00	4.74E+00	8.78E-04	2.47E-01	7.23E+01	7.73E+01
85.00	2.65E+00	4.90E-04	1.40E-01	5.02E+01	5.30E+01
95.00	2.89E+00	5.36E-04	1.54E-01	6.62E+01	6.93E+01
125.00	1.48E+00	2.73E-04	7.97E-02	5.09E+01	5.25E+01

```
  1024.204390525818000 total grams airborne in tank
1.896668805857189E-001 total g/s out riser
    34.745143949985500 total grams lost out riser
  1441.050397091778000 total grams settled on floor
  2499.999946117401000 total grams made airborne
0.000000000000000E+000 total grams bypassed
```

**** OUTPUT @ 10.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.51E+00	1.58E-03	4.82E-01	1.03E-02	9.00E+00
1.50	4.22E+01	7.82E-03	2.40E+00	3.77E-01	4.50E+01
2.50	4.35E+01	8.05E-03	2.48E+00	1.04E+00	4.70E+01
3.50	8.20E+01	1.52E-02	4.71E+00	3.78E+00	9.05E+01
4.50	1.23E+02	2.29E-02	7.15E+00	9.40E+00	1.40E+02
5.50	1.27E+02	2.34E-02	7.42E+00	1.45E+01	1.49E+02
6.50	9.26E+01	1.72E-02	5.50E+00	1.49E+01	1.13E+02
7.50	7.13E+01	1.32E-02	4.29E+00	1.54E+01	9.10E+01
8.50	6.14E+01	1.14E-02	3.76E+00	1.73E+01	8.25E+01
9.50	4.65E+01	8.60E-03	2.90E+00	1.66E+01	6.60E+01
15.00	4.26E+02	7.90E-02	3.01E+01	4.27E+02	8.84E+02
25.00	1.91E+02	3.54E-02	1.68E+01	6.58E+02	8.66E+02
35.00	9.02E+01	1.67E-02	8.87E+00	6.81E+02	7.80E+02
45.00	5.96E+01	1.10E-02	6.15E+00	7.72E+02	8.38E+02
55.00	4.17E+00	7.72E-04	4.40E-01	7.69E+01	8.15E+01
65.00	8.36E+00	1.55E-03	8.93E-01	2.06E+02	2.15E+02
75.00	4.74E+00	8.78E-04	5.11E-01	1.49E+02	1.55E+02
85.00	2.65E+00	4.90E-04	2.87E-01	1.03E+02	1.06E+02
95.00	2.89E+00	5.36E-04	3.15E-01	1.35E+02	1.39E+02
125.00	1.48E+00	2.73E-04	1.62E-01	1.03E+02	1.05E+02

1489.933580875397000 total grams airborne in tank
2.759127542958595E-001 total g/s out riser
105.531579777598400 total grams lost out riser
3404.534713128582000 total grams settled on floor
4999.999892234802000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.14E+00	1.51E-03	8.77E+00	1.87E-01	1.71E+01
1.50	3.73E+01	6.90E-03	4.17E+01	6.55E+00	8.55E+01
2.50	3.31E+01	6.14E-03	3.96E+01	1.66E+01	8.93E+01
3.50	5.12E+01	9.49E-03	6.69E+01	5.38E+01	1.72E+02
4.50	6.13E+01	1.13E-02	8.85E+01	1.16E+02	2.66E+02
5.50	4.96E+01	9.18E-03	7.89E+01	1.54E+02	2.82E+02
6.50	2.90E+01	5.37E-03	5.01E+01	1.36E+02	2.15E+02
7.50	1.84E+01	3.40E-03	3.36E+01	1.21E+02	1.73E+02
8.50	1.34E+01	2.49E-03	2.56E+01	1.18E+02	1.57E+02
9.50	8.86E+00	1.64E-03	1.73E+01	9.92E+01	1.25E+02
15.00	5.23E+01	9.68E-03	1.07E+02	1.52E+03	1.68E+03
25.00	1.94E+01	3.58E-03	4.04E+01	1.59E+03	1.65E+03
35.00	9.02E+00	1.67E-03	1.89E+01	1.45E+03	1.48E+03
45.00	5.96E+00	1.10E-03	1.25E+01	1.57E+03	1.59E+03
55.00	4.17E-01	7.72E-05	8.78E-01	1.54E+02	1.55E+02
65.00	8.36E-01	1.55E-04	1.76E+00	4.06E+02	4.09E+02
75.00	4.74E-01	8.78E-05	1.00E+00	2.92E+02	2.94E+02
85.00	2.65E-01	4.90E-05	5.58E-01	2.01E+02	2.01E+02
95.00	2.89E-01	5.36E-05	6.10E-01	2.62E+02	2.63E+02
125.00	1.48E-01	2.73E-05	3.11E-01	1.99E+02	2.00E+02

399.397335156798400 total grams airborne in tank

```
7.396223564319371E-002 total g/s out riser
   634.867989718914000 total grams lost out riser
  8465.734535068274000 total grams settled on floor
  9499.999755859375000 total grams made airborne
).000000000000000E+000 total grams bypassed
```

```
TRAC-TE.DAT
Example 2: QA Check 2.
1.,293.2,1.,100.,1000.,0.
2
:   54252,0.,10000.
2.164252,.1,0.
0.,600.1,0.
1.
1.
17
.5,1.
1.,0.
2.,0.
3.,0.
5.,0.
10.,0.
15.,0.
20.,0.
25.,0.
30.,0.
50.,0.
100.,0.
150.,0.
200.,0.
300.,0.
500.,0.
1000.,0.
```

TRAC-TE.OUT

Example 2: QA Check 2.

ADDITIONAL PARAMETERS:

```
particle density, g/cc =        1.000000000000000
tank temperature, degK =      293.200000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      100.000000000000000
tank volume, m**3 =     1000.000000000000000
bypass fraction =   0.000000000000000E+000

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000


Flow out @    0.000000E+00 min =        2.164252 cfm &    10000.000000g/m
Flow out @    1.000000E-01 min =        2.164252 cfm &    0.000000E+00g/m
Flow out @      600.100000 min =    0.000000E+00 cfm &    0.000000E+00g/m


**** OUTPUT @   1.000000000000000E-001 minutes ****
```

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.00E+03	1.02E-03	3.06E-03	3.06E-03	1.00E+03
1.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
20.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
25.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
30.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
50.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
150.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
200.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
300.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
500.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
******	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

```
   999.993896484375000 total grams airborne in tank
 1.021405216306448E-003 total g/s out riser
 3.064222168177366E-003 total grams lost out riser
 3.064222401008010E-003 total grams settled on floor
   1000.000000000000000 total grams made airborne
 0.000000000000000E+000 total grams bypassed


**** OUTPUT @      600.100000000000000 minutes ****
```

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g

.50	9.29E+02	9.49E-04	3.55E+01	3.55E+01	1.00E+03
1.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
20.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
25.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
30.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
50.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
150.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
200.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
300.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
500.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
******	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

929.091796875000000 total grams airborne in tank
9.489850490354002E-004 total g/s out riser
35.454113006591800 total grams lost out riser
35.454116821289060 total grams settled on floor
1000.000000000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

App. 6

SUMMARY FOR THE AEROSOL DEPOSITION

5/12/92

SOURCE	SAIC RESULTS: GENERATION RATE IN TANK (GRAMS/SEC)	SAIC RESULTS: MASS FLOW UP EXHAUST RISER (GRAMS/SEC)	SAIC RESULTS: MASS FLOW UP EXHAUST RISER WITH 6.35% "DIRECT SHOT" INTO RISER 9/5	NAI RESULTS: MASS FLOW UP EXHAUST RISER (GRAMS/SEC)
Droplets at flow of:				
350 cfm	1200	4.53	80.48	-
850 cfm	1200	9.64	85.23	-
1550 cfm	1200	15.37	90.63	-
"Dried" Droplets				
350 cfm	1200	2.78	38.63	-
850 cfm	1200	5.72	41.17	-
1550 cfm	1200	8.94	44.18	-
Solids (2.3g/cc)				
350 cfm	12.95	0.55	1.34	0.53
850 cfm	12.95	1.00	1.76	-
1550 cfm	12.95	1.43	2.17	-
Solids (2.4g/cc)				
350 cfm	13.51	0.56	1.38	-
850 cfm	13.51	1.01	1.81	-
1550 cfm	13.51	1.46	2.23	-

These results support the development of the portable modular exhuster which supports the Rotary Mode Core Drilling Operations.

CHECKER
M. C. PRATHER
9/11/92

SOURCE	GENERATION RATE IN TANK (GRAMS/SEC)	MASS FLOW UP EXHAUST RISER *WITH 6.35% "DIRECT SHOT" INTO RISER*	ACCUMULATED FLOW UP THE EXHAUST RISER IN KILOGRAMS AS A FUNCTION OF ACTUAL DRILLING TIME IN HOURS							
			0.5	1	1.5	2	2.5	3	3.5	4
Droplets at flow of:										
350 cfm	1200	80.48	144.9	289.7	434.6	579.5	724.3	869.2	1014.0	1158.9
850 cfm	1200	85.23	153.4	306.8	460.2	613.7	767.1	920.5	1073.9	1227.3
1550 cfm	1200	90.63	163.1	326.3	489.4	652.5	815.7	978.8	1141.9	1305.1
"Dried" Droplets										
350 cfm	1200	38.63	69.5	139.1	208.6	278.1	347.7	417.2	486.7	556.3
850 cfm	1200	41.17	74.1	148.2	222.3	296.4	370.5	444.6	518.7	592.8
1550 cfm	1200	44.18	79.5	159.0	238.6	318.1	397.6	477.1	556.7	636.2
Solids (2.3g/cc)										
350 cfm	12.95	1.34	2.4	4.8	7.2	9.6	12.1	14.5	16.9	19.3
850 cfm	12.95	1.76	3.2	6.3	9.5	12.7	15.8	19.0	22.2	25.3
1550 cfm.	12.95	2.17	3.9	7.8	11.7	15.6	19.5	23.4	27.3	31.2
Solids (2.4g/cc)										
350 cfm	13.51	1.38	2.5	5.0	7.5	9.9	12.4	14.9	17.4	19.9
850 cfm	13.51	1.81	3.3	6.5	9.8	13.0	16.3	19.5	22.8	26.1
1550 cfm	13.51	2.23	4.0	8.0	12.0	16.1	20.1	24.1	28.1	32.1

WHC-SD-WM-ES-225 REV. 0

WHC-SD-WM-ES-225 REV 0

G-2

CHECKER
M.C. PRATHER
9/11/92

SOURCE	GENERATION RATE IN TANK (GRAMS/SEC)	MASS FLOW UP EXHAUST RISER (GRAMS/SEC)	ACCUMULATED FLOW UP THE EXHAUST RISER IN KILOGRAMS AS A FUNCTION OF ACTUAL DRILLING TIME IN HOURS							
			0.5	1	1.5	2	2.5	3	3.5	4
Droplets at flow of:										
350 cfm	1200	4.53	8.2	16.3	24.5	32.6	40.8	48.9	57.1	65.2
850 cfm	1200	9.64	17.4	34.7	52.1	69.4	86.8	104.1	121.5	138.8
1550 cfm	1200	15.37	27.7	55.3	83.0	110.7	138.3	166.0	193.7	221.3
"Dried" Droplets										
350 cfm	1200	2.78	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
850 cfm	1200	5.72	10.3	20.6	30.9	41.2	51.5	61.8	72.1	82.4
1550 cfm	1200	8.94	16.1	32.2	48.3	64.4	80.5	96.6	112.6	128.7
Solids (2.3g/cc)										
350 cfm	12.95	0.55	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9
850 cfm	12.95	1.00	1.8	3.6	5.4	7.2	9.0	10.8	12.6	14.4
1550 cfm	12.95	1.43	2.6	5.1	7.7	10.3	12.9	15.4	18.0	20.6
Solids (2.4g/cc)										
350 cfm	13.51	0.56	1.0	2.0	3.0	4.0	5.0	6.0	7.1	8.1
850 cfm	13.51	1.01	1.8	3.6	5.5	7.3	9.1	10.9	12.7	14.5
1550 cfm	13.51	1.46	2.6	5.3	7.9	10.5	13.1	15.8	18.4	21.0

WHC-SD-WM-ES-225 REV. 0

G-3

CHECKER
M.G. FEATHER
9/11/92

APP. H

DON'T SAY IT --- *Write It!*

DATE: 05/20/92

TO: K.A.Giese

FROM: T.E. Arndt

Telephone: 6-9440

cc: F.C. Han
J.N. Papenfuss
M.C. Prather

SUBJECT: HEPA FILTER LOADING

Fluid Systems Analysis (FSA) was requested to determine the time required to change out a HEPA filter due to the amount of solid aerosols in the gas stream caused by core drilling in the tank crust. FSA was given specific data to help determine the HEPA filter loading. The data given was, mass flow rate in grams per second (MGMS), aerosol diameter distribution, and a density of 2.3 g/cc. The calculations were to permit for three different airflow rates, two different mass flow rates and diameter distribution order (location of aerosols in regard to the exhaust riser) for each airflow rate. The airflow rates are 350, 850, and 1550 cfm.
The diameter distribution order for determining the filter loadings were at "no bypass" (straight shot directly into the riser) and at "6.35% bypass" (near exhaust riser). Therefore, six separate calculations were performed. Prior to determining the HEPA filter loading, it was necessary to calculate the mass median particle diameter (DIAMIC) from the aerosol diameter distribution given.

	NEAR EXHAUST RISER			DIRECTLY IN EXHAUST RISER		
CFM	350	850	1550	350	850	1550
DIAMIC	4.6	5.6	5.9	23.3	16.5	14
MGMS	.55	1	1.43	1.34	1.76	2.17
% LOADING AT 7 MIN	2.3	11	33.2	5.3	18.5	48.4
FILT.CH IN HOURS	5	1	.35	2.2	.63	.24

The calculations assumed only a single HEPA filter (24" X 24" X 11 1/2" rated at 1000 cfm) as a model for this study. No exhaust system components, or system geometry was taken into consideration, ie, demister, chevrons, heater, or particulate settling in ductwork or on components.

If no entrained moisture is present in the gas stream, a de-mister may be more of a hinderance that an asset, as it will act as a filter and will need to be flushed on a continual basis. If it can be avoided, adding water to the tank is not advisable. If not flushed, the de-mister will soon be plugged, and a high differential pressure will shut down the exhaust train. A recirculated water system would have similar concerns, ie, build up of radioactive contaminants, and, eventually the water will still require disposal in a waste storage tank.

Using an existing ventilation system which components were designed for normal operation, and to specific criteria, may not be best suited for a core drilling operation that anticipates a large amount of particulate in the gas stream. If a problem occurred due to the core drilling operation, both the core drilling ~~and the~~ primary exhaust system would be out of service and tank confinement would be interrupted. A separate exhaust train design especially for core drilling may be required, this would allow the tank primary exhaust system to be used when replacing the HEPA filters for the core drilling, while maintaining tank confinement.

Please call at your convenience so we may arrange a meeting to discuss the results of the calculations and recommendations in greater detail.

APP. I

ANALYSIS AND SOURCE TERM

The purpose of this analysis was to calculate exposure rates at the surface of a HEPA filter. The exposure rate calculations were based on the gamma and beta emitting radionuclides in the A-101, S-112, and B-101 waste tanks. These calculations were performed using MICROSHIELD version 3.12. The HEPA filter is composed of filter paper material; roughly 60.96 cm in height, 60.96 cm wide, and 29.21 cm thick.

The particulate was assumed to be composed of Cs-137/Ba-137m, Sr-90/Y-90. The filter has a density of 1.6 g/cc. The following tables contain information on the time intervals, flow rates, and total activity.

TABLE 1.A SOURCE	GENERATION RATE IN TANK (grams/sec)	MASS FLOW UP EXHAUST RISER (grams/sec)	MASS FLOW UP WITH 6.35% DIRECT SHOT
Solids (2.3 g/cc)			
350 cfm	1.295E+01	5.50E-01	1.34E+00
850 cfm	1.295E+01	1.00E+00	1.76E+00
1550 cfm	1.295E+01	1.43E+00	2.17E+00

TABLE 1.B CONCENTRATIONS	ALL ROTARY MODE TANKS	TANK S-112 TANK A-101	TANK B-101
Radionuclides	Average Ci/g	Highest Ci/g	Lowest Ci/g
Ba-137m	8.02E-05	7.21E-04	1.02E-34
Cs-137	8.63E-05	9.02E-04	1.02E-34
Sr-90	9.79E-05	3.62E-04	6.08E-35
Y-90	1.00E-05	3.62E-04	6.10E-35

TABLE 1.C CALCULATED ACTIVITY 5 Hr AIR FLOW UP WITH A MASS FLOW OF 0.55 g/sec (NO BYPASS)

5 hrs 350 cfm no bypass	ALL ROTARY MODE TANKS	TANK S-112 TANK A-101	TANK B-101
Radionuclides	Average Ci	Highest Ci	Lowest Ci
Ba-137m	7.90E-01	7.14E+00	0
Cs-137	8.50E-01	8.93E+00	0
Sr-90	9.70E-01	3.58E+00	0
Y-90	9.90E-01	3.58E+00	0

TABLE 1.D CALCULATED ACTIVITY 1 Hr AIR FLOW UP WITH A MASS FLOW OF 1.0 g/sec (NO BYPASS)

1 hrs 850 cfm no bypass	ALL ROTARY MODE TANKS	TANK S-112 TANK A-101	TANK B-101
Radionuclides	Average Ci	Highest Ci	Lowest Ci
Ba-137m	2.90E-01	2.60E+00	0
Cs-137	3.20E-01	3.25E+00	0
Sr-90	3.50E-01	1.30E+00	0
Y-90	3.60E-01	1.30E+00	0

TABLE 1.E CALCULATED ACTIVITY 0.35 Hr AIR FLOW UP WITH A MASS FLOW OF 1.43 g/sec (NO BYPASS)

0.35 hrs no bps 1550 cfm	ALL ROTARY MODE TANKS	TANK S-112 TANK A-101	TANK B-101
Radionuclides	Average Ci	Highest Ci	Lowest Ci
Ba-137m	1.50E-01	1.30E+00	0
Cs-137	1.60E-01	1.63E+00	0
Sr-90	1.80E-01	6.50E-01	0
Y-90	1.80E-01	6.50E-01	0

TABLE 1.F CALCULATED ACTIVITY 2.2 Hr AIR FLOW UP WITH A MASS FLOW OF 1.34 g/sec (6.35% BYPASS)

2.2 hrs 6.35% bypass 350cfm	ALL ROTARY MODE TANKS	TANK S-112 TANK A-101	TANK B-101
Radionuclides	Average Ci	Highest Ci	Lowest Ci
Ba-137m	8.50E-01	7.65E+00	0
Cs-137	9.20E-01	9.58E+00	0
Sr-90	1.04E+00	3.84E+00	0
Y-90	1.06E+00	3.84E+00	0

TABLE 1.G CALCULATED ACTIVITY 0.63 Hr AIR FLOW UP WITH A MASS FLOW OF 1.76 g/sec (6.35% BYPASS)

0.63hrs 6.35% bypass 850cfm	ALL ROTARY MODE TANKS	TANK S-112 TANK A-101	TANK B-101
Radionuclides	Average Ci	Highest Ci	Lowest Ci
Ba-137m	3.20E-01	2.88E+00	0
Cs-137	3.50E-01	3.60E+00	0
Sr-90	3.90E-01	1.45E+00	0
Y-90	4.00E-01	1.45E+00	0

TABLE 1.H CALCULATED ACTIVITY 0.24 Hr AIR FLOW UP WITH A MASS FLOW OF 2.17 g/sec (6.35% BYPASS)

0.24hrs 6.35% bps 1550 cfm	ALL ROTARY MODE TANKS	TANK S-112 TANK A-101	TANK B-101
Radionuclides	Average Ci	Highest Ci	Lowest Ci
Ba-137m	7.90E-01	7.14E+00	0
Cs-137	8.50E-01	8.93E+00	0
Sr-90	9.70E-01	3.58E+00	0
Y-90	9.90E-01	3.58E+00	0

Sr-90, Y-90, Cs-137, and Ba-137m are the most abundant radionuclides in the tank waste, and are the primary dose contributors, so only these isotopes were considered. The concentrations was taken from the reference (see Table 1.B), and were given in Ci/g for each radionuclide. To obtain activities for each radionuclide of concern the concentration (Ci/g) was multiplied by the mass flow (g/sec) and the time interval (sec) for each different case.

The ^{137m}Ba concentration was also given in the reference, therefore the activity of the parent at 94.6% equal to the activity of the daughter product was not used to calculated the activity for ^{137m}Ba. The majority of the exposure rate from gamma emmitters are due to the ^{137m}Ba; however, ^{137}Cs, ^{90}Sr, and ^{90}Y was included in the exposure calculation due to beta emmitters.

The density of the tank contents was assumed to be 2.3 g/cc, as indicated in the attached reference. The waste was assumed to be an solids from tank waste.

GEOMETRY

The calculations for the HEPA filter were performed using the rectangular solid geometry option from MICROSHIELD. The exposure point was located at the surface of a HEPA filter with the following dimensions: length 24 inches, width 24 inches, and depth 11.5 inches.

RESULTS

The exposure rates calculated are given in the following Tables. The analysis of the HEPA filter provided results for six different cases.

TABLE 2: NO BYPASS @ 350 cfm 5 hrs

	Average	S-112	A-101
Isotope	(R/hr)	(R/hr)	(R/hr)
Ba-137m	3.98	35.99	0
Cs-137	0.89	9.36	0
Sr-90	1.11	2.04	4.10
Y-90	5.57	10.00	20.20
TOTAL	11.55	57.39	24.20

TABLE 3: 6.35% BYPASS @ 350 cfm 2.2 hrs

	Average	S-112	A-101
Isotope	(R/hr)	(R/hr)	(R/hr)
Ba-137m	4.28	38.56	0
Cs-137	0.97	1.00	0
Sr-90	1.19	2.19	4.40
Y-90	5.97	10.80	21.60
TOTAL	12.41	52.55	26.00

TABLE 4: NO BYPASS @ 850 cfm 1 hrs

	Average	S-112	A-101
Isotope	(R/hr)	(R/hr)	(R/hr)
Ba-137m	1.46	13.10	0
Cs-137	0.34	3.41	0
Sr-90	0.40	0.75	1.49
Y-90	2.30	3.67	7.33
TOTAL	4.50	20.93	8.82

TABLE 5: 6.35% BYPASS @ 850 cfm .63 hrs

	Average	S-112	A-101
Isotope	(R/hr)	(R/hr)	(R/hr)
Ba-137m	1.61	14.52	0
Cs-137	0.37	3.77	0
Sr-90	0.45	0.82	1.67
Y-90	2.26	4.05	8.19
TOTAL	4.69	23.16	9.86

TABLE 6: NO BYPASS @ 1550 cfm .35 hrs

Isotope	Average (R/hr)	S-112 (R/hr)	A-101 (R/hr)
Ba-137m	0.76	6.55	0
Cs-137	0.17	1.71	0
Sr-90	0.21	0.37	0.75
Y-90	1.01	1.80	3.67
TOTAL	**2.15**	**10.43**	**4.42**

TABLE 7: 6.35% BYPASS @ 1550 cfm .24 hrs

Isotope	Average (R/hr)	S-112 (R/hr)	A-101 (R/hr)
Ba-137m	0.76	6.80	0
Cs-137	0.17	0.18	0
Sr-90	0.21	0.39	0.78
Y-90	1.07	1.91	3.83
TOTAL	**2.21**	**9.28**	**4.61**

UNCERTAINTIES

The primary uncertainty in this analysis is the inhomogeneity of the tank contents, which may vary drastically from one location in the tank to the next. This analysis uses data from core samples taken from Rotary Mode Tanks, S-112, and A-101 (reference). Thus, the analysis data was used as the best representative sample of the tank contents. Unfortunately, the amount of inhomogeneity in the tank is not known, therefore a numeric value for the uncertainty this poses is impossible to estimate.

SUMMARY AND CONCLUSIONS

Exposure rates were calculated at contact to the HEPA filter using the computer codes MICROSHIELD and VARSKIN-MOD2. Field measurements should be obtained to use as comparison media for the analysis at hand. The exposure rates caused by sources other than the HEPA filter could be dominated by ground or equipment contamination, and/or exposure rates from an open riser.

The results for the bounding cases are expected to generate a very high radiation area; these results estimate exposure rates greater than 1.0 R/hr. The Maximum allowable dose to a worker is 300 mrem/week; this should be considered in the initial design criteria.

CHECKLIST FOR CALCULATION REVIEW

Document Reviewed: **EXPOSURE RATES FROM A HEPA FILTER SURFACE**

By: Isreal O. Lourant

Yes	No	N/A	
[✓]	[ ]	[ ]	Previous reviews complete and cover analysis, up to scope of this review, with no gaps.
[✓]	[ ]	[ ]	Problem completely defined.
[✓]	[ ]	[ ]	Necessary assumptions explicitly stated and supported.
[✓]	[ ]	[ ]	Computer codes and data files documented.
[✓]	[ ]	[ ]	Data used in calculations explicitly stated in document.
[✓]	[ ]	[ ]	Data checked for consistency with original source information as applicable.
[ ]	[ ]	[X]	Mathematical derivations checked including dimensional consistency of results.
[✓]	[ ]	[ ]	Models appropriate and used within range of validity or use outside range of established validity justified.
[✓]	[ ]	[ ]	Hand calculations checked for errors. Spreadsheet results should be treated exactly the same as hand calculations.
[✓]	[ ]	[ ]	Code runstreams correct and consistent with analysis documentation.
[✓]	[ ]	[ ]	Code output consistent with input and with results reported in analysis documentation.
[✓]	[ ]	[ ]	Acceptability limits on analytical results applicable and supported. Limits checked against sources.
[✓]	[ ]	[ ]	Safety margins consistent with good engineering practices.
[✓]	[ ]	[ ]	Conclusions consistent with analytical results and applicable limits.
[✓]	[ ]	[ ]	Results and conclusions address all points required in the problem statement.
[ ]		[X]	Review calculations, comments, and/or notes are attached.

Paul D. Rittmann *Paul Rittmann PhD CHP* 11/16/92
Reviewer Approval (Printed Name and Signature) Date

APP. I

TABLE 1. 500,000 GALLON TANK

IL = In-leakage, cubic feet per minute @ 14.7 psia and 70°F
WH = Waste height, inches
PR = Penetration rate, inches per minute

Values are in total mass (grams) of dust flowing up the exhaust riser for the drilling of one complete core that is WH inches long.

	PR=.5	PR=1	PR=2	PR=3	PR=4
IL=0					
WH=19	51.5	36.4	24.7	16.4	16.2
WH=76	289.1	147.3	138.2	90.3	89.0
WH=114	491.6	359.5	246.4	162.8	161.1
WH=171	835.5	639.3	454.3	307.0	306.3
IL=500					
WH=19	114.2	82.2	56.5	45.8	37.1
WH=76	605.9	324.8	309.9	204.3	201.8
WH=114	172.0	768.2	544.9	365.3	362.8
WH=171	1642.9	1324.9	983.6	679.4	681.5
IL=1000					
WH=19	172.0	125.9	87.3	58.2	57.6
WH=76	874.1	487.2	472.4	314.5	311.5
WH=114	1413.5	1126.2	821.6	588.3	556.5
WH=171	2293.0	1909.3	1460.8	1026.8	1035.0
IL=1400					
WH=19	215.0	159.4	111.4	74.4	73.8
WH=76	1063.6	607.8	596.6	400.2	397.1
WH=114	1703.4	1385.5	1029.6	706.6	706.2
WH=171	1741.0	2326.3	1813.8	1289.8	1304.6
IL=2100					
WH=19	284.5	215.5	152.6	102.5	101.9
WH=76	1355.6	802.3	802.7	545.2	542.7
WH=114	2147.7	1794.9	1369.7	954.6	958.2
WH=171	3418.0	2976.3	2382.8	1723.3	1752.2

TABLE 2. 750,000 GALLON TANK

IL = In-leakage, cubic feet per minute @ 14.7 psia and 70°F
WH = Waste height, inches
PR = Penetration rate, inches per minute

Values are in total mass (grams) of dust flowing up the exhaust riser for the drilling of one complete core that is WH inches long.

	PR=.5	PR=1	PR=2	PR=3	PR=4
IL=0					
WH=19	44.6	31.0	20.7	17.4	13.3
WH=95	435.3	241.3	158.9	132.2	100.2
WH=171	731.6	532.1	360.4	303.2	231.9
WH=266	1305.0	1002.2	713.1	614.1	479.4
IL=500					
WH=19	99.9	70.4	47.5	40.0	30.6
WH=95	725.5	528.7	356.6	227.0	227.0
WH=171	1471.9	1127.5	792.6	675.0	520.2
WH=266	2548.9	2056.6	1529.2	1340.0	1059.2
IL=1000					
WH=19	151.7	108.4	73.7	62.1	47.6
WH=95	1049.0	789.5	544.3	350.5	350.5
WH=171	2080.8	1646.4	1190.6	1025.1	796.1
WH=266	3552.4	2954.4	2260.7	2006.1	1601.9
IL=1400					
WH=19	190.9	137.9	94.2	79.6	61.0
WH=95	1278.5	982.4	687.9	583.4	447.1
WH=171	1507.0	2022.0	1488.9	1291.7	1008.8
WH=266	4245.2	3496.1	2801.3	2506.0	2014.3
IL=2100					
WH=19	255.1	187.5	129.4	109.8	84.3
WH=95	1634.0	1292.4	927.0	793.1	611.6
WH=171	3161.4	2616.5	1976.2	1733.6	1366.0
WH=266	5294.3	4597.7	3673.2	3324.1	2698.0

TABLE 3. 1,000,000 GALLON TANK

IL = In-leakage, cubic feet per minute @ 14.7 psia and 70°F
WH = Waste height, inches
PR = Penetration rate, inches per minute

Values are in total mass (grams) of dust flowing up the exhaust riser for the drilling of one complete core that is WH inches long.

	PR=.5	PR=1	PR=2	PR=3	PR=4
IL=0					
WH=19	39.2	26.8	17.7	11.4	11.2
WH=133	479.4	373.8	214.5	50.4	132.6
WH=247	1051.8	762.8	512.1	331.3	325.3
WH=361	1802.1	1396.1	1002.0	697.9	677.8
IL=500					
WH=19	88.3	61.2	40.6	26.2	25.6
WH=133	1001.1	810.4	480.0	114.7	299.8
WH=247	2899.1	1602.1	1118.9	736.9	726.6
WH=361	3501.0	2717.6	2131.0	1521.0	1488.0
IL=1000					
WH=19	134.9	94.5	63.0	40.7	39.9
WH=133	1442.5	1199.7	731.2	177.7	462.4
WH=247	2960.1	2329.8	1673.7	119.7	1108.6
WH=361	4868.4	3885.0	3138.8	2278.5	983.6
IL=1400					
WH=19	170.5	120.5	80.7	52.3	51.3
WH=133	1755.3	1483.9	922.9	227.1	589.4
WH=247	3464.1	2856.4	2088.4	1411.8	1402.2
WH=361	5811.0	4454.2	3882.4	2848.8	2813.0
IL=2100					
WH=19	229.6	164.7	111.2	72.3	71.0
WH=133	2240.3	1935.0	1241.4	311.9	805.4
WH=247	4494.2	3690.7	2764.4	1897.8	1893.7
WH=361	7236.0	6318.0	5080.1	3786.0	3758.5

Table 4. Comparison of Aerosols With and Without Bypass Fraction
(IL=2100 cfm, PR=1 in./min. for all cases)

WH (in.)	Distance to Riser (m)	Bypass Fraction	Aerosol w/Bypass (g)	Aerosol No Bypass (g)	Percent Increase w/Bypass
500,000 gallon tank					
19.0	5.0874	0.0119	249.4	215.5	13.5926
76.0	3.6397	0.0166	943.7	802.3	14.9836
140.0	2.0142	0.0301	2301.9	1794.9	22.0253
171.0	1.2268	0.0494	4210.2	2976.3	29.3074
181.8	0.9525	0.0636	4882.6	3213.0	34.1949
750,000 gallon tank					
19.0	7.3974	0.0082	211.5	187.5	11.3475
95.0	5.4671	0.0111	1450.5	1292.4	10.8997
171.0	3.5368	0.0171	3049.8	2616.5	14.2075
266.0	1.1239	0.0539	6693.7	4597.7	31.3130
272.7	0.9538	0.0635	7263.8	4808.0	33.8088
1,000,000 gallon tank					
19.0	9.7074	0.0062	183.0	164.7	10.0000
133.0	6.8120	0.0089	2111.3	1935.0	8.3503
247.0	3.9165	0.0155	4259.3	3690.7	13.3496
361.0	1.0210	0.0594	9448.1	6318.0	33.1294
363.6	0.9550	0.0635	9917.4	6556.8	33.8859

Table 5. Comparison of Dry and Liquid Aerosols
(PR=1 in./min. for all cases)

Tank Vol. (gal)	In-Leakage (scfm)	WH (in.)	Dry Aerosol (g)	Liquid Aerosol (g)	Liquid Aerosol w/.0635 bypass (g)
Worst Case					
500,000	2100	171	2976.3	191990.2	1002757.9
750,000	2100	266	4597.7	296558.8	1557886.0
1,000,000	2100	361	5676.9	405643.9	2117243.7
Anticipated Case					
500,000	500	171	1324.9	75327.2	893503.1
750,000	500	266	2056.6	116100.2	1388886.5
1,000,000	500	361	2717.6	159251.8	1886497.7

APP. K

TABLE 1. 500,000 GALLON TANK

IL = In-leakage, cubic feet per minute @ 14.7 psia and 70°F
WH = Waste height, inches
PR = Penetration rate, inches per minute

Values are in total mass (grams) of dust flowing up the exhaust riser for the drilling of one complete core that is WH inches long.

	PR=.5	PR=1	PR=2	PR=3	PR=4
IL=0					
WH=19	51.5	36.4	24.7	16.4	16.2
WH=76	289.1	147.3	138.2	90.3	89.0
WH=114	491.6	359.5	246.4	162.8	161.1
WH=171	835.5	639.3	454.3	307.0	306.3
IL=500					
WH=19	114.2	82.2	56.5	45.8	37.1
WH=76	605.9	324.8	309.9	204.3	201.8
WH=114	172.0	768.2	544.9	365.3	362.8
WH=171	1642.9	1324.9	983.6	679.4	681.5
IL=1000					
WH=19	172.0	125.9	87.3	58.2	57.6
WH=76	874.1	487.2	472.4	314.5	311.5
WH=114	1413.5	1126.2	821.6	588.3	556.5
WH=171	2293.0	1909.3	1460.8	1026.8	1035.0
IL=1400					
WH=19	215.0	159.4	111.4	74.4	73.8
WH=76	1063.6	607.8	596.6	400.2	397.1
WH=114	1703.4	1385.5	1029.6	706.6	706.2
WH=171	1741.0	2326.3	1813.8	1289.8	1304.6
IL=2100					
WH=19	284.5	215.5	152.6	102.5	101.9
WH=76	1355.6	802.3	802.7	545.2	542.7
WH=114	2147.7	1794.9	1369.7	954.6	958.2
WH=171	3418.0	2976.3	2382.8	1723.3	1752.2

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

ADDITIONAL PARAMETERS:

```
particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     1060.895809739524000
bypass fraction =   0.000000000000000E+000

Output divisions in Period      1.000000000000000 =        1.000000
Output divisions in Period      2.000000000000000 =        1.000000
Output divisions in Period      3.000000000000000 =        1.000000
Output divisions in Period      4.000000000000000 =        1.000000
Output divisions in Period      5.000000000000000 =        1.000000
Output divisions in Period      6.000000000000000 =        1.000000
Output divisions in Period      7.000000000000000 =        1.000000
Output divisions in Period      8.000000000000000 =        1.000000
Output divisions in Period      9.000000000000000 =        1.000000
Output divisions in Period     10.000000000000000 =        1.000000
Output divisions in Period     11.000000000000000 =        1.000000
Output divisions in Period     12.000000000000000 =        1.000000
Output divisions in Period     13.000000000000000 =        1.000000
Output divisions in Period     14.000000000000000 =        1.000000
Output divisions in Period     15.000000000000000 =        1.000000
Output divisions in Period     16.000000000000000 =        1.000000
Output divisions in Period     17.000000000000000 =        1.000000
Output divisions in Period     18.000000000000000 =        1.000000

Flow out @    0.000000E+00 min =      880.000000 cfm &      155.300000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      100.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      180.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      240.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      260.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      320.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      340.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      420.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      500.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      580.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      640.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      660.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m

**** OUTPUT @       20.000000000000000 minutes ****

  diam    airborne    outflow    totalout    totalflr    source
```

mcrn	g	g/s	g	g	g
.50	4.44E+00	1.74E-03	1.13E+00	2.72E-02	5.59E+00
1.50	2.15E+01	8.40E-03	5.50E+00	9.83E-01	2.80E+01
2.50	2.11E+01	8.25E-03	5.51E+00	2.62E+00	2.92E+01
3.50	3.71E+01	1.45E-02	1.00E+01	9.13E+00	5.62E+01
4.50	5.12E+01	2.01E-02	1.43E+01	2.14E+01	8.70E+01
5.50	4.76E+01	1.86E-02	1.39E+01	3.08E+01	9.22E+01
6.50	3.12E+01	1.22E-02	9.55E+00	2.94E+01	7.02E+01
7.50	2.15E+01	8.42E-03	6.89E+00	2.81E+01	5.65E+01
8.50	1.66E+01	6.49E-03	5.57E+00	2.91E+01	5.12E+01
9.50	1.13E+01	4.41E-03	3.95E+00	2.58E+01	4.10E+01
15.00	6.81E+01	2.67E-02	2.80E+01	4.53E+02	5.49E+02
25.00	2.51E+01	9.83E-03	1.12E+01	5.02E+02	5.38E+02
35.00	1.17E+01	4.57E-03	5.36E+00	4.67E+02	4.85E+02
45.00	7.71E+00	3.02E-03	3.57E+00	5.09E+02	5.20E+02
55.00	5.40E-01	2.11E-04	2.51E-01	4.98E+01	5.06E+01
65.00	1.08E+00	4.23E-04	5.04E-01	1.32E+02	1.34E+02
75.00	6.14E-01	2.40E-04	2.86E-01	9.51E+01	9.60E+01
85.00	3.42E-01	1.34E-04	1.60E-01	6.53E+01	6.58E+01
95.00	3.74E-01	1.46E-04	1.75E-01	8.55E+01	8.60E+01
125.00	1.91E-01	7.47E-05	8.94E-02	6.49E+01	6.52E+01

379.253203973174100 total grams airborne in tank
1.484677475309581E-001 total g/s out riser
126.006527468562100 total grams lost out riser
2600.740342209116000 total grams settled on floor
3106.000015735626000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.28E+00	1.90E-06	1.13E+00	1.76E-01	5.59E+00
1.50	1.67E+01	7.41E-06	5.54E+00	5.76E+00	2.80E+01
2.50	1.08E+01	4.79E-06	5.54E+00	1.29E+01	2.92E+01
3.50	1.02E+01	4.55E-06	1.00E+01	3.60E+01	5.62E+01
4.50	6.24E+00	2.78E-06	1.44E+01	6.64E+01	8.70E+01
5.50	2.10E+00	9.33E-07	1.39E+01	7.62E+01	9.22E+01
6.50	4.08E-01	1.81E-07	9.56E+00	6.02E+01	7.02E+01
7.50	6.80E-02	3.03E-08	6.90E+00	4.96E+01	5.65E+01
8.50	1.04E-02	4.63E-09	5.57E+00	4.57E+01	5.12E+01
9.50	1.15E-03	5.12E-10	3.96E+00	3.70E+01	4.10E+01
15.00	8.98E-09	4.00E-15	2.80E+01	5.21E+02	5.49E+02
25.00	1.22E-26	5.43E-33	1.12E+01	5.27E+02	5.38E+02
35.00	0.00E+00	0.00E+00	5.36E+00	4.79E+02	4.85E+02
45.00	0.00E+00	0.00E+00	3.57E+00	5.17E+02	5.20E+02
55.00	0.00E+00	0.00E+00	2.51E-01	5.04E+01	5.06E+01
65.00	0.00E+00	0.00E+00	5.04E-01	1.33E+02	1.34E+02
75.00	0.00E+00	0.00E+00	2.86E-01	9.57E+01	9.60E+01
85.00	0.00E+00	0.00E+00	1.60E-01	6.57E+01	6.58E+01
95.00	0.00E+00	0.00E+00	1.75E-01	8.59E+01	8.60E+01
125.00	0.00E+00	0.00E+00	8.94E-02	6.51E+01	6.52E+01

50.762084647566690 total grams airborne in tank
2.258185661335676E-005 total g/s out riser
126.187971726059900 total grams lost out riser

2929.049987226725000 total grams settled on floor
3106.000015735626000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	7.08E+00	2.77E-03	3.86E+00	2.42E-01	1.12E+01
1.50	3.10E+01	1.22E-02	1.71E+01	7.81E+00	5.59E+01
2.50	2.64E+01	1.04E-02	1.47E+01	1.72E+01	5.84E+01
3.50	4.13E+01	1.61E-02	2.32E+01	4.80E+01	1.12E+02
4.50	5.32E+01	2.08E-02	3.04E+01	9.03E+01	1.74E+02
5.50	4.81E+01	1.88E-02	2.83E+01	1.08E+02	1.84E+02
6.50	3.13E+01	1.23E-02	1.92E+01	8.99E+01	1.40E+02
7.50	2.15E+01	8.42E-03	1.38E+01	7.78E+01	1.13E+02
8.50	1.66E+01	6.49E-03	1.11E+01	7.48E+01	1.02E+02
9.50	1.13E+01	4.41E-03	7.91E+00	6.28E+01	8.20E+01
15.00	6.81E+01	2.67E-02	5.61E+01	9.73E+02	1.10E+03
25.00	2.51E+01	9.83E-03	2.25E+01	1.03E+03	1.08E+03
35.00	1.17E+01	4.57E-03	1.07E+01	9.47E+02	9.69E+02
45.00	7.71E+00	3.02E-03	7.14E+00	1.03E+03	1.04E+03
55.00	5.40E-01	2.11E-04	5.02E-01	1.00E+02	1.01E+02
65.00	1.08E+00	4.23E-04	1.01E+00	2.65E+02	2.67E+02
75.00	6.14E-01	2.40E-04	5.73E-01	1.91E+02	1.92E+02
85.00	3.42E-01	1.34E-04	3.20E-01	1.31E+02	1.32E+02
95.00	3.74E-01	1.46E-04	3.50E-01	1.71E+02	1.72E+02
125.00	1.91E-01	7.47E-05	1.79E-01	1.30E+02	1.30E+02

403.490845307707800 total grams airborne in tank
1.579561519101844E-001 total g/s out riser
268.954872131347700 total grams lost out riser
5539.554347053170000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	6.84E+00	3.04E-06	3.87E+00	4.79E-01	1.12E+01
1.50	2.41E+01	1.07E-05	1.71E+01	1.47E+01	5.59E+01
2.50	1.35E+01	6.02E-06	1.47E+01	3.01E+01	5.84E+01
3.50	1.14E+01	5.06E-06	2.32E+01	7.78E+01	1.12E+02
4.50	6.48E+00	2.88E-06	3.05E+01	1.37E+02	1.74E+02
5.50	2.12E+00	9.42E-07	2.83E+01	1.54E+02	1.84E+02
6.50	4.08E-01	1.82E-07	1.92E+01	1.21E+02	1.40E+02
7.50	6.80E-02	3.03E-08	1.38E+01	9.92E+01	1.13E+02
8.50	1.04E-02	4.63E-09	1.11E+01	9.13E+01	1.02E+02
9.50	1.15E-03	5.12E-10	7.91E+00	7.41E+01	8.20E+01
15.00	8.98E-09	4.00E-15	5.61E+01	1.04E+03	1.10E+03
25.00	1.22E-26	5.43E-33	2.25E+01	1.05E+03	1.08E+03
35.00	0.00E+00	0.00E+00	1.07E+01	9.58E+02	9.69E+02
45.00	0.00E+00	0.00E+00	7.14E+00	1.03E+03	1.04E+03
55.00	0.00E+00	0.00E+00	5.02E-01	1.01E+02	1.01E+02
65.00	0.00E+00	0.00E+00	1.01E+00	2.66E+02	2.67E+02

75.00	0.00E+00	0.00E+00	5.73E-01	1.91E+02	1.92E+02
85.00	0.00E+00	0.00E+00	3.20E-01	1.31E+02	1.32E+02
95.00	0.00E+00	0.00E+00	3.50E-01	1.72E+02	1.72E+02
125.00	0.00E+00	0.00E+00	1.79E-01	1.30E+02	1.30E+02

64.907993058926100 total grams airborne in tank
2.887475894880419E-005 total g/s out riser
269.165601283311800 total grams lost out riser
5877.926496773958000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.66E+00	3.39E-03	7.54E+00	5.68E-01	1.68E+01
1.50	3.53E+01	1.38E-02	3.13E+01	1.73E+01	8.39E+01
2.50	2.78E+01	1.09E-02	2.48E+01	3.49E+01	8.76E+01
3.50	4.17E+01	1.63E-02	3.68E+01	9.02E+01	1.69E+02
4.50	5.32E+01	2.08E-02	4.66E+01	1.61E+02	2.61E+02
5.50	4.81E+01	1.88E-02	4.27E+01	1.86E+02	2.77E+02
6.50	3.13E+01	1.23E-02	2.88E+01	1.50E+02	2.11E+02
7.50	2.15E+01	8.42E-03	2.07E+01	1.27E+02	1.70E+02
8.50	1.66E+01	6.49E-03	1.67E+01	1.20E+02	1.54E+02
9.50	1.13E+01	4.41E-03	1.19E+01	9.99E+01	1.23E+02
15.00	6.81E+01	2.67E-02	8.41E+01	1.49E+03	1.65E+03
25.00	2.51E+01	9.83E-03	3.37E+01	1.56E+03	1.61E+03
35.00	1.17E+01	4.57E-03	1.61E+01	1.43E+03	1.45E+03
45.00	7.71E+00	3.02E-03	1.07E+01	1.54E+03	1.56E+03
55.00	5.40E-01	2.11E-04	7.52E-01	1.51E+02	1.52E+02
65.00	1.08E+00	4.23E-04	1.51E+00	3.98E+02	4.01E+02
75.00	6.14E-01	2.40E-04	8.59E-01	2.86E+02	2.88E+02
85.00	3.42E-01	1.34E-04	4.80E-01	1.97E+02	1.98E+02
95.00	3.74E-01	1.46E-04	5.25E-01	2.57E+02	2.58E+02
125.00	1.91E-01	7.47E-05	2.68E-01	1.95E+02	1.96E+02

411.264626130461700 total grams airborne in tank
1.609993855599896E-001 total g/s out riser
416.925716578960400 total grams lost out riser
8489.809612393379000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.36E+00	3.72E-06	7.55E+00	8.59E-01	1.68E+01
1.50	2.74E+01	1.22E-05	3.13E+01	2.51E+01	8.39E+01
2.50	1.42E+01	6.33E-06	2.49E+01	4.85E+01	8.76E+01
3.50	1.15E+01	5.12E-06	3.68E+01	1.20E+02	1.69E+02
4.50	6.48E+00	2.88E-06	4.66E+01	2.08E+02	2.61E+02
5.50	2.12E+00	9.42E-07	4.28E+01	2.32E+02	2.77E+02
6.50	4.08E-01	1.82E-07	2.89E+01	1.81E+02	2.11E+02
7.50	6.80E-02	3.03E-08	2.07E+01	1.49E+02	1.70E+02

8.50	1.04E-02	4.63E-09	1.67E+01	1.37E+02	1.54E+02
9.50	1.15E-03	5.12E-10	1.19E+01	1.11E+02	1.23E+02
15.00	8.98E-09	4.00E-15	8.41E+01	1.56E+03	1.65E+03
25.00	1.22E-26	5.43E-33	3.37E+01	1.58E+03	1.61E+03
35.00	0.00E+00	0.00E+00	1.61E+01	1.44E+03	1.45E+03
45.00	0.00E+00	0.00E+00	1.07E+01	1.55E+03	1.56E+03
55.00	0.00E+00	0.00E+00	7.52E-01	1.51E+02	1.52E+02
65.00	0.00E+00	0.00E+00	1.51E+00	3.99E+02	4.01E+02
75.00	0.00E+00	0.00E+00	8.59E-01	2.87E+02	2.88E+02
85.00	0.00E+00	0.00E+00	4.80E-01	1.97E+02	1.98E+02
95.00	0.00E+00	0.00E+00	5.25E-01	2.58E+02	2.58E+02
125.00	0.00E+00	0.00E+00	2.68E-01	1.95E+02	1.96E+02

70.589931058949460 total grams airborne in tank
3.140240711602071E-005 total g/s out riser
417.147069692611700 total grams lost out riser
8830.263119935989000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	9.60E+00	3.76E-03	1.18E+01	9.61E-01	2.24E+01
1.50	3.72E+01	1.46E-02	4.67E+01	2.79E+01	1.12E+02
2.50	2.82E+01	1.10E-02	3.52E+01	5.34E+01	1.17E+02
3.50	4.18E+01	1.64E-02	5.04E+01	1.33E+02	2.25E+02
4.50	5.32E+01	2.08E-02	6.27E+01	2.32E+02	3.48E+02
5.50	4.81E+01	1.88E-02	5.72E+01	2.64E+02	3.69E+02
6.50	3.13E+01	1.23E-02	3.85E+01	2.11E+02	2.81E+02
7.50	2.15E+01	8.42E-03	2.76E+01	1.77E+02	2.26E+02
8.50	1.66E+01	6.49E-03	2.23E+01	1.66E+02	2.05E+02
9.50	1.13E+01	4.41E-03	1.58E+01	1.37E+02	1.64E+02
15.00	6.81E+01	2.67E-02	1.12E+02	2.01E+03	2.20E+03
25.00	2.51E+01	9.83E-03	4.50E+01	2.08E+03	2.15E+03
35.00	1.17E+01	4.57E-03	2.14E+01	1.91E+03	1.94E+03
45.00	7.71E+00	3.02E-03	1.43E+01	2.06E+03	2.08E+03
55.00	5.40E-01	2.11E-04	1.00E+00	2.01E+02	2.03E+02
65.00	1.08E+00	4.23E-04	2.02E+00	5.31E+02	5.34E+02
75.00	6.14E-01	2.40E-04	1.15E+00	3.82E+02	3.84E+02
85.00	3.42E-01	1.34E-04	6.40E-01	2.62E+02	2.63E+02
95.00	3.74E-01	1.46E-04	7.00E-01	3.43E+02	3.44E+02
125.00	1.91E-01	7.47E-05	3.58E-01	2.60E+02	2.61E+02

414.520011529326400 total grams airborne in tank
1.622737864163355E-001 total g/s out riser
566.952677130699200 total grams lost out riser
11442.527416110040000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g

.50	9.27E+00	4.12E-06	1.18E+01	1.28E+00	2.24E+01
1.50	2.89E+01	1.29E-05	4.68E+01	3.61E+01	1.12E+02
2.50	1.44E+01	6.41E-06	3.52E+01	6.71E+01	1.17E+02
3.50	1.15E+01	5.12E-06	5.04E+01	1.63E+02	2.25E+02
4.50	6.48E+00	2.88E-06	6.28E+01	2.79E+02	3.48E+02
5.50	2.12E+00	9.42E-07	5.72E+01	3.10E+02	3.69E+02
6.50	4.08E-01	1.82E-07	3.85E+01	2.42E+02	2.81E+02
7.50	6.80E-02	3.03E-08	2.76E+01	1.98E+02	2.26E+02
8.50	1.04E-02	4.63E-09	2.23E+01	1.83E+02	2.05E+02
9.50	1.15E-03	5.12E-10	1.58E+01	1.48E+02	1.64E+02
15.00	8.98E-09	4.00E-15	1.12E+02	2.08E+03	2.20E+03
25.00	1.22E-26	5.43E-33	4.50E+01	2.11E+03	2.15E+03
35.00	0.00E+00	0.00E+00	2.14E+01	1.92E+03	1.94E+03
45.00	0.00E+00	0.00E+00	1.43E+01	2.07E+03	2.08E+03
55.00	0.00E+00	0.00E+00	1.00E+00	2.02E+02	2.03E+02
65.00	0.00E+00	0.00E+00	2.02E+00	5.32E+02	5.34E+02
75.00	0.00E+00	0.00E+00	1.15E+00	3.83E+02	3.84E+02
85.00	0.00E+00	0.00E+00	6.40E-01	2.63E+02	2.63E+02
95.00	0.00E+00	0.00E+00	7.00E-01	3.43E+02	3.44E+02
125.00	0.00E+00	0.00E+00	3.58E-01	2.61E+02	2.61E+02

73.173032361334790 total grams airborne in tank
3.255151791720034E-005 total g/s out riser
567.178659498691600 total grams lost out riser
11783.648455977440000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.02E+01	3.98E-03	1.64E+01	1.39E+00	2.80E+01
1.50	3.81E+01	1.49E-02	6.27E+01	3.90E+01	1.40E+02
2.50	2.83E+01	1.11E-02	4.56E+01	7.21E+01	1.46E+02
3.50	4.18E+01	1.64E-02	6.40E+01	1.75E+02	2.81E+02
4.50	5.32E+01	2.08E-02	7.89E+01	3.03E+02	4.35E+02
5.50	4.81E+01	1.88E-02	7.16E+01	3.42E+02	4.61E+02
6.50	3.13E+01	1.23E-02	4.81E+01	2.72E+02	3.51E+02
7.50	2.15E+01	8.42E-03	3.45E+01	2.27E+02	2.83E+02
8.50	1.66E+01	6.49E-03	2.79E+01	2.12E+02	2.56E+02
9.50	1.13E+01	4.41E-03	1.98E+01	1.74E+02	2.05E+02
15.00	6.81E+01	2.67E-02	1.40E+02	2.54E+03	2.74E+03
25.00	2.51E+01	9.83E-03	5.62E+01	2.61E+03	2.69E+03
35.00	1.17E+01	4.57E-03	2.68E+01	2.38E+03	2.42E+03
45.00	7.71E+00	3.02E-03	1.79E+01	2.58E+03	2.60E+03
55.00	5.40E-01	2.11E-04	1.25E+00	2.51E+02	2.53E+02
65.00	1.08E+00	4.23E-04	2.52E+00	6.64E+02	6.68E+02
75.00	6.14E-01	2.40E-04	1.43E+00	4.78E+02	4.80E+02
85.00	3.42E-01	1.34E-04	8.00E-01	3.28E+02	3.29E+02
95.00	3.74E-01	1.46E-04	8.75E-01	4.29E+02	4.30E+02
125.00	1.91E-01	7.47E-05	4.47E-01	3.25E+02	3.26E+02

416.028181657195100 total grams airborne in tank
1.628641909119324E-001 total g/s out riser
717.922452688217200 total grams lost out riser
14396.049596309660000 total grams settled on floor
15530.000019073490000 total grams made airborne

0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	9.81E+00	4.36E-06	1.64E+01	1.73E+00	2.80E+01
1.50	2.96E+01	1.31E-05	6.28E+01	4.74E+01	1.40E+02
2.50	1.45E+01	6.43E-06	4.57E+01	8.59E+01	1.46E+02
3.50	1.15E+01	5.12E-06	6.40E+01	2.06E+02	2.81E+02
4.50	6.48E+00	2.88E-06	7.89E+01	3.49E+02	4.35E+02
5.50	2.12E+00	9.42E-07	7.16E+01	3.88E+02	4.61E+02
6.50	4.08E-01	1.82E-07	4.82E+01	3.02E+02	3.51E+02
7.50	6.80E-02	3.03E-08	3.45E+01	2.48E+02	2.83E+02
8.50	1.04E-02	4.63E-09	2.79E+01	2.28E+02	2.56E+02
9.50	1.15E-03	5.12E-10	1.98E+01	1.85E+02	2.05E+02
15.00	8.98E-09	4.00E-15	1.40E+02	2.60E+03	2.74E+03
25.00	1.22E-26	5.43E-33	5.62E+01	2.63E+03	2.69E+03
35.00	0.00E+00	0.00E+00	2.68E+01	2.40E+03	2.42E+03
45.00	0.00E+00	0.00E+00	1.79E+01	2.58E+03	2.60E+03
55.00	0.00E+00	0.00E+00	1.25E+00	2.52E+02	2.53E+02
65.00	0.00E+00	0.00E+00	2.52E+00	6.65E+02	6.68E+02
75.00	0.00E+00	0.00E+00	1.43E+00	4.78E+02	4.80E+02
85.00	0.00E+00	0.00E+00	8.00E-01	3.28E+02	3.29E+02
95.00	0.00E+00	0.00E+00	8.75E-01	4.29E+02	4.30E+02
125.00	0.00E+00	0.00E+00	4.47E-01	3.26E+02	3.26E+02

74.422753888434400 total grams airborne in tank
3.310746497092675E-005 total g/s out riser
718.150623738765700 total grams lost out riser
14737.426925539970000 total grams settled on floor
15530.000019073490000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.05E+01	4.11E-03	2.12E+01	1.85E+00	3.35E+01
1.50	3.85E+01	1.51E-02	7.89E+01	5.03E+01	1.68E+02
2.50	2.83E+01	1.11E-02	5.61E+01	9.08E+01	1.75E+02
3.50	4.18E+01	1.64E-02	7.76E+01	2.18E+02	3.37E+02
4.50	5.32E+01	2.08E-02	9.51E+01	3.73E+02	5.22E+02
5.50	4.81E+01	1.88E-02	8.60E+01	4.19E+02	5.53E+02
6.50	3.13E+01	1.23E-02	5.78E+01	3.32E+02	4.21E+02
7.50	2.15E+01	8.42E-03	4.14E+01	2.76E+02	3.39E+02
8.50	1.66E+01	6.49E-03	3.34E+01	2.57E+02	3.07E+02
9.50	1.13E+01	4.41E-03	2.37E+01	2.11E+02	2.46E+02
15.00	6.81E+01	2.67E-02	1.68E+02	3.06E+03	3.29E+03
25.00	2.51E+01	9.83E-03	6.74E+01	3.14E+03	3.23E+03
35.00	1.17E+01	4.57E-03	3.21E+01	2.86E+03	2.91E+03
45.00	7.71E+00	3.02E-03	2.14E+01	3.09E+03	3.12E+03
55.00	5.40E-01	2.11E-04	1.50E+00	3.02E+02	3.04E+02
65.00	1.08E+00	4.23E-04	3.02E+00	7.97E+02	8.01E+02
75.00	6.14E-01	2.40E-04	1.72E+00	5.74E+02	5.76E+02
85.00	3.42E-01	1.34E-04	9.69E-01	3.94E+02	3.95E+02

95.00	3.74E-01	1.46E-04	1.05E+00	5.15E+02	5.16E+02
125.00	1.91E-01	7.47E-05	5.36E-01	3.91E+02	3.91E+02

416.766273126006100 total grams airborne in tank
1.631531356033520E-001 total g/s out riser
869.350722372531900 total grams lost out riser
17349.883290886880000 total grams settled on floor
18636.000000000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.01E+01	4.51E-06	2.12E+01	2.20E+00	3.35E+01
1.50	2.98E+01	1.33E-05	7.90E+01	5.89E+01	1.68E+02
2.50	1.45E+01	6.43E-06	5.61E+01	1.05E+02	1.75E+02
3.50	1.15E+01	5.12E-06	7.76E+01	2.48E+02	3.37E+02
4.50	6.48E+00	2.88E-06	9.51E+01	4.20E+02	5.22E+02
5.50	2.12E+00	9.42E-07	8.60E+01	4.65E+02	5.53E+02
6.50	4.08E-01	1.82E-07	5.78E+01	3.63E+02	4.21E+02
7.50	6.80E-02	3.03E-08	4.14E+01	2.98E+02	3.39E+02
8.50	1.04E-02	4.63E-09	3.34E+01	2.74E+02	3.07E+02
9.50	1.15E-03	5.12E-10	2.37E+01	2.22E+02	2.46E+02
15.00	8.98E-09	4.00E-15	1.68E+02	3.12E+03	3.29E+03
25.00	1.22E-26	5.43E-33	6.74E+01	3.16E+03	3.23E+03
35.00	0.00E+00	0.00E+00	3.21E+01	2.88E+03	2.91E+03
45.00	0.00E+00	0.00E+00	2.14E+01	3.10E+03	3.12E+03
55.00	0.00E+00	0.00E+00	1.50E+00	3.02E+02	3.04E+02
65.00	0.00E+00	0.00E+00	3.02E+00	7.98E+02	8.01E+02
75.00	0.00E+00	0.00E+00	1.72E+00	5.74E+02	5.76E+02
85.00	0.00E+00	0.00E+00	9.60E-01	3.94E+02	3.95E+02
95.00	0.00E+00	0.00E+00	1.05E+00	5.15E+02	5.16E+02
125.00	0.00E+00	0.00E+00	5.36E-01	3.91E+02	3.91E+02

75.052416402167310 total grams airborne in tank
3.338757501453126E-005 total g/s out riser
869.580001711845400 total grams lost out riser
17691.368063449860000 total grams settled on floor
18636.000000000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.07E+01	4.19E-03	2.61E+01	2.32E+00	3.91E+01
1.50	3.86E+01	1.51E-02	9.53E+01	6.18E+01	1.96E+02
2.50	2.83E+01	1.11E-02	6.65E+01	1.10E+02	2.04E+02
3.50	4.18E+01	1.64E-02	9.12E+01	2.61E+02	3.94E+02
4.50	5.32E+01	2.08E-02	1.11E+02	4.44E+02	6.09E+02
5.50	4.81E+01	1.88E-02	1.00E+02	4.97E+02	6.46E+02
6.50	3.13E+01	1.23E-02	6.74E+01	3.93E+02	4.91E+02
7.50	2.15E+01	8.42E-03	4.83E+01	3.26E+02	3.96E+02
8.50	1.66E+01	6.49E-03	3.90E+01	3.03E+02	3.59E+02
9.50	1.13E+01	4.41E-03	2.77E+01	2.48E+02	2.87E+02

15.00	6.81E+01	2.67E-02	1.96E+02	3.58E+03	3.84E+03
25.00	2.51E+01	9.83E-03	7.87E+01	3.66E+03	3.77E+03
35.00	1.17E+01	4.57E-03	3.75E+01	3.34E+03	3.39E+03
45.00	7.71E+00	3.02E-03	2.50E+01	3.61E+03	3.64E+03
55.00	5.40E-01	2.11E-04	1.76E+00	3.52E+02	3.54E+02
65.00	1.08E+00	4.23E-04	3.53E+00	9.30E+02	9.35E+02
75.00	6.14E-01	2.40E-04	2.00E+00	6.69E+02	6.72E+02
85.00	3.42E-01	1.34E-04	1.12E+00	4.59E+02	4.61E+02
95.00	3.74E-01	1.46E-04	1.22E+00	6.01E+02	6.02E+02
125.00	1.91E-01	7.47E-05	6.26E-01	4.56E+02	4.57E+02

417.141284570097900 total grams airborne in tank
1.632999432404176E-001 total g/s out riser
1021.010910511017000 total grams lost out riser
20303.848294973370000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.03E+01	4.59E-06	2.61E+01	2.68E+00	3.91E+01
1.50	3.00E+01	1.33E-05	9.53E+01	7.04E+01	1.96E+02
2.50	1.45E+01	6.44E-06	6.66E+01	1.23E+02	2.04E+02
3.50	1.15E+01	5.12E-06	9.12E+01	2.91E+02	3.94E+02
4.50	6.48E+00	2.88E-06	1.11E+02	4.91E+02	6.09E+02
5.50	2.12E+00	9.42E-07	1.00E+02	5.43E+02	6.46E+02
6.50	4.08E-01	1.82E-07	6.74E+01	4.24E+02	4.91E+02
7.50	6.80E-02	3.03E-08	4.84E+01	3.47E+02	3.96E+02
8.50	1.04E-02	4.63E-09	3.90E+01	3.20E+02	3.59E+02
9.50	1.15E-03	5.12E-10	2.77E+01	2.59E+02	2.87E+02
15.00	8.98E-09	4.00E-15	1.96E+02	3.65E+03	3.84E+03
25.00	1.22E-26	5.43E-33	7.87E+01	3.69E+03	3.77E+03
35.00	0.00E+00	0.00E+00	3.75E+01	3.35E+03	3.39E+03
45.00	0.00E+00	0.00E+00	2.50E+01	3.62E+03	3.64E+03
55.00	0.00E+00	0.00E+00	1.76E+00	3.53E+02	3.54E+02
65.00	0.00E+00	0.00E+00	3.53E+00	9.31E+02	9.35E+02
75.00	0.00E+00	0.00E+00	2.00E+00	6.70E+02	6.72E+02
85.00	0.00E+00	0.00E+00	1.12E+00	4.60E+02	4.61E+02
95.00	0.00E+00	0.00E+00	1.22E+00	6.01E+02	6.02E+02
125.00	0.00E+00	0.00E+00	6.26E-01	4.56E+02	4.57E+02

75.379590588873850 total grams airborne in tank
3.353312008741393E-005 total g/s out riser
1021.240760028362000 total grams lost out riser
20645.380313396450000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.08E+01	4.24E-03	3.11E+01	2.80E+00	4.47E+01
1.50	3.87E+01	1.51E-02	1.12E+02	7.33E+01	2.24E+02

2.50	2.83E+01	1.11E-02	7.70E+01	1.28E+02	2.34E+02
3.50	4.18E+01	1.64E-02	1.05E+02	3.03E+02	4.50E+02
4.50	5.32E+01	2.08E-02	1.27E+02	5.15E+02	6.96E+02
5.50	4.81E+01	1.88E-02	1.15E+02	5.75E+02	7.38E+02
6.50	3.13E+01	1.23E-02	7.71E+01	4.53E+02	5.62E+02
7.50	2.15E+01	8.42E-03	5.53E+01	3.75E+02	4.52E+02
8.50	1.66E+01	6.49E-03	4.46E+01	3.49E+02	4.10E+02
9.50	1.13E+01	4.41E-03	3.16E+01	2.85E+02	3.28E+02
15.00	6.81E+01	2.67E-02	2.24E+02	4.10E+03	4.39E+03
25.00	2.51E+01	9.83E-03	8.99E+01	4.19E+03	4.30E+03
35.00	1.17E+01	4.57E-03	4.28E+01	3.82E+03	3.88E+03
45.00	7.71E+00	3.02E-03	2.86E+01	4.13E+03	4.16E+03
55.00	5.40E-01	2.11E-04	2.01E+00	4.02E+02	4.05E+02
65.00	1.08E+00	4.23E-04	4.03E+00	1.06E+03	1.07E+03
75.00	6.14E-01	2.40E-04	2.29E+00	7.65E+02	7.68E+02
85.00	3.42E-01	1.34E-04	1.28E+00	5.25E+02	5.27E+02
95.00	3.74E-01	1.46E-04	1.40E+00	6.87E+02	6.88E+02
125.00	1.91E-01	7.47E-05	7.15E-01	5.21E+02	5.22E+02

417.337461099028600 total grams airborne in tank
1.633767419625656E-001 total g/s out riser
1172.791954219341000 total grams lost out riser
23257.871569633480000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.04E+01	4.64E-06	3.11E+01	3.16E+00	4.47E+01
1.50	3.00E+01	1.34E-05	1.12E+02	8.19E+01	2.24E+02
2.50	1.45E+01	6.44E-06	7.70E+01	1.42E+02	2.34E+02
3.50	1.15E+01	5.12E-06	1.05E+02	3.33E+02	4.50E+02
4.50	6.48E+00	2.88E-06	1.27E+02	5.62E+02	6.96E+02
5.50	2.12E+00	9.42E-07	1.15E+02	6.21E+02	7.38E+02
6.50	4.08E-01	1.82E-07	7.71E+01	4.84E+02	5.62E+02
7.50	6.80E-02	3.03E-08	5.53E+01	3.97E+02	4.52E+02
8.50	1.04E-02	4.63E-09	4.46E+01	3.65E+02	4.10E+02
9.50	1.15E-03	5.12E-10	3.17E+01	2.96E+02	3.28E+02
15.00	8.98E-09	4.00E-15	2.24E+02	4.17E+03	4.39E+03
25.00	1.22E-26	5.43E-33	8.99E+01	4.21E+03	4.30E+03
35.00	0.00E+00	0.00E+00	4.28E+01	3.83E+03	3.88E+03
45.00	0.00E+00	0.00E+00	2.86E+01	4.13E+03	4.16E+03
55.00	0.00E+00	0.00E+00	2.01E+00	4.03E+02	4.05E+02
65.00	0.00E+00	0.00E+00	4.03E+00	1.06E+03	1.07E+03
75.00	0.00E+00	0.00E+00	2.29E+00	7.66E+02	7.68E+02
85.00	0.00E+00	0.00E+00	1.28E+00	5.25E+02	5.27E+02
95.00	0.00E+00	0.00E+00	1.40E+00	6.87E+02	6.88E+02
125.00	0.00E+00	0.00E+00	7.15E-01	5.21E+02	5.22E+02

75.553933698004710 total grams airborne in tank
3.361067770285497E-005 total g/s out riser
1173.022085547447000 total grams lost out riser
23599.424887180330000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.09E+01	4.26E-03	3.61E+01	3.28E+00	5.03E+01
1.50	3.87E+01	1.52E-02	1.28E+02	8.48E+01	2.52E+02
2.50	2.83E+01	1.11E-02	8.74E+01	1.47E+02	2.63E+02
3.50	4.18E+01	1.64E-02	1.18E+02	3.46E+02	5.06E+02
4.50	5.32E+01	2.08E-02	1.44E+02	5.86E+02	7.83E+02
5.50	4.81E+01	1.88E-02	1.29E+02	6.53E+02	8.30E+02
6.50	3.13E+01	1.23E-02	8.67E+01	5.14E+02	6.32E+02
7.50	2.15E+01	8.42E-03	6.22E+01	4.25E+02	5.09E+02
8.50	1.66E+01	6.49E-03	5.01E+01	3.95E+02	4.61E+02
9.50	1.13E+01	4.41E-03	3.56E+01	3.22E+02	3.69E+02
15.00	6.81E+01	2.67E-02	2.52E+02	4.62E+03	4.94E+03
25.00	2.51E+01	9.83E-03	1.01E+02	4.72E+03	4.84E+03
35.00	1.17E+01	4.57E-03	4.82E+01	4.30E+03	4.36E+03
45.00	7.71E+00	3.02E-03	3.21E+01	4.64E+03	4.68E+03
55.00	5.40E-01	2.11E-04	2.26E+00	4.53E+02	4.56E+02
65.00	1.08E+00	4.23E-04	4.53E+00	1.20E+03	1.20E+03
75.00	6.14E-01	2.40E-04	2.58E+00	8.61E+02	8.64E+02
85.00	3.42E-01	1.34E-04	1.44E+00	5.91E+02	5.93E+02
95.00	3.74E-01	1.46E-04	1.57E+00	7.72E+02	7.74E+02
125.00	1.91E-01	7.47E-05	8.05E-01	5.86E+02	5.87E+02

417.442588433623300 total grams airborne in tank
1.634178966414765E-001 total g/s out riser
1324.637574553490000 total grams lost out riser
26211.920911073680000 total grams settled on floor
27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.05E+01	4.67E-06	3.62E+01	3.65E+00	5.03E+01
1.50	3.01E+01	1.34E-05	1.28E+02	9.34E+01	2.52E+02
2.50	1.45E+01	6.44E-06	8.75E+01	1.61E+02	2.63E+02
3.50	1.15E+01	5.12E-06	1.18E+02	3.76E+02	5.06E+02
4.50	6.48E+00	2.88E-06	1.44E+02	6.33E+02	7.83E+02
5.50	2.12E+00	9.42E-07	1.29E+02	6.99E+02	8.30E+02
6.50	4.08E-01	1.82E-07	8.67E+01	5.45E+02	6.32E+02
7.50	6.80E-02	3.03E-08	6.22E+01	4.47E+02	5.09E+02
8.50	1.04E-02	4.63E-09	5.01E+01	4.11E+02	4.61E+02
9.50	1.15E-03	5.12E-10	3.56E+01	3.33E+02	3.69E+02
15.00	8.98E-09	4.00E-15	2.52E+02	4.69E+03	4.94E+03
25.00	1.22E-26	5.43E-33	1.01E+02	4.74E+03	4.84E+03
35.00	0.00E+00	0.00E+00	4.82E+01	4.31E+03	4.36E+03
45.00	0.00E+00	0.00E+00	3.21E+01	4.65E+03	4.68E+03
55.00	0.00E+00	0.00E+00	2.26E+00	4.53E+02	4.56E+02
65.00	0.00E+00	0.00E+00	4.53E+00	1.20E+03	1.20E+03
75.00	0.00E+00	0.00E+00	2.58E+00	8.61E+02	8.64E+02
85.00	0.00E+00	0.00E+00	1.44E+00	5.91E+02	5.93E+02
95.00	0.00E+00	0.00E+00	1.57E+00	7.73E+02	7.74E+02
125.00	0.00E+00	0.00E+00	8.05E-01	5.86E+02	5.87E+02

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    75.648837643927560 total grams airborne in tank
3.365289644691127E-005 total g/s out riser
  1324.867856562138000 total grams lost out riser
 26553.484482288360000 total grams settled on floor
 27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed
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TABLE 1. 500,000 GALLON TANK

IL = In-leakage, cubic feet per minute @ 14.7 psia and 70°F
WH = Waste height, inches
PR = Penetration rate, inches per minute

Values are in total mass (grams) of dust flowing up the exhaust riser for the drilling of one complete core that is WH inches long.

	PR=.5	PR=1	PR=2	PR=3	PR=4
IL=0					
WH=19	51.5	36.4	24.7	16.4	16.2
WH=76	289.1	147.3	138.2	90.3	89.0
WH=114	491.6	359.5	246.4	162.8	161.1
WH=171	835.5	639.3	454.3	307.0	306.3
IL=500					
WH=19	114.2	82.2	56.5	45.8	37.1
WH=76	605.9	324.8	309.9	204.3	201.8
WH=114	172.0	768.2	544.9	365.3	362.8
WH=171	1642.9	1324.9	983.6	679.4	681.5
IL=1000					
WH=19	172.0	125.9	87.3	58.2	57.6
WH=76	874.1	487.2	472.4	314.5	311.5
WH=114	1413.5	1126.2	821.6	588.3	556.5
WH=171	2293.0	1909.3	1460.8	1026.8	1035.0
IL=1400					
WH=19	215.0	159.4	111.4	74.4	73.8
WH=76	1063.6	607.8	596.6	400.2	397.1
WH=114	1703.4	1385.5	1029.6	706.6	706.2
WH=171	1741.0	2326.3	1813.8	1289.8	1304.6
IL=2100					
WH=19	284.5	215.5	152.6	102.5	101.9
WH=76	1355.6	802.3	802.7	545.2	542.7
WH=114	2147.7	1794.9	1369.7	954.6	958.2
WH=171	3418.0	2976.3	2382.8	1723.3	1752.2

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

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ADDITIONAL PARAMETERS:

```
particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     1060.895809739524000
bypass fraction =   0.000000000000000E+000

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000
Output divisions in Period        3.000000000000000 =        1.000000
Output divisions in Period        4.000000000000000 =        1.000000
Output divisions in Period        5.000000000000000 =        1.000000
Output divisions in Period        6.000000000000000 =        1.000000
Output divisions in Period        7.000000000000000 =        1.000000
Output divisions in Period        8.000000000000000 =        1.000000
Output divisions in Period        9.000000000000000 =        1.000000
Output divisions in Period       10.000000000000000 =        1.000000
Output divisions in Period       11.000000000000000 =        1.000000
Output divisions in Period       12.000000000000000 =        1.000000
Output divisions in Period       13.000000000000000 =        1.000000
Output divisions in Period       14.000000000000000 =        1.000000
Output divisions in Period       15.000000000000000 =        1.000000
Output divisions in Period       16.000000000000000 =        1.000000
Output divisions in Period       17.000000000000000 =        1.000000
Output divisions in Period       18.000000000000000 =        1.000000


Flow out @    0.000000E+00 min =     2480.000000 cfm &      155.300000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      100.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      180.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      240.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      260.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      320.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      340.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      420.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      500.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      580.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      640.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      660.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m


**** OUTPUT @       20.000000000000000 minutes ****

  diam     airborne    outflow    totalout    totalflr    source
  mcrn        g          g/s         g           g          g
```

.50	3.09E+00	3.40E-03	2.48E+00	2.13E-02	5.59E+00
1.50	1.50E+01	1.65E-02	1.22E+01	7.72E-01	2.80E+01
2.50	1.49E+01	1.64E-02	1.23E+01	2.07E+00	2.92E+01
3.50	2.65E+01	2.93E-02	2.24E+01	7.27E+00	5.62E+01
4.50	3.73E+01	4.11E-02	3.25E+01	1.72E+01	8.70E+01
5.50	3.53E+01	3.90E-02	3.19E+01	2.50E+01	9.22E+01
6.50	2.38E+01	2.62E-02	2.22E+01	2.42E+01	7.02E+01
7.50	1.68E+01	1.85E-02	1.62E+01	2.35E+01	5.65E+01
8.50	1.32E+01	1.46E-02	1.33E+01	2.47E+01	5.12E+01
9.50	9.23E+00	1.02E-02	9.59E+00	2.22E+01	4.10E+01
15.00	6.16E+01	6.80E-02	7.24E+01	4.15E+02	5.49E+02
25.00	2.41E+01	2.66E-02	3.05E+01	4.83E+02	5.38E+02
35.00	1.14E+01	1.26E-02	1.48E+01	4.58E+02	4.85E+02
45.00	7.62E+00	8.41E-03	9.94E+00	5.03E+02	5.20E+02
55.00	5.35E-01	5.90E-04	7.01E-01	4.94E+01	5.06E+01
65.00	1.07E+00	1.18E-03	1.41E+00	1.31E+02	1.34E+02
75.00	6.10E-01	6.73E-04	8.03E-01	9.46E+01	9.60E+01
85.00	3.41E-01	3.76E-04	4.49E-01	6.51E+01	6.58E+01
95.00	3.73E-01	4.11E-04	4.91E-01	8.52E+01	8.60E+01
125.00	1.90E-01	2.10E-04	2.51E-01	6.48E+01	6.52E+01

303.005901545286200 total grams airborne in tank
3.342896553222090E-001 total g/s out riser
306.840727359056500 total grams lost out riser
2496.153413446620000 total grams settled on floor
3106.000015735626000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	2.98E+00	1.32E-06	2.49E+00	1.25E-01	5.59E+00
1.50	1.16E+01	5.18E-06	1.22E+01	4.11E+00	2.80E+01
2.50	7.59E+00	3.38E-06	1.23E+01	9.31E+00	2.92E+01
3.50	7.31E+00	3.25E-06	2.25E+01	2.64E+01	5.62E+01
4.50	4.54E+00	2.02E-06	3.25E+01	4.99E+01	8.70E+01
5.50	1.56E+00	6.93E-07	3.19E+01	5.88E+01	9.22E+01
6.50	3.10E-01	1.38E-07	2.22E+01	4.77E+01	7.02E+01
7.50	5.30E-02	2.36E-08	1.62E+01	4.02E+01	5.65E+01
8.50	8.32E-03	3.70E-09	1.33E+01	3.79E+01	5.12E+01
9.50	9.43E-04	4.20E-10	9.59E+00	3.14E+01	4.10E+01
15.00	8.12E-09	3.61E-15	7.24E+01	4.76E+02	5.49E+02
25.00	1.17E-26	5.22E-33	3.05E+01	5.07E+02	5.38E+02
35.00	0.00E+00	0.00E+00	1.48E+01	4.70E+02	4.85E+02
45.00	0.00E+00	0.00E+00	9.94E+00	5.10E+02	5.20E+02
55.00	0.00E+00	0.00E+00	7.01E-01	4.99E+01	5.06E+01
65.00	0.00E+00	0.00E+00	1.41E+00	1.32E+02	1.34E+02
75.00	0.00E+00	0.00E+00	8.03E-01	9.52E+01	9.60E+01
85.00	0.00E+00	0.00E+00	4.49E-01	6.54E+01	6.58E+01
95.00	0.00E+00	0.00E+00	4.91E-01	8.55E+01	8.60E+01
125.00	0.00E+00	0.00E+00	2.51E-01	6.50E+01	6.52E+01

35.992678532292820 total grams airborne in tank
1.601158628617416E-005 total g/s out riser
306.973193168640100 total grams lost out riser
2763.034149453044000 total grams settled on floor
3106.000015735626000 total grams made airborne

0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.87E+00	4.27E-03	7.15E+00	1.65E-01	1.12E+01
1.50	1.78E+01	1.97E-02	3.27E+01	5.40E+00	5.59E+01
2.50	1.65E+01	1.82E-02	2.97E+01	1.22E+01	5.84E+01
3.50	2.78E+01	3.07E-02	4.95E+01	3.52E+01	1.12E+02
4.50	3.79E+01	4.18E-02	6.76E+01	6.85E+01	1.74E+02
5.50	3.55E+01	3.92E-02	6.45E+01	8.45E+01	1.84E+02
6.50	2.38E+01	2.62E-02	4.45E+01	7.21E+01	1.40E+02
7.50	1.68E+01	1.85E-02	3.25E+01	6.38E+01	1.13E+02
8.50	1.32E+01	1.46E-02	2.66E+01	6.26E+01	1.02E+02
9.50	9.23E+00	1.02E-02	1.92E+01	5.36E+01	8.20E+01
15.00	6.16E+01	6.80E-02	1.45E+02	8.91E+02	1.10E+03
25.00	2.41E+01	2.66E-02	6.10E+01	9.91E+02	1.08E+03
35.00	1.14E+01	1.26E-02	2.96E+01	9.28E+02	9.69E+02
45.00	7.62E+00	8.41E-03	1.99E+01	1.01E+03	1.04E+03
55.00	5.35E-01	5.90E-04	1.40E+00	9.93E+01	1.01E+02
65.00	1.07E+00	1.18E-03	2.82E+00	2.63E+02	2.67E+02
75.00	6.10E-01	6.73E-04	1.61E+00	1.90E+02	1.92E+02
85.00	3.41E-01	3.76E-04	8.98E-01	1.30E+02	1.32E+02
95.00	3.73E-01	4.11E-04	9.82E-01	1.71E+02	1.72E+02
125.00	1.90E-01	2.10E-04	5.03E-01	1.30E+02	1.30E+02

310.288353890180600 total grams airborne in tank
3.423239830881357E-001 total g/s out riser
637.467280149459800 total grams lost out riser
5264.244410604239000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.73E+00	1.66E-06	7.15E+00	2.94E-01	1.12E+01
1.50	1.39E+01	6.16E-06	3.27E+01	9.37E+00	5.59E+01
2.50	8.42E+00	3.75E-06	2.97E+01	2.03E+01	5.84E+01
3.50	7.66E+00	3.41E-06	4.95E+01	5.53E+01	1.12E+02
4.50	4.61E+00	2.05E-06	6.76E+01	1.02E+02	1.74E+02
5.50	1.56E+00	6.96E-07	6.45E+01	1.18E+02	1.84E+02
6.50	3.10E-01	1.38E-07	4.46E+01	9.55E+01	1.40E+02
7.50	5.30E-02	2.36E-08	3.25E+01	8.05E+01	1.13E+02
8.50	8.32E-03	3.70E-09	2.66E+01	7.59E+01	1.02E+02
9.50	9.43E-04	4.20E-10	1.92E+01	6.28E+01	8.20E+01
15.00	8.12E-09	3.61E-15	1.45E+02	9.53E+02	1.10E+03
25.00	1.17E-26	5.22E-33	6.10E+01	1.01E+03	1.08E+03
35.00	0.00E+00	0.00E+00	2.96E+01	9.39E+02	9.69E+02
45.00	0.00E+00	0.00E+00	1.99E+01	1.02E+03	1.04E+03
55.00	0.00E+00	0.00E+00	1.40E+00	9.99E+01	1.01E+02
65.00	0.00E+00	0.00E+00	2.82E+00	2.64E+02	2.67E+02
75.00	0.00E+00	0.00E+00	1.61E+00	1.90E+02	1.92E+02
85.00	0.00E+00	0.00E+00	8.98E-01	1.31E+02	1.32E+02

95.00	0.00E+00	0.00E+00	9.82E-01	1.71E+02	1.72E+02
125.00	0.00E+00	0.00E+00	5.03E-01	1.30E+02	1.30E+02

40.214880506715030 total grams airborne in tank
1.788986127269066E-005 total g/s out riser
637.608510494232200 total grams lost out riser
5534.176658391953000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.07E+00	4.49E-03	1.24E+01	3.39E-01	1.68E+01
1.50	1.84E+01	2.03E-02	5.47E+01	1.08E+01	8.39E+01
2.50	1.66E+01	1.84E-02	4.76E+01	2.33E+01	8.76E+01
3.50	2.78E+01	3.07E-02	7.67E+01	6.41E+01	1.69E+02
4.50	3.79E+01	4.18E-02	1.03E+02	1.20E+02	2.61E+02
5.50	3.55E+01	3.92E-02	9.72E+01	1.44E+02	2.77E+02
6.50	2.38E+01	2.62E-02	6.69E+01	1.20E+02	2.11E+02
7.50	1.68E+01	1.85E-02	4.88E+01	1.04E+02	1.70E+02
8.50	1.32E+01	1.46E-02	3.99E+01	1.01E+02	1.54E+02
9.50	9.23E+00	1.02E-02	2.88E+01	8.50E+01	1.23E+02
15.00	6.16E+01	6.80E-02	2.17E+02	1.37E+03	1.65E+03
25.00	2.41E+01	2.66E-02	9.16E+01	1.50E+03	1.61E+03
35.00	1.14E+01	1.26E-02	4.44E+01	1.40E+03	1.45E+03
45.00	7.62E+00	8.41E-03	2.98E+01	1.52E+03	1.56E+03
55.00	5.35E-01	5.90E-04	2.10E+00	1.49E+02	1.52E+02
65.00	1.07E+00	1.18E-03	4.23E+00	3.95E+02	4.01E+02
75.00	6.10E-01	6.73E-04	2.41E+00	2.85E+02	2.88E+02
85.00	3.41E-01	3.76E-04	1.35E+00	1.96E+02	1.98E+02
95.00	3.73E-01	4.11E-04	1.47E+00	2.56E+02	2.58E+02
125.00	1.90E-01	2.10E-04	7.54E-01	1.95E+02	1.96E+02

311.274894684553100 total grams airborne in tank
3.434123783372343E-001 total g/s out riser
971.044855296611800 total grams lost out riser
8035.680298298597000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.92E+00	1.75E-06	1.24E+01	4.75E-01	1.68E+01
1.50	1.43E+01	6.35E-06	5.47E+01	1.49E+01	8.39E+01
2.50	8.51E+00	3.79E-06	4.77E+01	3.14E+01	8.76E+01
3.50	7.68E+00	3.42E-06	7.67E+01	8.43E+01	1.69E+02
4.50	4.61E+00	2.05E-06	1.03E+02	1.54E+02	2.61E+02
5.50	1.56E+00	6.96E-07	9.72E+01	1.78E+02	2.77E+02
6.50	3.10E-01	1.38E-07	6.69E+01	1.43E+02	2.11E+02
7.50	5.30E-02	2.36E-08	4.88E+01	1.21E+02	1.70E+02
8.50	8.32E-03	3.70E-09	3.99E+01	1.14E+02	1.54E+02
9.50	9.43E-04	4.20E-10	2.88E+01	9.42E+01	1.23E+02

15.00	8.12E-09	3.61E-15	2.17E+02	1.43E+03	1.65E+03
25.00	1.17E-26	5.22E-33	9.16E+01	1.52E+03	1.61E+03
35.00	0.00E+00	0.00E+00	4.44E+01	1.41E+03	1.45E+03
45.00	0.00E+00	0.00E+00	2.98E+01	1.53E+03	1.56E+03
55.00	0.00E+00	0.00E+00	2.10E+00	1.50E+02	1.52E+02
65.00	0.00E+00	0.00E+00	4.23E+00	3.96E+02	4.01E+02
75.00	0.00E+00	0.00E+00	2.41E+00	2.86E+02	2.88E+02
85.00	0.00E+00	0.00E+00	1.35E+00	1.96E+02	1.98E+02
95.00	0.00E+00	0.00E+00	1.47E+00	2.57E+02	2.58E+02
125.00	0.00E+00	0.00E+00	7.54E-01	1.95E+02	1.96E+02

40.934478770217150 total grams airborne in tank
1.820997887977949E-005 total g/s out riser
971.187435746192900 total grams lost out riser
8305.878116846085000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.12E+00	4.54E-03	1.77E+01	5.21E-01	2.24E+01
1.50	1.85E+01	2.04E-02	7.71E+01	1.63E+01	1.12E+02
2.50	1.67E+01	1.84E-02	6.57E+01	3.45E+01	1.17E+02
3.50	2.78E+01	3.07E-02	1.04E+02	9.31E+01	2.25E+02
4.50	3.79E+01	4.18E-02	1.38E+02	1.72E+02	3.48E+02
5.50	3.55E+01	3.92E-02	1.30E+02	2.04E+02	3.69E+02
6.50	2.38E+01	2.62E-02	8.92E+01	1.68E+02	2.81E+02
7.50	1.68E+01	1.85E-02	6.50E+01	1.44E+02	2.26E+02
8.50	1.32E+01	1.46E-02	5.32E+01	1.39E+02	2.05E+02
9.50	9.23E+00	1.02E-02	3.84E+01	1.16E+02	1.64E+02
15.00	6.16E+01	6.80E-02	2.90E+02	1.84E+03	2.20E+03
25.00	2.41E+01	2.66E-02	1.22E+02	2.01E+03	2.15E+03
35.00	1.14E+01	1.26E-02	5.92E+01	1.87E+03	1.94E+03
45.00	7.62E+00	8.41E-03	3.98E+01	2.03E+03	2.08E+03
55.00	5.35E-01	5.90E-04	2.80E+00	1.99E+02	2.03E+02
65.00	1.07E+00	1.18E-03	5.64E+00	5.28E+02	5.34E+02
75.00	6.10E-01	6.73E-04	3.21E+00	3.80E+02	3.84E+02
85.00	3.41E-01	3.76E-04	1.80E+00	2.61E+02	2.63E+02
95.00	3.73E-01	4.11E-04	1.96E+00	3.42E+02	3.44E+02
125.00	1.90E-01	2.10E-04	1.01E+00	2.60E+02	2.61E+02

311.450306862592700 total grams airborne in tank
3.436059011146426E-001 total g/s out riser
1305.133932471275000 total grams lost out riser
10807.415906488900000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.97E+00	1.77E-06	1.77E+01	6.59E-01	2.24E+01
1.50	1.44E+01	6.38E-06	7.71E+01	2.04E+01	1.12E+02

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2.50	8.52E+00	3.79E-06	6.57E+01	4.26E+01	1.17E+02
3.50	7.68E+00	3.42E-06	1.04E+02	1.13E+02	2.25E+02
4.50	4.61E+00	2.05E-06	1.38E+02	2.05E+02	3.48E+02
5.50	1.56E+00	6.96E-07	1.30E+02	2.38E+02	3.69E+02
6.50	3.10E-01	1.38E-07	8.92E+01	1.91E+02	2.81E+02
7.50	5.30E-02	2.36E-08	6.50E+01	1.61E+02	2.26E+02
8.50	8.32E-03	3.70E-09	5.32E+01	1.52E+02	2.05E+02
9.50	9.43E-04	4.20E-10	3.84E+01	1.26E+02	1.64E+02
15.00	8.12E-09	3.61E-15	2.90E+02	1.91E+03	2.20E+03
25.00	1.17E-26	5.22E-33	1.22E+02	2.03E+03	2.15E+03
35.00	0.00E+00	0.00E+00	5.92E+01	1.88E+03	1.94E+03
45.00	0.00E+00	0.00E+00	3.98E+01	2.04E+03	2.08E+03
55.00	0.00E+00	0.00E+00	2.80E+00	2.00E+02	2.03E+02
65.00	0.00E+00	0.00E+00	5.64E+00	5.29E+02	5.34E+02
75.00	0.00E+00	0.00E+00	3.21E+00	3.81E+02	3.84E+02
85.00	0.00E+00	0.00E+00	1.80E+00	2.62E+02	2.63E+02
95.00	0.00E+00	0.00E+00	1.96E+00	3.42E+02	3.44E+02
125.00	0.00E+00	0.00E+00	1.01E+00	2.60E+02	2.61E+02

41.073536168059550 total grams airborne in tank
1.827183981037972E-005 total g/s out riser
1305.276749610901000 total grams lost out riser
11077.649837553500000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.13E+00	4.56E-03	2.31E+01	7.06E-01	2.80E+01
1.50	1.85E+01	2.04E-02	9.95E+01	2.18E+01	1.40E+02
2.50	1.67E+01	1.84E-02	8.37E+01	4.56E+01	1.46E+02
3.50	2.78E+01	3.07E-02	1.31E+02	1.22E+02	2.81E+02
4.50	3.79E+01	4.18E-02	1.73E+02	2.24E+02	4.35E+02
5.50	3.55E+01	3.92E-02	1.63E+02	2.63E+02	4.61E+02
6.50	2.38E+01	2.62E-02	1.12E+02	2.16E+02	3.51E+02
7.50	1.68E+01	1.85E-02	8.13E+01	1.85E+02	2.83E+02
8.50	1.32E+01	1.46E-02	6.66E+01	1.76E+02	2.56E+02
9.50	9.23E+00	1.02E-02	4.80E+01	1.48E+02	2.05E+02
15.00	6.16E+01	6.80E-02	3.62E+02	2.32E+03	2.74E+03
25.00	2.41E+01	2.66E-02	1.53E+02	2.51E+03	2.69E+03
35.00	1.14E+01	1.26E-02	7.40E+01	2.34E+03	2.42E+03
45.00	7.62E+00	8.41E-03	4.97E+01	2.54E+03	2.60E+03
55.00	5.35E-01	5.90E-04	3.50E+00	2.49E+02	2.53E+02
65.00	1.07E+00	1.18E-03	7.05E+00	6.60E+02	6.68E+02
75.00	6.10E-01	6.73E-04	4.01E+00	4.75E+02	4.80E+02
85.00	3.41E-01	3.76E-04	2.24E+00	3.27E+02	3.29E+02
95.00	3.73E-01	4.11E-04	2.46E+00	4.27E+02	4.30E+02
125.00	1.90E-01	2.10E-04	1.26E+00	3.25E+02	3.26E+02

311.484858959913300 total grams airborne in tank
3.436440196819603E-001 total g/s out riser
1639.322544097900000 total grams lost out riser
13579.192811846730000 total grams settled on floor
15530.000019073490000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.77E-06	2.31E+01	8.44E-01	2.80E+01
1.50	1.44E+01	6.39E-06	9.95E+01	2.59E+01	1.40E+02
2.50	8.52E+00	3.79E-06	8.37E+01	5.37E+01	1.46E+02
3.50	7.68E+00	3.42E-06	1.31E+02	1.42E+02	2.81E+02
4.50	4.61E+00	2.05E-06	1.73E+02	2.57E+02	4.35E+02
5.50	1.56E+00	6.96E-07	1.63E+02	2.97E+02	4.61E+02
6.50	3.10E-01	1.38E-07	1.12E+02	2.39E+02	3.51E+02
7.50	5.30E-02	2.36E-08	8.13E+01	2.01E+02	2.83E+02
8.50	8.32E-03	3.70E-09	6.66E+01	1.90E+02	2.56E+02
9.50	9.43E-04	4.20E-10	4.80E+01	1.57E+02	2.05E+02
15.00	8.12E-09	3.61E-15	3.62E+02	2.38E+03	2.74E+03
25.00	1.17E-26	5.22E-33	1.53E+02	2.54E+03	2.69E+03
35.00	0.00E+00	0.00E+00	7.40E+01	2.35E+03	2.42E+03
45.00	0.00E+00	0.00E+00	4.97E+01	2.55E+03	2.60E+03
55.00	0.00E+00	0.00E+00	3.50E+00	2.50E+02	2.53E+02
65.00	0.00E+00	0.00E+00	7.05E+00	6.61E+02	6.68E+02
75.00	0.00E+00	0.00E+00	4.01E+00	4.76E+02	4.80E+02
85.00	0.00E+00	0.00E+00	2.24E+00	3.27E+02	3.29E+02
95.00	0.00E+00	0.00E+00	2.46E+00	4.28E+02	4.30E+02
125.00	0.00E+00	0.00E+00	1.26E+00	3.25E+02	3.26E+02

41.102149258574690 total grams airborne in tank
1.828456887085206E-005 total g/s out riser
1639.465414285660000 total grams lost out riser
13849.432518601420000 total grams settled on floor
15530.000019073490000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.13E+00	4.56E-03	2.85E+01	8.90E-01	3.35E+01
1.50	1.85E+01	2.04E-02	1.22E+02	2.73E+01	1.68E+02
2.50	1.67E+01	1.84E-02	1.02E+02	5.68E+01	1.75E+02
3.50	2.78E+01	3.07E-02	1.58E+02	1.51E+02	3.37E+02
4.50	3.79E+01	4.18E-02	2.08E+02	2.76E+02	5.22E+02
5.50	3.55E+01	3.92E-02	1.95E+02	3.23E+02	5.53E+02
6.50	2.38E+01	2.62E-02	1.34E+02	2.63E+02	4.21E+02
7.50	1.68E+01	1.85E-02	9.76E+01	2.25E+02	3.39E+02
8.50	1.32E+01	1.46E-02	7.99E+01	2.14E+02	3.07E+02
9.50	9.23E+00	1.02E-02	5.75E+01	1.79E+02	2.46E+02
15.00	6.16E+01	6.80E-02	4.35E+02	2.80E+03	3.29E+03
25.00	2.41E+01	2.66E-02	1.83E+02	3.02E+03	3.23E+03
35.00	1.14E+01	1.26E-02	8.88E+01	2.81E+03	2.91E+03
45.00	7.62E+00	8.41E-03	5.96E+01	3.05E+03	3.12E+03
55.00	5.35E-01	5.90E-04	4.20E+00	2.99E+02	3.04E+02
65.00	1.07E+00	1.18E-03	8.46E+00	7.92E+02	8.01E+02
75.00	6.10E-01	6.73E-04	4.82E+00	5.70E+02	5.76E+02
85.00	3.41E-01	3.76E-04	2.69E+00	3.92E+02	3.95E+02
95.00	3.73E-01	4.11E-04	2.95E+00	5.13E+02	5.16E+02
125.00	1.90E-01	2.10E-04	1.51E+00	3.90E+02	3.91E+02

311.492050617933300 total grams airborne in tank
3.436519540846348E-001 total g/s out riser
1973.531733512878000 total grams lost out riser
16350.976136982440000 total grams settled on floor
18636.000000000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.77E-06	2.85E+01	1.03E+00	3.35E+01
1.50	1.44E+01	6.39E-06	1.22E+02	3.15E+01	1.68E+02
2.50	8.52E+00	3.79E-06	1.02E+02	6.49E+01	1.75E+02
3.50	7.68E+00	3.42E-06	1.58E+02	1.71E+02	3.37E+02
4.50	4.61E+00	2.05E-06	2.08E+02	3.09E+02	5.22E+02
5.50	1.56E+00	6.96E-07	1.95E+02	3.57E+02	5.53E+02
6.50	3.10E-01	1.38E-07	1.34E+02	2.87E+02	4.21E+02
7.50	5.30E-02	2.36E-08	9.76E+01	2.42E+02	3.39E+02
8.50	8.32E-03	3.70E-09	7.99E+01	2.28E+02	3.07E+02
9.50	9.43E-04	4.20E-10	5.75E+01	1.88E+02	2.46E+02
15.00	8.12E-09	3.61E-15	4.35E+02	2.86E+03	3.29E+03
25.00	1.17E-26	5.22E-33	1.83E+02	3.04E+03	3.23E+03
35.00	0.00E+00	0.00E+00	8.88E+01	2.82E+03	2.91E+03
45.00	0.00E+00	0.00E+00	5.96E+01	3.06E+03	3.12E+03
55.00	0.00E+00	0.00E+00	4.20E+00	3.00E+02	3.04E+02
65.00	0.00E+00	0.00E+00	8.46E+00	7.93E+02	8.01E+02
75.00	0.00E+00	0.00E+00	4.82E+00	5.71E+02	5.76E+02
85.00	0.00E+00	0.00E+00	2.69E+00	3.92E+02	3.95E+02
95.00	0.00E+00	0.00E+00	2.95E+00	5.13E+02	5.16E+02
125.00	0.00E+00	0.00E+00	1.51E+00	3.90E+02	3.91E+02

41.108281622847760 total grams airborne in tank
1.828729735495738E-005 total g/s out riser
1973.674642324448000 total grams lost out riser
16621.217181086540000 total grams settled on floor
18636.000000000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.13E+00	4.56E-03	3.39E+01	1.08E+00	3.91E+01
1.50	1.85E+01	2.04E-02	1.44E+02	3.29E+01	1.96E+02
2.50	1.67E+01	1.84E-02	1.20E+02	6.79E+01	2.04E+02
3.50	2.78E+01	3.07E-02	1.86E+02	1.80E+02	3.94E+02
4.50	3.79E+01	4.18E-02	2.43E+02	3.28E+02	6.09E+02
5.50	3.55E+01	3.92E-02	2.28E+02	3.82E+02	6.46E+02
6.50	2.38E+01	2.62E-02	1.56E+02	3.11E+02	4.91E+02
7.50	1.68E+01	1.85E-02	1.14E+02	2.65E+02	3.96E+02
8.50	1.32E+01	1.46E-02	9.32E+01	2.52E+02	3.59E+02
9.50	9.23E+00	1.02E-02	6.71E+01	2.11E+02	2.87E+02
15.00	6.16E+01	6.80E-02	5.07E+02	3.27E+03	3.84E+03
25.00	2.41E+01	2.66E-02	2.14E+02	3.53E+03	3.77E+03

35.00	1.14E+01	1.26E-02	1.04E+02	3.28E+03	3.39E+03
45.00	7.62E+00	8.41E-03	6.96E+01	3.56E+03	3.64E+03
55.00	5.35E-01	5.90E-04	4.90E+00	3.49E+02	3.54E+02
65.00	1.07E+00	1.18E-03	9.87E+00	9.24E+02	9.35E+02
75.00	6.10E-01	6.73E-04	5.62E+00	6.66E+02	6.72E+02
85.00	3.41E-01	3.76E-04	3.14E+00	4.57E+02	4.61E+02
95.00	3.73E-01	4.11E-04	3.44E+00	5.98E+02	6.02E+02
125.00	1.90E-01	2.10E-04	1.76E+00	4.55E+02	4.57E+02

311.493605107069000 total grams airborne in tank
3.436536695808172E-001 total g/s out riser
2307.745400428772000 total grams lost out riser
19122.760971665380000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.77E-06	3.39E+01	1.21E+00	3.91E+01
1.50	1.44E+01	6.39E-06	1.44E+02	3.70E+01	1.96E+02
2.50	8.52E+00	3.79E-06	1.20E+02	7.61E+01	2.04E+02
3.50	7.68E+00	3.42E-06	1.86E+02	2.00E+02	3.94E+02
4.50	4.61E+00	2.05E-06	2.43E+02	3.61E+02	6.09E+02
5.50	1.56E+00	6.96E-07	2.28E+02	4.16E+02	6.46E+02
6.50	3.10E-01	1.38E-07	1.56E+02	3.35E+02	4.91E+02
7.50	5.30E-02	2.36E-08	1.14E+02	2.82E+02	3.96E+02
8.50	8.32E-03	3.70E-09	9.32E+01	2.66E+02	3.59E+02
9.50	9.43E-04	4.20E-10	6.71E+01	2.20E+02	2.87E+02
15.00	8.12E-09	3.61E-15	5.07E+02	3.33E+03	3.84E+03
25.00	1.17E-26	5.22E-33	2.14E+02	3.55E+03	3.77E+03
35.00	0.00E+00	0.00E+00	1.04E+02	3.29E+03	3.39E+03
45.00	0.00E+00	0.00E+00	6.96E+01	3.57E+03	3.64E+03
55.00	0.00E+00	0.00E+00	4.90E+00	3.49E+02	3.54E+02
65.00	0.00E+00	0.00E+00	9.87E+00	9.25E+02	9.35E+02
75.00	0.00E+00	0.00E+00	5.62E+00	6.66E+02	6.72E+02
85.00	0.00E+00	0.00E+00	3.14E+00	4.58E+02	4.61E+02
95.00	0.00E+00	0.00E+00	3.44E+00	5.99E+02	6.02E+02
125.00	0.00E+00	0.00E+00	1.76E+00	4.55E+02	4.57E+02

41.109637270888530 total grams airborne in tank
1.828790034994465E-005 total g/s out riser
2307.888288259506000 total grams lost out riser
19393.002171278000000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	3.93E+01	1.26E+00	4.47E+01
1.50	1.85E+01	2.04E-02	1.67E+02	3.84E+01	2.24E+02
2.50	1.67E+01	1.84E-02	1.38E+02	7.91E+01	2.34E+02
3.50	2.78E+01	3.07E-02	2.13E+02	2.09E+02	4.50E+02

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4.50	3.79E+01	4.18E-02	2.78E+02	3.80E+02	6.96E+02
5.50	3.55E+01	3.92E-02	2.61E+02	4.42E+02	7.38E+02
6.50	2.38E+01	2.62E-02	1.79E+02	3.59E+02	5.62E+02
7.50	1.68E+01	1.85E-02	1.30E+02	3.05E+02	4.52E+02
8.50	1.32E+01	1.46E-02	1.06E+02	2.90E+02	4.10E+02
9.50	9.23E+00	1.02E-02	7.67E+01	2.42E+02	3.28E+02
15.00	6.16E+01	6.80E-02	5.79E+02	3.75E+03	4.39E+03
25.00	2.41E+01	2.66E-02	2.44E+02	4.04E+03	4.30E+03
35.00	1.14E+01	1.26E-02	1.18E+02	3.75E+03	3.88E+03
45.00	7.62E+00	8.41E-03	7.95E+01	4.07E+03	4.16E+03
55.00	5.35E-01	5.90E-04	5.60E+00	3.99E+02	4.05E+02
65.00	1.07E+00	1.18E-03	1.13E+01	1.06E+03	1.07E+03
75.00	6.10E-01	6.73E-04	6.42E+00	7.61E+02	7.68E+02
85.00	3.41E-01	3.76E-04	3.59E+00	5.23E+02	5.27E+02
95.00	3.73E-01	4.11E-04	3.93E+00	6.84E+02	6.88E+02
125.00	1.90E-01	2.10E-04	2.01E+00	5.20E+02	5.22E+02

311.493951767683000 total grams airborne in tank
3.436540500260890E-001 total g/s out riser
2641.960032463074000 total grams lost out riser
21894.545951724050000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	3.93E+01	1.40E+00	4.47E+01
1.50	1.44E+01	6.39E-06	1.67E+02	4.25E+01	2.24E+02
2.50	8.52E+00	3.79E-06	1.38E+02	8.72E+01	2.34E+02
3.50	7.68E+00	3.42E-06	2.13E+02	2.29E+02	4.50E+02
4.50	4.61E+00	2.05E-06	2.78E+02	4.13E+02	6.96E+02
5.50	1.56E+00	6.96E-07	2.61E+02	4.76E+02	7.38E+02
6.50	3.10E-01	1.38E-07	1.79E+02	3.83E+02	5.62E+02
7.50	5.30E-02	2.36E-08	1.30E+02	3.22E+02	4.52E+02
8.50	8.32E-03	3.70E-09	1.07E+02	3.03E+02	4.10E+02
9.50	9.43E-04	4.20E-10	7.67E+01	2.51E+02	3.28E+02
15.00	8.12E-09	3.61E-15	5.79E+02	3.81E+03	4.39E+03
25.00	1.17E-26	5.22E-33	2.44E+02	4.06E+03	4.30E+03
35.00	0.00E+00	0.00E+00	1.18E+02	3.76E+03	3.88E+03
45.00	0.00E+00	0.00E+00	7.95E+01	4.08E+03	4.16E+03
55.00	0.00E+00	0.00E+00	5.60E+00	3.99E+02	4.05E+02
65.00	0.00E+00	0.00E+00	1.13E+01	1.06E+03	1.07E+03
75.00	0.00E+00	0.00E+00	6.42E+00	7.61E+02	7.68E+02
85.00	0.00E+00	0.00E+00	3.59E+00	5.23E+02	5.27E+02
95.00	0.00E+00	0.00E+00	3.93E+00	6.84E+02	6.88E+02
125.00	0.00E+00	0.00E+00	2.01E+00	5.20E+02	5.22E+02

41.109944354018420 total grams airborne in tank
1.828803677414992E-005 total g/s out riser
2642.102843046188000 total grams lost out riser
22164.787242293360000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	4.47E+01	1.45E+00	5.03E+01
1.50	1.85E+01	2.04E-02	1.89E+02	4.39E+01	2.52E+02
2.50	1.67E+01	1.84E-02	1.56E+02	9.03E+01	2.63E+02
3.50	2.78E+01	3.07E-02	2.40E+02	2.38E+02	5.06E+02
4.50	3.79E+01	4.18E-02	3.13E+02	4.31E+02	7.83E+02
5.50	3.55E+01	3.92E-02	2.93E+02	5.02E+02	8.30E+02
6.50	2.38E+01	2.62E-02	2.01E+02	4.07E+02	6.32E+02
7.50	1.68E+01	1.85E-02	1.46E+02	3.46E+02	5.09E+02
8.50	1.32E+01	1.46E-02	1.20E+02	3.28E+02	4.61E+02
9.50	9.23E+00	1.02E-02	8.63E+01	2.73E+02	3.69E+02
15.00	6.16E+01	6.80E-02	6.52E+02	4.23E+03	4.94E+03
25.00	2.41E+01	2.66E-02	2.75E+02	4.54E+03	4.84E+03
35.00	1.14E+01	1.26E-02	1.33E+02	4.22E+03	4.36E+03
45.00	7.62E+00	8.41E-03	8.94E+01	4.59E+03	4.68E+03
55.00	5.35E-01	5.90E-04	6.31E+00	4.49E+02	4.56E+02
65.00	1.07E+00	1.18E-03	1.27E+01	1.19E+03	1.20E+03
75.00	6.10E-01	6.73E-04	7.23E+00	8.56E+02	8.64E+02
85.00	3.41E-01	3.76E-04	4.04E+00	5.88E+02	5.93E+02
95.00	3.73E-01	4.11E-04	4.42E+00	7.70E+02	7.74E+02
125.00	1.90E-01	2.10E-04	2.26E+00	5.85E+02	5.87E+02

311.494029968977000 total grams airborne in tank
3.436541366390884E-001 total g/s out riser
2976.174831390381000 total grams lost out riser
24666.331290841100000 total grams settled on floor
27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	4.47E+01	1.58E+00	5.03E+01
1.50	1.44E+01	6.39E-06	1.89E+02	4.81E+01	2.52E+02
2.50	8.52E+00	3.79E-06	1.56E+02	9.84E+01	2.63E+02
3.50	7.68E+00	3.42E-06	2.40E+02	2.58E+02	5.06E+02
4.50	4.61E+00	2.05E-06	3.13E+02	4.65E+02	7.83E+02
5.50	1.56E+00	6.96E-07	2.93E+02	5.35E+02	8.30E+02
6.50	3.10E-01	1.38E-07	2.01E+02	4.30E+02	6.32E+02
7.50	5.30E-02	2.36E-08	1.46E+02	3.62E+02	5.09E+02
8.50	8.32E-03	3.70E-09	1.20E+02	3.41E+02	4.61E+02
9.50	9.43E-04	4.20E-10	8.63E+01	2.83E+02	3.69E+02
15.00	8.12E-09	3.61E-15	6.52E+02	4.29E+03	4.94E+03
25.00	1.17E-26	5.22E-33	2.75E+02	4.57E+03	4.84E+03
35.00	0.00E+00	0.00E+00	1.33E+02	4.23E+03	4.36E+03
45.00	0.00E+00	0.00E+00	8.94E+01	4.59E+03	4.68E+03
55.00	0.00E+00	0.00E+00	6.31E+00	4.49E+02	4.56E+02
65.00	0.00E+00	0.00E+00	1.27E+01	1.19E+03	1.20E+03
75.00	0.00E+00	0.00E+00	7.23E+00	8.57E+02	8.64E+02
85.00	0.00E+00	0.00E+00	4.04E+00	5.89E+02	5.93E+02
95.00	0.00E+00	0.00E+00	4.42E+00	7.70E+02	7.74E+02
125.00	0.00E+00	0.00E+00	2.26E+00	5.85E+02	5.87E+02

41.110015879592150 total grams airborne in tank

```
1.828806883383816E-005 total g/s out riser
  2976.317687749863000 total grams lost out riser
 24936.572754859920000 total grams settled on floor
 27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed
```

TABLE 2. 750,000 GALLON TANK

IL = In-leakage, cubic feet per minute @ 14.7 psia and 70°F
WH = Waste height, inches
PR = Penetration rate, inches per minute

Values are in total mass (grams) of dust flowing up the exhaust riser for the drilling of one complete core that is WH inches long.

	PR=.5	PR=1	PR=2	PR=3	PR=4
IL=0					
WH=19	44.6	31.0	20.7	17.4	13.3
WH=95	435.3	241.3	158.9	132.2	100.2
WH=171	731.6	532.1	360.4	303.2	231.9
WH=266	1305.0	1002.2	713.1	614.1	479.4
IL=500					
WH=19	99.9	70.4	47.5	40.0	30.6
WH=95	725.5	528.7	356.6	227.0	227.0
WH=171	1471.9	1127.5	792.6	675.0	520.2
WH=266	2548.9	2056.6	1529.2	1340.0	1059.2
IL=1000					
WH=19	151.7	108.4	73.7	62.1	47.6
WH=95	1049.0	789.5	544.3	350.5	350.5
WH=171	2080.8	1646.4	1190.6	1025.1	796.1
WH=266	3552.4	2954.4	2260.7	2006.1	1601.9
IL=1400					
WH=19	190.9	137.9	94.2	79.6	61.0
WH=95	1278.5	982.4	687.9	583.4	447.1
WH=171	1507.0	2022.0	1488.9	1291.7	1008.8
WH=266	4245.2	3496.1	2801.3	2506.0	2014.3
IL=2100					
WH=19	255.1	187.5	129.4	109.8	84.3
WH=95	1634.0	1292.4	927.0	793.1	611.6
WH=171	3161.4	2616.5	1976.2	1733.6	1366.0
WH=266	5294.3	4597.7	3673.2	3324.1	2698.0

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

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ADDITIONAL PARAMETERS:

```
particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     1121.770479426199000
bypass fraction =   0.000000000000000E+000

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000
Output divisions in Period        3.000000000000000 =        1.000000
Output divisions in Period        4.000000000000000 =        1.000000
Output divisions in Period        5.000000000000000 =        1.000000
Output divisions in Period        6.000000000000000 =        1.000000
Output divisions in Period        7.000000000000000 =        1.000000
Output divisions in Period        8.000000000000000 =        1.000000
Output divisions in Period        9.000000000000000 =        1.000000
Output divisions in Period       10.000000000000000 =        1.000000
Output divisions in Period       11.000000000000000 =        1.000000
Output divisions in Period       12.000000000000000 =        1.000000
Output divisions in Period       13.000000000000000 =        1.000000
Output divisions in Period       14.000000000000000 =        1.000000
Output divisions in Period       15.000000000000000 =        1.000000
Output divisions in Period       16.000000000000000 =        1.000000
Output divisions in Period       17.000000000000000 =        1.000000
Output divisions in Period       18.000000000000000 =        1.000000
Output divisions in Period       19.000000000000000 =        1.000000
Output divisions in Period       20.000000000000000 =        1.000000
Output divisions in Period       21.000000000000000 =        1.000000
Output divisions in Period       22.000000000000000 =        1.000000
Output divisions in Period       23.000000000000000 =        1.000000
Output divisions in Period       24.000000000000000 =        1.000000
Output divisions in Period       25.000000000000000 =        1.000000
Output divisions in Period       26.000000000000000 =        1.000000
Output divisions in Period       27.000000000000000 =        1.000000
Output divisions in Period       28.000000000000000 =        1.000000


Flow out @    0.000000E+00 min =      880.000000 cfm &      155.300000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      100.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      180.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      240.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      260.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      320.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      340.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      420.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      500.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      580.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      640.000000 min =      880.000000 cfm &      155.300000g/m
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Flow out @      660.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      740.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      800.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      820.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      880.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      900.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      960.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      980.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1040.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @     1060.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1120.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m


**** OUTPUT @       20.000000000000000 minutes ****
```

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.49E+00	1.66E-03	1.07E+00	2.60E-02	5.59E+00
1.50	2.18E+01	8.06E-03	5.25E+00	9.39E-01	2.80E+01
2.50	2.14E+01	7.93E-03	5.27E+00	2.50E+00	2.92E+01
3.50	3.79E+01	1.40E-02	9.59E+00	8.76E+00	5.62E+01
4.50	5.26E+01	1.95E-02	1.38E+01	2.06E+01	8.70E+01
5.50	4.91E+01	1.82E-02	1.34E+01	2.97E+01	9.22E+01
6.50	3.24E+01	1.20E-02	9.26E+00	2.85E+01	7.02E+01
7.50	2.24E+01	8.30E-03	6.71E+00	2.74E+01	5.65E+01
8.50	1.74E+01	6.42E-03	5.44E+00	2.85E+01	5.12E+01
9.50	1.18E+01	4.38E-03	3.88E+00	2.53E+01	4.10E+01
15.00	7.20E+01	2.67E-02	2.78E+01	4.49E+02	5.49E+02
25.00	2.65E+01	9.83E-03	1.12E+01	5.00E+02	5.38E+02
35.00	1.24E+01	4.57E-03	5.35E+00	4.67E+02	4.85E+02
45.00	8.16E+00	3.02E-03	3.57E+00	5.09E+02	5.20E+02
55.00	5.71E-01	2.11E-04	2.51E-01	4.98E+01	5.06E+01
65.00	1.14E+00	4.23E-04	5.04E-01	1.32E+02	1.34E+02
75.00	6.49E-01	2.40E-04	2.86E-01	9.50E+01	9.60E+01
85.00	3.62E-01	1.34E-04	1.60E-01	6.53E+01	6.58E+01
95.00	3.95E-01	1.46E-04	1.75E-01	8.55E+01	8.60E+01
125.00	2.02E-01	7.47E-05	8.94E-02	6.49E+01	6.52E+01

```
    393.660385832190500 total grams airborne in tank
 1.457448762885178E-001 total g/s out riser
    123.106577135622500 total grams lost out riser
   2589.233087502420000 total grams settled on floor
   3106.000015735626000 total grams made airborne
 0.000000000000000E+000 total grams bypassed


**** OUTPUT @       80.000000000000000 minutes ****
```

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.34E+00	1.83E-06	1.08E+00	1.68E-01	5.59E+00
1.50	1.71E+01	7.20E-06	5.28E+00	5.55E+00	2.80E+01
2.50	1.14E+01	4.78E-06	5.30E+00	1.25E+01	2.92E+01
3.50	1.12E+01	4.71E-06	9.62E+00	3.54E+01	5.62E+01
4.50	7.18E+00	3.02E-06	1.38E+01	6.60E+01	8.70E+01
5.50	2.56E+00	1.08E-06	1.34E+01	7.62E+01	9.22E+01

6.50	5.35E-01	2.25E-07	9.28E+00	6.04E+01	7.02E+01
7.50	9.69E-02	4.08E-08	6.72E+00	4.97E+01	5.65E+01
8.50	1.63E-02	6.84E-09	5.44E+00	4.58E+01	5.12E+01
9.50	1.99E-03	8.38E-10	3.88E+00	3.71E+01	4.10E+01
15.00	3.26E-08	1.37E-14	2.78E+01	5.21E+02	5.49E+02
25.00	3.92E-25	1.65E-31	1.12E+01	5.27E+02	5.38E+02
35.00	0.00E+00	0.00E+00	5.35E+00	4.79E+02	4.85E+02
45.00	0.00E+00	0.00E+00	3.57E+00	5.17E+02	5.20E+02
55.00	0.00E+00	0.00E+00	2.51E-01	5.04E+01	5.06E+01
65.00	0.00E+00	0.00E+00	5.04E-01	1.33E+02	1.34E+02
75.00	0.00E+00	0.00E+00	2.86E-01	9.57E+01	9.60E+01
85.00	0.00E+00	0.00E+00	1.60E-01	6.57E+01	6.58E+01
95.00	0.00E+00	0.00E+00	1.75E-01	8.59E+01	8.60E+01
125.00	0.00E+00	0.00E+00	8.94E-02	6.51E+01	6.52E+01

54.412759787213020 total grams airborne in tank
2.289231270676650E-005 total g/s out riser
123.287945561111000 total grams lost out riser
2928.299362599850000 total grams settled on floor
3106.000015735626000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	7.25E+00	2.68E-03	3.70E+00	2.32E-01	1.12E+01
1.50	3.19E+01	1.18E-02	1.65E+01	7.54E+00	5.59E+01
2.50	2.73E+01	1.01E-02	1.43E+01	1.68E+01	5.84E+01
3.50	4.27E+01	1.58E-02	2.26E+01	4.72E+01	1.12E+02
4.50	5.50E+01	2.03E-02	2.96E+01	8.94E+01	1.74E+02
5.50	4.97E+01	1.84E-02	2.75E+01	1.07E+02	1.84E+02
6.50	3.25E+01	1.20E-02	1.87E+01	8.92E+01	1.40E+02
7.50	2.24E+01	8.30E-03	1.34E+01	7.72E+01	1.13E+02
8.50	1.74E+01	6.42E-03	1.09E+01	7.43E+01	1.02E+02
9.50	1.18E+01	4.38E-03	7.76E+00	6.24E+01	8.20E+01
15.00	7.20E+01	2.67E-02	5.56E+01	9.70E+02	1.10E+03
25.00	2.65E+01	9.83E-03	2.24E+01	1.03E+03	1.08E+03
35.00	1.24E+01	4.57E-03	1.07E+01	9.46E+02	9.69E+02
45.00	8.16E+00	3.02E-03	7.13E+00	1.03E+03	1.04E+03
55.00	5.71E-01	2.11E-04	5.01E-01	1.00E+02	1.01E+02
65.00	1.14E+00	4.23E-04	1.01E+00	2.65E+02	2.67E+02
75.00	6.49E-01	2.40E-04	5.73E-01	1.91E+02	1.92E+02
85.00	3.62E-01	1.34E-04	3.20E-01	1.31E+02	1.32E+02
95.00	3.95E-01	1.46E-04	3.50E-01	1.71E+02	1.72E+02
125.00	2.02E-01	7.47E-05	1.79E-01	1.30E+02	1.30E+02

420.327893957495700 total grams airborne in tank
1.556179860417615E-001 total g/s out riser
263.583647608757000 total grams lost out riser
5528.088501304388000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam	airborne	outflow	totalout	totalflr	source

mcrn	g	g/s	g	g	g
.50	7.01E+00	2.95E-06	3.71E+00	4.62E-01	1.12E+01
1.50	2.51E+01	1.06E-05	1.65E+01	1.43E+01	5.59E+01
2.50	1.45E+01	6.09E-06	1.43E+01	2.96E+01	5.84E+01
3.50	1.26E+01	5.31E-06	2.26E+01	7.72E+01	1.12E+02
4.50	7.50E+00	3.16E-06	2.96E+01	1.37E+02	1.74E+02
5.50	2.59E+00	1.09E-06	2.75E+01	1.54E+02	1.84E+02
6.50	5.37E-01	2.26E-07	1.87E+01	1.21E+02	1.40E+02
7.50	9.70E-02	4.08E-08	1.35E+01	9.95E+01	1.13E+02
8.50	1.63E-02	6.84E-09	1.09E+01	9.16E+01	1.02E+02
9.50	1.99E-03	8.38E-10	7.76E+00	7.42E+01	8.20E+01
15.00	3.26E-08	1.37E-14	5.56E+01	1.04E+03	1.10E+03
25.00	3.92E-25	1.65E-31	2.24E+01	1.05E+03	1.08E+03
35.00	0.00E+00	0.00E+00	1.07E+01	9.58E+02	9.69E+02
45.00	0.00E+00	0.00E+00	7.13E+00	1.03E+03	1.04E+03
55.00	0.00E+00	0.00E+00	5.01E-01	1.01E+02	1.01E+02
65.00	0.00E+00	0.00E+00	1.01E+00	2.66E+02	2.67E+02
75.00	0.00E+00	0.00E+00	5.73E-01	1.91E+02	1.92E+02
85.00	0.00E+00	0.00E+00	3.20E-01	1.31E+02	1.32E+02
95.00	0.00E+00	0.00E+00	3.50E-01	1.72E+02	1.72E+02
125.00	0.00E+00	0.00E+00	1.79E-01	1.30E+02	1.30E+02

69.958334281617740 total grams airborne in tank
2.943258321782382E-005 total g/s out riser
263.795473203063000 total grams lost out riser
5878.246320933104000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.94E+00	3.31E-03	7.29E+00	5.48E-01	1.68E+01
1.50	3.66E+01	1.36E-02	3.04E+01	1.68E+01	8.39E+01
2.50	2.89E+01	1.07E-02	2.43E+01	3.44E+01	8.76E+01
3.50	4.33E+01	1.60E-02	3.60E+01	8.94E+01	1.69E+02
4.50	5.51E+01	2.04E-02	4.54E+01	1.60E+02	2.61E+02
5.50	4.97E+01	1.84E-02	4.15E+01	1.85E+02	2.77E+02
6.50	3.25E+01	1.20E-02	2.80E+01	1.50E+02	2.11E+02
7.50	2.24E+01	8.30E-03	2.02E+01	1.27E+02	1.70E+02
8.50	1.74E+01	6.42E-03	1.63E+01	1.20E+02	1.54E+02
9.50	1.18E+01	4.38E-03	1.16E+01	9.95E+01	1.23E+02
15.00	7.20E+01	2.67E-02	8.35E+01	1.49E+03	1.65E+03
25.00	2.65E+01	9.83E-03	3.36E+01	1.55E+03	1.61E+03
35.00	1.24E+01	4.57E-03	1.60E+01	1.43E+03	1.45E+03
45.00	8.16E+00	3.02E-03	1.07E+01	1.54E+03	1.56E+03
55.00	5.71E-01	2.11E-04	7.52E-01	1.51E+02	1.52E+02
65.00	1.14E+00	4.23E-04	1.51E+00	3.98E+02	4.01E+02
75.00	6.49E-01	2.40E-04	8.59E-01	2.86E+02	2.88E+02
85.00	3.62E-01	1.34E-04	4.80E-01	1.97E+02	1.98E+02
95.00	3.95E-01	1.46E-04	5.25E-01	2.57E+02	2.58E+02
125.00	2.02E-01	7.47E-05	2.68E-01	1.95E+02	1.96E+02

429.089913114905400 total grams airborne in tank
1.588619497415493E-001 total g/s out riser
409.340227872133300 total grams lost out riser

8479.569942533970000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.64E+00	3.63E-06	7.30E+00	8.32E-01	1.68E+01
1.50	2.88E+01	1.21E-05	3.05E+01	2.45E+01	8.39E+01
2.50	1.53E+01	6.45E-06	2.43E+01	4.79E+01	8.76E+01
3.50	1.28E+01	5.38E-06	3.60E+01	1.20E+02	1.69E+02
4.50	7.52E+00	3.16E-06	4.54E+01	2.08E+02	2.61E+02
5.50	2.59E+00	1.09E-06	4.16E+01	2.33E+02	2.77E+02
6.50	5.37E-01	2.26E-07	2.80E+01	1.82E+02	2.11E+02
7.50	9.70E-02	4.08E-08	2.02E+01	1.49E+02	1.70E+02
8.50	1.63E-02	6.84E-09	1.63E+01	1.37E+02	1.54E+02
9.50	1.99E-03	8.38E-10	1.16E+01	1.11E+02	1.23E+02
15.00	3.26E-08	1.37E-14	8.35E+01	1.56E+03	1.65E+03
25.00	3.92E-25	1.65E-31	3.36E+01	1.58E+03	1.61E+03
35.00	0.00E+00	0.00E+00	1.60E+01	1.44E+03	1.45E+03
45.00	0.00E+00	0.00E+00	1.07E+01	1.55E+03	1.56E+03
55.00	0.00E+00	0.00E+00	7.52E-01	1.51E+02	1.52E+02
65.00	0.00E+00	0.00E+00	1.51E+00	3.99E+02	4.01E+02
75.00	0.00E+00	0.00E+00	8.59E-01	2.87E+02	2.88E+02
85.00	0.00E+00	0.00E+00	4.80E-01	1.97E+02	1.98E+02
95.00	0.00E+00	0.00E+00	5.25E-01	2.58E+02	2.58E+02
125.00	0.00E+00	0.00E+00	2.68E-01	1.95E+02	1.96E+02

76.367942250842190 total grams airborne in tank
3.212920641278815E-005 total g/s out riser
409.563368558883700 total grams lost out riser
8832.068945646286000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	9.97E+00	3.69E-03	1.15E+01	9.32E-01	2.24E+01
1.50	3.88E+01	1.44E-02	4.57E+01	2.73E+01	1.12E+02
2.50	2.94E+01	1.09E-02	3.46E+01	5.28E+01	1.17E+02
3.50	4.33E+01	1.60E-02	4.94E+01	1.32E+02	2.25E+02
4.50	5.51E+01	2.04E-02	6.12E+01	2.32E+02	3.48E+02
5.50	4.97E+01	1.84E-02	5.56E+01	2.64E+02	3.69E+02
6.50	3.25E+01	1.20E-02	3.74E+01	2.11E+02	2.81E+02
7.50	2.24E+01	8.30E-03	2.69E+01	1.77E+02	2.26E+02
8.50	1.74E+01	6.42E-03	2.18E+01	1.66E+02	2.05E+02
9.50	1.18E+01	4.38E-03	1.55E+01	1.37E+02	1.64E+02
15.00	7.20E+01	2.67E-02	1.11E+02	2.01E+03	2.20E+03
25.00	2.65E+01	9.83E-03	4.48E+01	2.08E+03	2.15E+03
35.00	1.24E+01	4.57E-03	2.14E+01	1.90E+03	1.94E+03
45.00	8.16E+00	3.02E-03	1.43E+01	2.06E+03	2.08E+03
55.00	5.71E-01	2.11E-04	1.00E+00	2.01E+02	2.03E+02
65.00	1.14E+00	4.23E-04	2.01E+00	5.31E+02	5.34E+02

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75.00	6.49E-01	2.40E-04	1.15E+00	3.82E+02	3.84E+02
85.00	3.62E-01	1.34E-04	6.40E-01	2.62E+02	2.63E+02
95.00	3.95E-01	1.46E-04	7.00E-01	3.43E+02	3.44E+02
125.00	2.02E-01	7.47E-05	3.58E-01	2.60E+02	2.61E+02

432.859076246619200 total grams airborne in tank
1.602574071657727E-001 total g/s out riser
557.316343992948500 total grams lost out riser
11433.824942529200000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	9.64E+00	4.06E-06	1.15E+01	1.25E+00	2.24E+01
1.50	3.06E+01	1.29E-05	4.58E+01	3.55E+01	1.12E+02
2.50	1.56E+01	6.55E-06	3.46E+01	6.66E+01	1.17E+02
3.50	1.28E+01	5.39E-06	4.95E+01	1.63E+02	2.25E+02
4.50	7.52E+00	3.16E-06	6.13E+01	2.79E+02	3.48E+02
5.50	2.59E+00	1.09E-06	5.56E+01	3.11E+02	3.69E+02
6.50	5.37E-01	2.26E-07	3.74E+01	2.43E+02	2.81E+02
7.50	9.70E-02	4.08E-08	2.69E+01	1.99E+02	2.26E+02
8.50	1.63E-02	6.84E-09	2.18E+01	1.83E+02	2.05E+02
9.50	1.99E-03	8.38E-10	1.55E+01	1.48E+02	1.64E+02
15.00	3.26E-08	1.37E-14	1.11E+02	2.08E+03	2.20E+03
25.00	3.92E-25	1.65E-31	4.48E+01	2.11E+03	2.15E+03
35.00	0.00E+00	0.00E+00	2.14E+01	1.92E+03	1.94E+03
45.00	0.00E+00	0.00E+00	1.43E+01	2.07E+03	2.08E+03
55.00	0.00E+00	0.00E+00	1.00E+00	2.02E+02	2.03E+02
65.00	0.00E+00	0.00E+00	2.01E+00	5.32E+02	5.34E+02
75.00	0.00E+00	0.00E+00	1.15E+00	3.83E+02	3.84E+02
85.00	0.00E+00	0.00E+00	6.40E-01	2.63E+02	2.63E+02
95.00	0.00E+00	0.00E+00	7.00E-01	3.43E+02	3.44E+02
125.00	0.00E+00	0.00E+00	3.58E-01	2.61E+02	2.61E+02

79.364903665656190 total grams airborne in tank
3.339007734400711E-005 total g/s out riser
557.544570177793500 total grams lost out riser
11787.090765476230000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.06E+01	3.93E-03	1.60E+01	1.36E+00	2.80E+01
1.50	3.99E+01	1.48E-02	6.16E+01	3.83E+01	1.40E+02
2.50	2.95E+01	1.09E-02	4.50E+01	7.15E+01	1.46E+02
3.50	4.34E+01	1.60E-02	6.29E+01	1.75E+02	2.81E+02
4.50	5.51E+01	2.04E-02	7.71E+01	3.03E+02	4.35E+02
5.50	4.97E+01	1.84E-02	6.96E+01	3.42E+02	4.61E+02
6.50	3.25E+01	1.20E-02	4.68E+01	2.72E+02	3.51E+02
7.50	2.24E+01	8.30E-03	3.[illegible]E+01	2.27E+02	2.83E+02

8.50	1.74E+01	6.42E-03	2.72E+01	2.12E+02	2.56E+02
9.50	1.18E+01	4.38E-03	1.94E+01	1.74E+02	2.05E+02
15.00	7.20E+01	2.67E-02	1.39E+02	2.53E+03	2.74E+03
25.00	2.65E+01	9.83E-03	5.60E+01	2.61E+03	2.69E+03
35.00	1.24E+01	4.57E-03	2.67E+01	2.38E+03	2.42E+03
45.00	8.16E+00	3.02E-03	1.78E+01	2.58E+03	2.60E+03
55.00	5.71E-01	2.11E-04	1.25E+00	2.51E+02	2.53E+02
65.00	1.14E+00	4.23E-04	2.52E+00	6.64E+02	6.68E+02
75.00	6.49E-01	2.40E-04	1.43E+00	4.78E+02	4.80E+02
85.00	3.62E-01	1.34E-04	8.00E-01	3.28E+02	3.29E+02
95.00	3.95E-01	1.46E-04	8.74E-01	4.29E+02	4.30E+02
125.00	2.02E-01	7.47E-05	4.47E-01	3.25E+02	3.26E+02

434.655296072363900 total grams airborne in tank
1.609224217754672E-001 total g/s out riser
706.339334189891800 total grams lost out riser
14389.005602598190000 total grams settled on floor
15530.000019073490000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.03E+01	4.31E-06	1.60E+01	1.69E+00	2.80E+01
1.50	3.14E+01	1.32E-05	6.16E+01	4.68E+01	1.40E+02
2.50	1.56E+01	6.58E-06	4.50E+01	8.53E+01	1.46E+02
3.50	1.28E+01	5.39E-06	6.29E+01	2.05E+02	2.81E+02
4.50	7.52E+00	3.16E-06	7.71E+01	3.50E+02	4.35E+02
5.50	2.59E+00	1.09E-06	6.97E+01	3.89E+02	4.61E+02
6.50	5.37E-01	2.26E-07	4.68E+01	3.04E+02	3.51E+02
7.50	9.70E-02	4.08E-08	3.37E+01	2.49E+02	2.83E+02
8.50	1.63E-02	6.84E-09	2.72E+01	2.29E+02	2.56E+02
9.50	1.99E-03	8.38E-10	1.94E+01	1.86E+02	2.05E+02
15.00	3.26E-08	1.37E-14	1.39E+02	2.61E+03	2.74E+03
25.00	3.92E-25	1.65E-31	5.61E+01	2.63E+03	2.69E+03
35.00	0.00E+00	0.00E+00	2.67E+01	2.40E+03	2.42E+03
45.00	0.00E+00	0.00E+00	1.78E+01	2.58E+03	2.60E+03
55.00	0.00E+00	0.00E+00	1.25E+00	2.52E+02	2.53E+02
65.00	0.00E+00	0.00E+00	2.52E+00	6.65E+02	6.68E+02
75.00	0.00E+00	0.00E+00	1.43E+00	4.78E+02	4.80E+02
85.00	0.00E+00	0.00E+00	8.00E-01	3.28E+02	3.29E+02
95.00	0.00E+00	0.00E+00	8.74E-01	4.29E+02	4.30E+02
125.00	0.00E+00	0.00E+00	4.47E-01	3.26E+02	3.26E+02

80.856261945838070 total grams airborne in tank
3.401751522876639E-005 total g/s out riser
706.570029437542000 total grams lost out riser
14742.573971748350000 total grams settled on floor
15530.000019073490000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g

.50	1.10E+01	4.07E-03	2.07E+01	1.81E+00	3.35E+01
1.50	4.03E+01	1.49E-02	7.77E+01	4.96E+01	1.68E+02
2.50	2.95E+01	1.09E-02	5.54E+01	9.02E+01	1.75E+02
3.50	4.34E+01	1.60E-02	7.64E+01	2.18E+02	3.37E+02
4.50	5.51E+01	2.04E-02	9.29E+01	3.74E+02	5.22E+02
5.50	4.97E+01	1.84E-02	8.37E+01	4.20E+02	5.53E+02
6.50	3.25E+01	1.20E-02	5.62E+01	3.32E+02	4.21E+02
7.50	2.24E+01	8.30E-03	4.04E+01	2.76E+02	3.39E+02
8.50	1.74E+01	6.42E-03	3.27E+01	2.57E+02	3.07E+02
9.50	1.18E+01	4.38E-03	2.33E+01	2.11E+02	2.46E+02
15.00	7.20E+01	2.67E-02	1.67E+02	3.05E+03	3.29E+03
25.00	2.65E+01	9.83E-03	6.73E+01	3.13E+03	3.23E+03
35.00	1.24E+01	4.57E-03	3.21E+01	2.86E+03	2.91E+03
45.00	8.16E+00	3.02E-03	2.14E+01	3.09E+03	3.12E+03
55.00	5.71E-01	2.11E-04	1.50E+00	3.02E+02	3.04E+02
65.00	1.14E+00	4.23E-04	3.02E+00	7.97E+02	8.01E+02
75.00	6.49E-01	2.40E-04	1.72E+00	5.73E+02	5.76E+02
85.00	3.62E-01	1.34E-04	9.60E-01	3.94E+02	3.95E+02
95.00	3.95E-01	1.46E-04	1.05E+00	5.15E+02	5.16E+02
125.00	2.02E-01	7.47E-05	5.36E-01	3.91E+02	3.91E+02

435.559327825903900 total grams airborne in tank
1.612571204823325E-001 total g/s out riser
855.885956406593300 total grams lost out riser
17344.554844975470000 total grams settled on floor
18636.000000000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.06E+01	4.47E-06	2.08E+01	2.16E+00	3.35E+01
1.50	3.17E+01	1.34E-05	7.78E+01	5.82E+01	1.68E+02
2.50	1.57E+01	6.59E-06	5.54E+01	1.04E+02	1.75E+02
3.50	1.28E+01	5.39E-06	7.64E+01	2.48E+02	3.37E+02
4.50	7.52E+00	3.16E-06	9.30E+01	4.21E+02	5.22E+02
5.50	2.59E+00	1.09E-06	8.37E+01	4.67E+02	5.53E+02
6.50	5.37E-01	2.26E-07	5.62E+01	3.64E+02	4.21E+02
7.50	9.70E-02	4.08E-08	4.04E+01	2.99E+02	3.39E+02
8.50	1.63E-02	6.84E-09	3.27E+01	2.75E+02	3.07E+02
9.50	1.99E-03	8.38E-10	2.33E+01	2.23E+02	2.46E+02
15.00	3.26E-08	1.37E-14	1.67E+02	3.13E+03	3.29E+03
25.00	3.92E-25	1.65E-31	6.73E+01	3.16E+03	3.23E+03
35.00	0.00E+00	0.00E+00	3.21E+01	2.88E+03	2.91E+03
45.00	0.00E+00	0.00E+00	2.14E+01	3.10E+03	3.12E+03
55.00	0.00E+00	0.00E+00	1.50E+00	3.02E+02	3.04E+02
65.00	0.00E+00	0.00E+00	3.02E+00	7.98E+02	8.01E+02
75.00	0.00E+00	0.00E+00	1.72E+00	5.74E+02	5.76E+02
85.00	0.00E+00	0.00E+00	9.60E-01	3.94E+02	3.95E+02
95.00	0.00E+00	0.00E+00	1.05E+00	5.15E+02	5.16E+02
125.00	0.00E+00	0.00E+00	5.36E-01	3.91E+02	3.91E+02

81.628500200385190 total grams airborne in tank
3.434240765461782E-005 total g/s out riser
856.117939174175300 total grams lost out riser
17698.253973007200000 total grams settled on floor
18636.000000000000000 total grams made airborne

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0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.12E+01	4.16E-03	2.56E+01	2.28E+00	3.91E+01
1.50	4.06E+01	1.50E-02	9.40E+01	6.11E+01	1.96E+02
2.50	2.96E+01	1.09E-02	6.58E+01	1.09E+02	2.04E+02
3.50	4.34E+01	1.60E-02	8.98E+01	2.60E+02	3.94E+02
4.50	5.51E+01	2.04E-02	1.09E+02	4.45E+02	6.09E+02
5.50	4.97E+01	1.84E-02	9.78E+01	4.98E+02	6.46E+02
6.50	3.25E+01	1.20E-02	6.56E+01	3.93E+02	4.91E+02
7.50	2.24E+01	8.30E-03	4.71E+01	3.26E+02	3.96E+02
8.50	1.74E+01	6.42E-03	3.81E+01	3.03E+02	3.59E+02
9.50	1.18E+01	4.38E-03	2.72E+01	2.48E+02	2.87E+02
15.00	7.20E+01	2.67E-02	1.95E+02	3.58E+03	3.84E+03
25.00	2.65E+01	9.83E-03	7.85E+01	3.66E+03	3.77E+03
35.00	1.24E+01	4.57E-03	3.74E+01	3.34E+03	3.39E+03
45.00	8.16E+00	3.02E-03	2.50E+01	3.61E+03	3.64E+03
55.00	5.71E-01	2.11E-04	1.75E+00	3.52E+02	3.54E+02
65.00	1.14E+00	4.23E-04	3.52E+00	9.30E+02	9.35E+02
75.00	6.49E-01	2.40E-04	2.00E+00	6.69E+02	6.72E+02
85.00	3.62E-01	1.34E-04	1.12E+00	4.59E+02	4.61E+02
95.00	3.95E-01	1.46E-04	1.22E+00	6.01E+02	6.02E+02
125.00	2.02E-01	7.47E-05	6.26E-01	4.56E+02	4.57E+02

436.031250700354600 total grams airborne in tank
1.614318417196046E-001 total g/s out riser
1005.704743921757000 total grams lost out riser
20300.264363527300000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.09E+01	4.57E-06	2.56E+01	2.63E+00	3.91E+01
1.50	3.19E+01	1.34E-05	9.41E+01	6.97E+01	1.96E+02
2.50	1.57E+01	6.59E-06	6.58E+01	1.23E+02	2.04E+02
3.50	1.28E+01	5.39E-06	8.99E+01	2.91E+02	3.94E+02
4.50	7.52E+00	3.16E-06	1.09E+02	4.92E+02	6.09E+02
5.50	2.59E+00	1.09E-06	9.78E+01	5.45E+02	6.46E+02
6.50	5.37E-01	2.26E-07	6.56E+01	4.25E+02	4.91E+02
7.50	9.70E-02	4.08E-08	4.71E+01	3.48E+02	3.96E+02
8.50	1.63E-02	6.84E-09	3.81E+01	3.21E+02	3.59E+02
9.50	1.99E-03	8.38E-10	2.72E+01	2.60E+02	2.87E+02
15.00	3.26E-08	1.37E-14	1.95E+02	3.65E+03	3.84E+03
25.00	3.92E-25	1.65E-31	7.85E+01	3.69E+03	3.77E+03
35.00	0.00E+00	0.00E+00	3.74E+01	3.35E+03	3.39E+03
45.00	0.00E+00	0.00E+00	2.50E+01	3.62E+03	3.64E+03
55.00	0.00E+00	0.00E+00	1.75E+00	3.53E+02	3.54E+02
65.00	0.00E+00	0.00E+00	3.52E+00	9.31E+02	9.35E+02
75.00	0.00E+00	0.00E+00	2.00E+00	6.70E+02	6.72E+02
85.00	0.00E+00	0.00E+00	1.12E+00	4.60E+02	4.61E+02

95.00	0.00E+00	0.00E+00	1.22E+00	6.01E+02	6.02E+02
125.00	0.00E+00	0.00E+00	6.26E-01	4.56E+02	4.57E+02

82.040421701544860 total grams airborne in tank
3.451571005105124E-005 total g/s out riser
1005.937371551991000 total grams lost out riser
20654.022729635240000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.14E+01	4.21E-03	3.06E+01	2.75E+00	4.47E+01
1.50	4.07E+01	1.51E-02	1.10E+02	7.26E+01	2.24E+02
2.50	2.96E+01	1.09E-02	7.62E+01	1.28E+02	2.34E+02
3.50	4.34E+01	1.60E-02	1.03E+02	3.03E+02	4.50E+02
4.50	5.51E+01	2.04E-02	1.25E+02	5.16E+02	6.96E+02
5.50	4.97E+01	1.84E-02	1.12E+02	5.76E+02	7.38E+02
6.50	3.25E+01	1.20E-02	7.50E+01	4.54E+02	5.62E+02
7.50	2.24E+01	8.30E-03	5.39E+01	3.76E+02	4.52E+02
8.50	1.74E+01	6.42E-03	4.36E+01	3.49E+02	4.10E+02
9.50	1.18E+01	4.38E-03	3.10E+01	2.85E+02	3.28E+02
15.00	7.20E+01	2.67E-02	2.23E+02	4.10E+03	4.39E+03
25.00	2.65E+01	9.83E-03	8.97E+01	4.19E+03	4.30E+03
35.00	1.24E+01	4.57E-03	4.28E+01	3.82E+03	3.88E+03
45.00	8.16E+00	3.02E-03	2.85E+01	4.13E+03	4.16E+03
55.00	5.71E-01	2.11E-04	2.01E+00	4.02E+02	4.05E+02
65.00	1.14E+00	4.23E-04	4.03E+00	1.06E+03	1.07E+03
75.00	6.49E-01	2.40E-04	2.29E+00	7.65E+02	7.68E+02
85.00	3.62E-01	1.34E-04	1.28E+00	5.25E+02	5.27E+02
95.00	3.95E-01	1.46E-04	1.40E+00	6.86E+02	6.88E+02
125.00	2.02E-01	7.47E-05	7.15E-01	5.21E+02	5.22E+02

436.284620985388800 total grams airborne in tank
1.615256445293198E-001 total g/s out riser
1155.669115900993000 total grams lost out riser
23256.046702861790000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.10E+01	4.63E-06	3.06E+01	3.11E+00	4.47E+01
1.50	3.20E+01	1.35E-05	1.10E+02	8.12E+01	2.24E+02
2.50	1.57E+01	6.59E-06	7.63E+01	1.42E+02	2.34E+02
3.50	1.28E+01	5.39E-06	1.03E+02	3.34E+02	4.50E+02
4.50	7.52E+00	3.16E-06	1.25E+02	5.64E+02	6.96E+02
5.50	2.59E+00	1.09E-06	1.12E+02	6.24E+02	7.38E+02
6.50	5.37E-01	2.26E-07	7.50E+01	4.86E+02	5.62E+02
7.50	9.70E-02	4.08E-08	5.39E+01	3.98E+02	4.52E+02
8.50	1.63E-02	6.84E-09	4.36E+01	3.66E+02	4.10E+02
9.50	1.99E-03	8.38E-10	3.10E+01	2.97E+02	3.28E+02

15.00	3.26E-08	1.37E-14	2.23E+02	4.17E+03	4.39E+03
25.00	3.92E-25	1.65E-31	8.97E+01	4.21E+03	4.30E+03
35.00	0.00E+00	0.00E+00	4.28E+01	3.83E+03	3.88E+03
45.00	0.00E+00	0.00E+00	2.85E+01	4.13E+03	4.16E+03
55.00	0.00E+00	0.00E+00	2.01E+00	4.03E+02	4.05E+02
65.00	0.00E+00	0.00E+00	4.03E+00	1.06E+03	1.07E+03
75.00	0.00E+00	0.00E+00	2.29E+00	7.66E+02	7.68E+02
85.00	0.00E+00	0.00E+00	1.28E+00	5.25E+02	5.27E+02
95.00	0.00E+00	0.00E+00	1.40E+00	6.87E+02	6.88E+02
125.00	0.00E+00	0.00E+00	7.15E-01	5.21E+02	5.22E+02

82.265516496771910 total grams airborne in tank
3.461040982263130E-005 total g/s out riser
1155.902105808258000 total grams lost out riser
23609.833095073700000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.15E+01	4.25E-03	3.56E+01	3.23E+00	5.03E+01
1.50	4.07E+01	1.51E-02	1.27E+02	8.41E+01	2.52E+02
2.50	2.96E+01	1.09E-02	8.66E+01	1.47E+02	2.63E+02
3.50	4.34E+01	1.60E-02	1.17E+02	3.46E+02	5.06E+02
4.50	5.51E+01	2.04E-02	1.40E+02	5.87E+02	7.83E+02
5.50	4.97E+01	1.84E-02	1.26E+02	6.55E+02	8.30E+02
6.50	3.25E+01	1.20E-02	8.44E+01	5.15E+02	6.32E+02
7.50	2.24E+01	8.30E-03	6.06E+01	4.26E+02	5.09E+02
8.50	1.74E+01	6.42E-03	4.90E+01	3.95E+02	4.61E+02
9.50	1.18E+01	4.38E-03	3.49E+01	3.22E+02	3.69E+02
15.00	7.20E+01	2.67E-02	2.50E+02	4.62E+03	4.94E+03
25.00	2.65E+01	9.83E-03	1.01E+02	4.71E+03	4.84E+03
35.00	1.24E+01	4.57E-03	4.81E+01	4.30E+03	4.36E+03
45.00	8.16E+00	3.02E-03	3.21E+01	4.64E+03	4.68E+03
55.00	5.71E-01	2.11E-04	2.26E+00	4.53E+02	4.56E+02
65.00	1.14E+00	4.23E-04	4.53E+00	1.20E+03	1.20E+03
75.00	6.49E-01	2.40E-04	2.58E+00	8.61E+02	8.64E+02
85.00	3.62E-01	1.34E-04	1.44E+00	5.91E+02	5.93E+02
95.00	3.95E-01	1.46E-04	1.57E+00	7.72E+02	7.74E+02
125.00	2.02E-01	7.47E-05	8.04E-01	5.86E+02	5.87E+02

436.423822149634400 total grams airborne in tank
1.615771834549378E-001 total g/s out riser
1305.713232338428000 total grams lost out riser
26211.863565683360000 total grams settled on floor
27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.11E+01	4.67E-06	3.56E+01	3.60E+00	5.03E+01
1.50	3.20E+01	1.35E-05	1.27E+02	9.27E+01	2.52E+02

2.50	1.57E+01	6.59E-06	8.67E+01	1.60E+02	2.63E+02
3.50	1.28E+01	5.39E-06	1.17E+02	3.76E+02	5.06E+02
4.50	7.52E+00	3.16E-06	1.41E+02	6.35E+02	7.83E+02
5.50	2.59E+00	1.09E-06	1.26E+02	7.02E+02	8.30E+02
6.50	5.37E-01	2.26E-07	8.44E+01	5.47E+02	6.32E+02
7.50	9.70E-02	4.08E-08	6.06E+01	4.48E+02	5.09E+02
8.50	1.63E-02	6.84E-09	4.90E+01	4.12E+02	4.61E+02
9.50	1.99E-03	8.38E-10	3.49E+01	3.34E+02	3.69E+02
15.00	3.26E-08	1.37E-14	2.50E+02	4.69E+03	4.94E+03
25.00	3.92E-25	1.65E-31	1.01E+02	4.74E+03	4.84E+03
35.00	0.00E+00	0.00E+00	4.81E+01	4.31E+03	4.36E+03
45.00	0.00E+00	0.00E+00	3.21E+01	4.65E+03	4.68E+03
55.00	0.00E+00	0.00E+00	2.26E+00	4.53E+02	4.56E+02
65.00	0.00E+00	0.00E+00	4.53E+00	1.20E+03	1.20E+03
75.00	0.00E+00	0.00E+00	2.58E+00	8.61E+02	8.64E+02
85.00	0.00E+00	0.00E+00	1.44E+00	5.91E+02	5.93E+02
95.00	0.00E+00	0.00E+00	1.57E+00	7.73E+02	7.74E+02
125.00	0.00E+00	0.00E+00	8.04E-01	5.86E+02	5.87E+02

82.391064859503840 total grams airborne in tank
3.466322963693146E-005 total g/s out riser
1305.946418225765000 total grams lost out riser
26565.663462877270000 total grams settled on floor
27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 740.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.15E+01	4.27E-03	4.07E+01	3.72E+00	5.59E+01
1.50	4.07E+01	1.51E-02	1.43E+02	9.56E+01	2.80E+02
2.50	2.96E+01	1.09E-02	9.70E+01	1.65E+02	2.92E+02
3.50	4.34E+01	1.60E-02	1.30E+02	3.89E+02	5.62E+02
4.50	5.51E+01	2.04E-02	1.56E+02	6.58E+02	8.70E+02
5.50	4.97E+01	1.84E-02	1.40E+02	7.33E+02	9.22E+02
6.50	3.25E+01	1.20E-02	9.37E+01	5.76E+02	7.02E+02
7.50	2.24E+01	8.30E-03	6.73E+01	4.76E+02	5.65E+02
8.50	1.74E+01	6.42E-03	5.45E+01	4.41E+02	5.12E+02
9.50	1.18E+01	4.38E-03	3.88E+01	3.59E+02	4.10E+02
15.00	7.20E+01	2.67E-02	2.78E+02	5.14E+03	5.49E+03
25.00	2.65E+01	9.83E-03	1.12E+02	5.24E+03	5.38E+03
35.00	1.24E+01	4.57E-03	5.35E+01	4.78E+03	4.85E+03
45.00	8.16E+00	3.02E-03	3.57E+01	5.16E+03	5.20E+03
55.00	5.71E-01	2.11E-04	2.51E+00	5.03E+02	5.06E+02
65.00	1.14E+00	4.23E-04	5.04E+00	1.33E+03	1.34E+03
75.00	6.49E-01	2.40E-04	2.86E+00	9.56E+02	9.60E+02
85.00	3.62E-01	1.34E-04	1.60E+00	6.57E+02	6.58E+02
95.00	3.95E-01	1.46E-04	1.75E+00	8.58E+02	8.60E+02
125.00	2.02E-01	7.47E-05	8.94E-01	6.51E+02	6.52E+02

436.501819357276000 total grams airborne in tank
1.616060605083476E-001 total g/s out riser
1455.801934480667000 total grams lost out riser
29167.696943283080000 total grams settled on floor
31059.999252319340000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 800.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.11E+01	4.69E-06	4.07E+01	4.09E+00	5.59E+01
1.50	3.21E+01	1.35E-05	1.43E+02	1.04E+02	2.80E+02
2.50	1.57E+01	6.59E-06	9.71E+01	1.79E+02	2.92E+02
3.50	1.28E+01	5.39E-06	1.30E+02	4.19E+02	5.62E+02
4.50	7.52E+00	3.16E-06	1.56E+02	7.06E+02	8.70E+02
5.50	2.59E+00	1.09E-06	1.40E+02	7.80E+02	9.22E+02
6.50	5.37E-01	2.26E-07	9.38E+01	6.08E+02	7.02E+02
7.50	9.70E-02	4.08E-08	6.73E+01	4.98E+02	5.65E+02
8.50	1.63E-02	6.84E-09	5.45E+01	4.58E+02	5.12E+02
9.50	1.99E-03	8.38E-10	3.88E+01	3.71E+02	4.10E+02
15.00	3.26E-08	1.37E-14	2.78E+02	5.21E+03	5.49E+03
25.00	3.92E-25	1.65E-31	1.12E+02	5.27E+03	5.38E+03
35.00	0.00E+00	0.00E+00	5.35E+01	4.79E+03	4.85E+03
45.00	0.00E+00	0.00E+00	3.57E+01	5.17E+03	5.20E+03
55.00	0.00E+00	0.00E+00	2.51E+00	5.04E+02	5.06E+02
65.00	0.00E+00	0.00E+00	5.04E+00	1.33E+03	1.34E+03
75.00	0.00E+00	0.00E+00	2.86E+00	9.57E+02	9.60E+02
85.00	0.00E+00	0.00E+00	1.60E+00	6.57E+02	6.58E+02
95.00	0.00E+00	0.00E+00	1.75E+00	8.59E+02	8.60E+02
125.00	0.00E+00	0.00E+00	8.94E-01	6.51E+02	6.52E+02

82.462315775031190 total grams airborne in tank
3.469320658230190E-005 total g/s out riser
1456.035238623619000 total grams lost out riser
29521.503595829010000 total grams settled on floor
31059.999252319340000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 820.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.16E+01	4.28E-03	4.57E+01	4.21E+00	6.15E+01
1.50	4.08E+01	1.51E-02	1.60E+02	1.07E+02	3.07E+02
2.50	2.96E+01	1.09E-02	1.07E+02	1.84E+02	3.21E+02
3.50	4.34E+01	1.60E-02	1.44E+02	4.31E+02	6.18E+02
4.50	5.51E+01	2.04E-02	1.72E+02	7.29E+02	9.57E+02
5.50	4.97E+01	1.84E-02	1.54E+02	8.11E+02	1.01E+03
6.50	3.25E+01	1.20E-02	1.03E+02	6.37E+02	7.72E+02
7.50	2.24E+01	8.30E-03	7.41E+01	5.25E+02	6.22E+02
8.50	1.74E+01	6.42E-03	5.99E+01	4.86E+02	5.64E+02
9.50	1.18E+01	4.38E-03	4.27E+01	3.96E+02	4.51E+02
15.00	7.20E+01	2.67E-02	3.06E+02	5.66E+03	6.04E+03
25.00	2.65E+01	9.83E-03	1.23E+02	5.77E+03	5.92E+03
35.00	1.24E+01	4.57E-03	5.88E+01	5.26E+03	5.33E+03
45.00	8.16E+00	3.02E-03	3.92E+01	5.68E+03	5.72E+03
55.00	5.71E-01	2.11E-04	2.76E+00	5.54E+02	5.57E+02
65.00	1.14E+00	4.23E-04	5.54E+00	1.46E+03	1.47E+03
75.00	6.49E-01	2.40E-04	3.15E+00	1.05E+03	1.06E+03
85.00	3.62E-01	1.34E-04	1.76E+00	7.22E+02	7.24E+02
95.00	3.95E-01	1.46E-04	1.92E+00	9.44E+02	9.46E+02
125.00	2.02E-01	7.47E-05	9.83E-01	7.16E+02	7.17E+02

436.546266302466400 total grams airborne in tank
1.616225155812572E-001 total g/s out riser
1605.915935695171000 total grams lost out riser
32123.538781166080000 total grams settled on floor
34165.999111175540000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 880.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.12E+01	4.70E-06	4.57E+01	4.58E+00	6.15E+01
1.50	3.21E+01	1.35E-05	1.60E+02	1.16E+02	3.07E+02
2.50	1.57E+01	6.59E-06	1.07E+02	1.98E+02	3.21E+02
3.50	1.28E+01	5.39E-06	1.44E+02	4.62E+02	6.18E+02
4.50	7.52E+00	3.16E-06	1.72E+02	7.77E+02	9.57E+02
5.50	2.59E+00	1.09E-06	1.54E+02	8.58E+02	1.01E+03
6.50	5.37E-01	2.26E-07	1.03E+02	6.68E+02	7.72E+02
7.50	9.70E-02	4.08E-08	7.41E+01	5.48E+02	6.22E+02
8.50	1.63E-02	6.84E-09	5.99E+01	5.04E+02	5.64E+02
9.50	1.99E-03	8.38E-10	4.27E+01	4.08E+02	4.51E+02
15.00	3.26E-08	1.37E-14	3.06E+02	5.73E+03	6.04E+03
25.00	3.92E-25	1.65E-31	1.23E+02	5.79E+03	5.92E+03
35.00	0.00E+00	0.00E+00	5.88E+01	5.27E+03	5.33E+03
45.00	0.00E+00	0.00E+00	3.92E+01	5.68E+03	5.72E+03
55.00	0.00E+00	0.00E+00	2.76E+00	5.54E+02	5.57E+02
65.00	0.00E+00	0.00E+00	5.54E+00	1.46E+03	1.47E+03
75.00	0.00E+00	0.00E+00	3.15E+00	1.05E+03	1.06E+03
85.00	0.00E+00	0.00E+00	1.76E+00	7.23E+02	7.24E+02
95.00	0.00E+00	0.00E+00	1.92E+00	9.44E+02	9.46E+02
125.00	0.00E+00	0.00E+00	9.83E-01	7.17E+02	7.17E+02

82.503365732306580 total grams airborne in tank
3.471047697719386E-005 total g/s out riser
1606.149293243885000 total grams lost out riser
32477.348636627200000 total grams settled on floor
34165.999111175540000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 900.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.16E+01	4.29E-03	5.08E+01	4.70E+00	6.71E+01
1.50	4.08E+01	1.51E-02	1.76E+02	1.19E+02	3.35E+02
2.50	2.96E+01	1.09E-02	1.18E+02	2.03E+02	3.50E+02
3.50	4.34E+01	1.60E-02	1.57E+02	4.74E+02	6.75E+02
4.50	5.51E+01	2.04E-02	1.88E+02	8.01E+02	1.04E+03
5.50	4.97E+01	1.84E-02	1.68E+02	8.89E+02	1.11E+03
6.50	3.25E+01	1.20E-02	1.13E+02	6.97E+02	8.42E+02
7.50	2.24E+01	8.30E-03	8.08E+01	5.75E+02	6.78E+02
8.50	1.74E+01	6.42E-03	6.54E+01	5.32E+02	6.15E+02
9.50	1.18E+01	4.38E-03	4.66E+01	4.34E+02	4.92E+02
15.00	7.20E+01	2.67E-02	3.34E+02	6.18E+03	6.59E+03
25.00	2.65E+01	9.83E-03	1.35E+02	6.29E+03	6.46E+03

35.00	1.24E+01	4.57E-03	6.42E+01	5.74E+03	5.81E+03
45.00	8.16E+00	3.02E-03	4.28E+01	6.19E+03	6.24E+03
55.00	5.71E-01	2.11E-04	3.01E+00	6.04E+02	6.08E+02
65.00	1.14E+00	4.23E-04	6.04E+00	1.60E+03	1.60E+03
75.00	6.49E-01	2.40E-04	3.44E+00	1.15E+03	1.15E+03
85.00	3.62E-01	1.34E-04	1.92E+00	7.88E+02	7.90E+02
95.00	3.95E-01	1.46E-04	2.10E+00	1.03E+03	1.03E+03
125.00	2.02E-01	7.47E-05	1.07E+00	7.81E+02	7.83E+02

436.571955427527400 total grams airborne in tank
1.616320267130504E-001 total g/s out riser
1756.044596791267000 total grams lost out riser
35079.384477615360000 total grams settled on floor
37271.998817443850000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 960.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.12E+01	4.71E-06	5.08E+01	5.07E+00	6.71E+01
1.50	3.21E+01	1.35E-05	1.76E+02	1.27E+02	3.35E+02
2.50	1.57E+01	6.59E-06	1.18E+02	2.17E+02	3.50E+02
3.50	1.28E+01	5.39E-06	1.57E+02	5.05E+02	6.75E+02
4.50	7.52E+00	3.16E-06	1.88E+02	8.48E+02	1.04E+03
5.50	2.59E+00	1.09E-06	1.68E+02	9.36E+02	1.11E+03
6.50	5.37E-01	2.26E-07	1.13E+02	7.29E+02	8.42E+02
7.50	9.70E-02	4.08E-08	8.08E+01	5.97E+02	6.78E+02
8.50	1.63E-02	6.84E-09	6.54E+01	5.50E+02	6.15E+02
9.50	1.99E-03	8.38E-10	4.66E+01	4.45E+02	4.92E+02
15.00	3.26E-08	1.37E-14	3.34E+02	6.25E+03	6.59E+03
25.00	3.92E-25	1.65E-31	1.35E+02	6.32E+03	6.46E+03
35.00	0.00E+00	0.00E+00	6.42E+01	5.75E+03	5.81E+03
45.00	0.00E+00	0.00E+00	4.28E+01	6.20E+03	6.24E+03
55.00	0.00E+00	0.00E+00	3.01E+00	6.05E+02	6.08E+02
65.00	0.00E+00	0.00E+00	6.04E+00	1.60E+03	1.60E+03
75.00	0.00E+00	0.00E+00	3.44E+00	1.15E+03	1.15E+03
85.00	0.00E+00	0.00E+00	1.92E+00	7.88E+02	7.90E+02
95.00	0.00E+00	0.00E+00	2.10E+00	1.03E+03	1.03E+03
125.00	0.00E+00	0.00E+00	1.07E+00	7.82E+02	7.83E+02

82.527314401740170 total grams airborne in tank
3.472055281424746E-005 total g/s out riser
1756.277981042862000 total grams lost out riser
35433.196067810060000 total grams settled on floor
37271.998817443850000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 980.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.16E+01	4.29E-03	5.59E+01	5.19E+00	7.27E+01
1.50	4.08E+01	1.51E-02	1.92E+02	1.30E+02	3.63E+02
2.50	2.96E+01	1.09E-02	1.28E+02	2.22E+02	3.80E+02
3.50	4.34E+01	1.60E-02	1.71E+02	5.17E+02	7.31E+02

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4.50	5.51E+01	2.04E-02	2.04E+02	8.72E+02	1.13E+03
5.50	4.97E+01	1.84E-02	1.82E+02	9.67E+02	1.20E+03
6.50	3.25E+01	1.20E-02	1.22E+02	7.58E+02	9.13E+02
7.50	2.24E+01	8.30E-03	8.75E+01	6.25E+02	7.35E+02
8.50	1.74E+01	6.42E-03	7.08E+01	5.78E+02	6.66E+02
9.50	1.18E+01	4.38E-03	5.04E+01	4.71E+02	5.33E+02
15.00	7.20E+01	2.67E-02	3.62E+02	6.70E+03	7.13E+03
25.00	2.65E+01	9.83E-03	1.46E+02	6.82E+03	6.99E+03
35.00	1.24E+01	4.57E-03	6.95E+01	6.22E+03	6.30E+03
45.00	8.16E+00	3.02E-03	4.64E+01	6.71E+03	6.76E+03
55.00	5.71E-01	2.11E-04	3.26E+00	6.54E+02	6.58E+02
65.00	1.14E+00	4.23E-04	6.55E+00	1.73E+03	1.74E+03
75.00	6.49E-01	2.40E-04	3.72E+00	1.24E+03	1.25E+03
85.00	3.62E-01	1.34E-04	2.08E+00	8.54E+02	8.56E+02
95.00	3.95E-01	1.46E-04	2.27E+00	1.12E+03	1.12E+03
125.00	2.02E-01	7.47E-05	1.16E+00	8.47E+02	8.48E+02

436.586986288428300 total grams airborne in tank
1.616375918310951E-001 total g/s out riser
1906.181787729263000 total grams lost out riser
38035.232532501220000 total grams settled on floor
40377.998489379880000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1040.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.12E+01	4.72E-06	5.59E+01	5.56E+00	7.27E+01
1.50	3.21E+01	1.35E-05	1.92E+02	1.39E+02	3.63E+02
2.50	1.57E+01	6.59E-06	1.28E+02	2.36E+02	3.80E+02
3.50	1.28E+01	5.39E-06	1.71E+02	5.47E+02	7.31E+02
4.50	7.52E+00	3.16E-06	2.04E+02	9.19E+02	1.13E+03
5.50	2.59E+00	1.09E-06	1.82E+02	1.01E+03	1.20E+03
6.50	5.37E-01	2.26E-07	1.22E+02	7.90E+02	9.13E+02
7.50	9.70E-02	4.08E-08	8.75E+01	6.47E+02	7.35E+02
8.50	1.63E-02	6.84E-09	7.08E+01	5.95E+02	6.66E+02
9.50	1.99E-03	8.38E-10	5.04E+01	4.83E+02	5.33E+02
15.00	3.26E-08	1.37E-14	3.62E+02	6.77E+03	7.13E+03
25.00	3.92E-25	1.65E-31	1.46E+02	6.85E+03	6.99E+03
35.00	0.00E+00	0.00E+00	6.95E+01	6.23E+03	6.30E+03
45.00	0.00E+00	0.00E+00	4.64E+01	6.72E+03	6.76E+03
55.00	0.00E+00	0.00E+00	3.26E+00	6.55E+02	6.58E+02
65.00	0.00E+00	0.00E+00	6.55E+00	1.73E+03	1.74E+03
75.00	0.00E+00	0.00E+00	3.72E+00	1.24E+03	1.25E+03
85.00	0.00E+00	0.00E+00	2.08E+00	8.54E+02	8.56E+02
95.00	0.00E+00	0.00E+00	2.27E+00	1.12E+03	1.12E+03
125.00	0.00E+00	0.00E+00	1.16E+00	8.47E+02	8.48E+02

82.541426874274350 total grams airborne in tank
3.472649135990268E-005 total g/s out riser
1906.415179252625000 total grams lost out riser
38389.044976711270000 total grams settled on floor
40377.998489379880000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1060.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.16E+01	4.30E-03	6.10E+01	5.68E+00	7.83E+01
1.50	4.08E+01	1.51E-02	2.09E+02	1.42E+02	3.91E+02
2.50	2.96E+01	1.09E-02	1.39E+02	2.40E+02	4.09E+02
3.50	4.34E+01	1.60E-02	1.84E+02	5.60E+02	7.87E+02
4.50	5.51E+01	2.04E-02	2.20E+02	9.43E+02	1.22E+03
5.50	4.97E+01	1.84E-02	1.96E+02	1.05E+03	1.29E+03
6.50	3.25E+01	1.20E-02	1.31E+02	8.19E+02	9.83E+02
7.50	2.24E+01	8.30E-03	9.43E+01	6.75E+02	7.91E+02
8.50	1.74E+01	6.42E-03	7.63E+01	6.24E+02	7.17E+02
9.50	1.18E+01	4.38E-03	5.43E+01	5.08E+02	5.74E+02
15.00	7.20E+01	2.67E-02	3.89E+02	7.22E+03	7.68E+03
25.00	2.65E+01	9.83E-03	1.57E+02	7.35E+03	7.53E+03
35.00	1.24E+01	4.57E-03	7.49E+01	6.70E+03	6.78E+03
45.00	8.16E+00	3.02E-03	4.99E+01	7.23E+03	7.28E+03
55.00	5.71E-01	2.11E-04	3.51E+00	7.05E+02	7.09E+02
65.00	1.14E+00	4.23E-04	7.05E+00	1.86E+03	1.87E+03
75.00	6.49E-01	2.40E-04	4.01E+00	1.34E+03	1.34E+03
85.00	3.62E-01	1.34E-04	2.24E+00	9.19E+02	9.22E+02
95.00	3.95E-01	1.46E-04	2.45E+00	1.20E+03	1.20E+03
125.00	2.02E-01	7.47E-05	1.25E+00	9.12E+02	9.13E+02

436.595864996314000 total grams airborne in tank
1.616408793997834E-001 total g/s out riser
2056.324055552483000 total grams lost out riser
40991.081547737120000 total grams settled on floor
43483.998191833500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1120.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.12E+01	4.72E-06	6.10E+01	6.05E+00	7.83E+01
1.50	3.21E+01	1.35E-05	2.09E+02	1.50E+02	3.91E+02
2.50	1.57E+01	6.59E-06	1.39E+02	2.54E+02	4.09E+02
3.50	1.28E+01	5.39E-06	1.84E+02	5.90E+02	7.87E+02
4.50	7.52E+00	3.16E-06	2.20E+02	9.90E+02	1.22E+03
5.50	2.59E+00	1.09E-06	1.96E+02	1.09E+03	1.29E+03
6.50	5.37E-01	2.26E-07	1.31E+02	8.51E+02	9.83E+02
7.50	9.70E-02	4.08E-08	9.43E+01	6.97E+02	7.91E+02
8.50	1.63E-02	6.84E-09	7.63E+01	6.41E+02	7.17E+02
9.50	1.99E-03	8.38E-10	5.43E+01	5.20E+02	5.74E+02
15.00	3.26E-08	1.37E-14	3.89E+02	7.29E+03	7.68E+03
25.00	3.92E-25	1.65E-31	1.57E+02	7.37E+03	7.53E+03
35.00	0.00E+00	0.00E+00	7.49E+01	6.71E+03	6.78E+03
45.00	0.00E+00	0.00E+00	4.99E+01	7.23E+03	7.28E+03
55.00	0.00E+00	0.00E+00	3.51E+00	7.05E+02	7.09E+02
65.00	0.00E+00	0.00E+00	7.05E+00	1.86E+03	1.87E+03
75.00	0.00E+00	0.00E+00	4.01E+00	1.34E+03	1.34E+03
85.00	0.00E+00	0.00E+00	2.24E+00	9.20E+02	9.22E+02
95.00	0.00E+00	0.00E+00	2.45E+00	1.20E+03	1.20E+03
125.00	0.00E+00	0.00E+00	1.25E+00	9.12E+02	9.13E+02

82.549821115607360 total grams airborne in tank

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3.473002201833496E-005 total g/s out riser
  2056.557474255562000 total grams lost out riser
 41344.894331455230000 total grams settled on floor
 43483.998191833500000 total grams made airborne
0.000000000000000E+000 total grams bypassed
```

TABLE 2. 750,000 GALLON TANK

IL = In-leakage, cubic feet per minute @ 14.7 psia and 70°F
WH = Waste height, inches
PR = Penetration rate, inches per minute

Values are in total mass (grams) of dust flowing up the exhaust riser for the drilling of one complete core that is WH inches long.

	PR=.5	PR=1	PR=2	PR=3	PR=4
IL=0					
WH=19	44.6	31.0	20.7	17.4	13.3
WH=95	435.3	241.3	158.9	132.2	100.2
WH=171	731.6	532.1	360.4	303.2	231.9
WH=266	1305.0	1002.2	713.1	614.1	479.4
IL=500					
WH=19	99.9	70.4	47.5	40.0	30.6
WH=95	725.5	528.7	356.6	227.0	227.0
WH=171	1471.9	1127.5	792.6	675.0	520.2
WH=266	2548.9	2056.6	1529.2	1340.0	1059.2
IL=1000					
WH=19	151.7	108.4	73.7	62.1	47.6
WH=95	1049.0	789.5	544.3	350.5	350.5
WH=171	2080.8	1646.4	1190.6	1025.1	796.1
WH=266	3552.4	2954.4	2260.7	2006.1	1601.9
IL=1400					
WH=19	190.9	137.9	94.2	79.6	61.0
WH=95	1278.5	982.4	687.9	583.4	447.1
WH=171	1507.0	2022.0	1488.9	1291.7	1008.8
WH=266	4245.2	3496.1	2801.3	2506.0	2014.3
IL=2100					
WH=19	255.1	187.5	129.4	109.8	84.3
WH=95	1634.0	1292.4	927.0	793.1	611.6
WH=171	3161.4	2616.5	1976.2	1733.6	1366.0
WH=266	5294.3	4597.7	3673.2	3324.1	2698.0

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

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ADDITIONAL PARAMETERS:

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particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =      1121.770479426199000
bypass fraction =   0.000000000000000E+000

Output divisions in Period      1.000000000000000 =      1.000000
Output divisions in Period      2.000000000000000 =      1.000000
Output divisions in Period      3.000000000000000 =      1.000000
Output divisions in Period      4.000000000000000 =      1.000000
Output divisions in Period      5.000000000000000 =      1.000000
Output divisions in Period      6.000000000000000 =      1.000000
Output divisions in Period      7.000000000000000 =      1.000000
Output divisions in Period      8.000000000000000 =      1.000000
Output divisions in Period      9.000000000000000 =      1.000000
Output divisions in Period     10.000000000000000 =      1.000000
Output divisions in Period     11.000000000000000 =      1.000000
Output divisions in Period     12.000000000000000 =      1.000000
Output divisions in Period     13.000000000000000 =      1.000000
Output divisions in Period     14.000000000000000 =      1.000000
Output divisions in Period     15.000000000000000 =      1.000000
Output divisions in Period     16.000000000000000 =      1.000000
Output divisions in Period     17.000000000000000 =      1.000000
Output divisions in Period     18.000000000000000 =      1.000000
Output divisions in Period     19.000000000000000 =      1.000000
Output divisions in Period     20.000000000000000 =      1.000000
Output divisions in Period     21.000000000000000 =      1.000000
Output divisions in Period     22.000000000000000 =      1.000000
Output divisions in Period     23.000000000000000 =      1.000000
Output divisions in Period     24.000000000000000 =      1.000000
Output divisions in Period     25.000000000000000 =      1.000000
Output divisions in Period     26.000000000000000 =      1.000000
Output divisions in Period     27.000000000000000 =      1.000000
Output divisions in Period     28.000000000000000 =      1.000000


Flow out @    0.000000E+00 min =     2480.000000 cfm &     155.300000g/m
Flow out @       20.000000 min =        1.000000 cfm &   0.000000E+00g/m
Flow out @       80.000000 min =     2480.000000 cfm &     155.300000g/m
Flow out @      100.000000 min =        1.000000 cfm &   0.000000E+00g/m
Flow out @      160.000000 min =     2480.000000 cfm &     155.300000g/m
Flow out @      180.000000 min =        1.000000 cfm &   0.000000E+00g/m
Flow out @      240.000000 min =     2480.000000 cfm &     155.300000g/m
Flow out @      260.000000 min =        1.000000 cfm &   0.000000E+00g/m
Flow out @      320.000000 min =     2480.000000 cfm &     155.300000g/m
Flow out @      340.000000 min =        1.000000 cfm &   0.000000E+00g/m
Flow out @      400.000000 min =     2480.000000 cfm &     155.300000g/m
Flow out @      420.000000 min =        1.000000 cfm &   0.000000E+00g/m
Flow out @      480.000000 min =     2480.000000 cfm &     155.300000g/m
Flow out @      500.000000 min =        1.000000 cfm &   0.000000E+00g/m
Flow out @      560.000000 min =     2480.000000 cfm &     155.300000g/m
Flow out @      580.000000 min =        1.000000 cfm &   0.000000E+00g/m
Flow out @      640.000000 min =     2480.000000 cfm &     155.300000g/m
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Flow out @      660.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      740.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      800.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      820.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      880.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      900.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      960.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      980.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1040.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1060.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1120.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m
```

**** OUTPUT @ 20.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.17E+00	3.31E-03	2.40E+00	2.06E-02	5.59E+00
1.50	1.55E+01	1.61E-02	1.18E+01	7.45E-01	2.80E+01
2.50	1.53E+01	1.60E-02	1.19E+01	2.00E+00	2.92E+01
3.50	2.75E+01	2.86E-02	2.17E+01	7.04E+00	5.62E+01
4.50	3.87E+01	4.04E-02	3.15E+01	1.67E+01	8.70E+01
5.50	3.68E+01	3.84E-02	3.10E+01	2.44E+01	9.22E+01
6.50	2.48E+01	2.59E-02	2.17E+01	2.37E+01	7.02E+01
7.50	1.76E+01	1.83E-02	1.59E+01	2.30E+01	5.65E+01
8.50	1.39E+01	1.45E-02	1.31E+01	2.43E+01	5.12E+01
9.50	9.73E+00	1.01E-02	9.44E+00	2.18E+01	4.10E+01
15.00	6.51E+01	6.80E-02	7.19E+01	4.12E+02	5.49E+02
25.00	2.55E+01	2.66E-02	3.04E+01	4.82E+02	5.38E+02
35.00	1.21E+01	1.26E-02	1.48E+01	4.58E+02	4.85E+02
45.00	8.06E+00	8.41E-03	9.93E+00	5.02E+02	5.20E+02
55.00	5.66E-01	5.90E-04	7.00E-01	4.94E+01	5.06E+01
65.00	1.14E+00	1.18E-03	1.41E+00	1.31E+02	1.34E+02
75.00	6.45E-01	6.73E-04	8.02E-01	9.45E+01	9.60E+01
85.00	3.60E-01	3.76E-04	4.49E-01	6.50E+01	6.58E+01
95.00	3.94E-01	4.11E-04	4.91E-01	8.52E+01	8.60E+01
125.00	2.01E-01	2.10E-04	2.51E-01	6.48E+01	6.52E+01

```
    317.187515139579800 total grams airborne in tank
 3.309456400747877E-001 total g/s out riser
    301.542327016592000 total grams lost out riser
   2487.270245507360000 total grams settled on floor
   3106.000015735626000 total grams made airborne
 0.000000000000000E+000 total grams bypassed
```

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.07E+00	1.29E-06	2.40E+00	1.21E-01	5.59E+00
1.50	1.22E+01	5.12E-06	1.18E+01	4.02E+00	2.80E+01
2.50	8.13E+00	3.42E-06	1.19E+01	9.19E+00	2.92E+01
3.50	8.12E+00	3.41E-06	2.18E+01	2.63E+01	5.62E+01
4.50	5.29E+00	2.22E-06	3.16E+01	5.01E+01	8.70E+01
5.50	1.92E+00	8.09E-07	3.10E+01	5.93E+01	9.22E+01

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6.50	4.10E-01	1.73E-07	2.17E+01	4.81E+01	7.02E+01
7.50	7.60E-02	3.20E-08	1.59E+01	4.05E+01	5.65E+01
8.50	1.31E-02	5.49E-09	1.31E+01	3.82E+01	5.12E+01
9.50	1.64E-03	6.89E-10	9.44E+00	3.16E+01	4.10E+01
15.00	2.95E-08	1.24E-14	7.19E+01	4.77E+02	5.49E+02
25.00	3.77E-25	1.59E-31	3.04E+01	5.08E+02	5.38E+02
35.00	0.00E+00	0.00E+00	1.48E+01	4.70E+02	4.85E+02
45.00	0.00E+00	0.00E+00	9.93E+00	5.10E+02	5.20E+02
55.00	0.00E+00	0.00E+00	7.00E-01	4.99E+01	5.06E+01
65.00	0.00E+00	0.00E+00	1.41E+00	1.32E+02	1.34E+02
75.00	0.00E+00	0.00E+00	8.02E-01	9.52E+01	9.60E+01
85.00	0.00E+00	0.00E+00	4.49E-01	6.54E+01	6.58E+01
95.00	0.00E+00	0.00E+00	4.91E-01	8.55E+01	8.60E+01
125.00	0.00E+00	0.00E+00	2.51E-01	6.50E+01	6.52E+01

39.185419570602240 total grams airborne in tank
1.648592839857457E-005 total g/s out riser
301.676510363817200 total grams lost out riser
2765.138148069382000 total grams settled on floor
3106.000015735626000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.04E+00	4.22E-03	6.98E+00	1.61E-01	1.12E+01
1.50	1.87E+01	1.95E-02	3.20E+01	5.30E+00	5.59E+01
2.50	1.72E+01	1.80E-02	2.91E+01	1.21E+01	5.84E+01
3.50	2.90E+01	3.03E-02	4.84E+01	3.50E+01	1.12E+02
4.50	3.95E+01	4.12E-02	6.61E+01	6.84E+01	1.74E+02
5.50	3.71E+01	3.87E-02	6.30E+01	8.44E+01	1.84E+02
6.50	2.49E+01	2.60E-02	4.35E+01	7.20E+01	1.40E+02
7.50	1.76E+01	1.83E-02	3.18E+01	6.36E+01	1.13E+02
8.50	1.39E+01	1.45E-02	2.61E+01	6.24E+01	1.02E+02
9.50	9.73E+00	1.01E-02	1.89E+01	5.34E+01	8.20E+01
15.00	6.51E+01	6.80E-02	1.44E+02	8.89E+02	1.10E+03
25.00	2.55E+01	2.66E-02	6.09E+01	9.90E+02	1.08E+03
35.00	1.21E+01	1.26E-02	2.96E+01	9.27E+02	9.69E+02
45.00	8.06E+00	8.41E-03	1.99E+01	1.01E+03	1.04E+03
55.00	5.66E-01	5.90E-04	1.40E+00	9.93E+01	1.01E+02
65.00	1.14E+00	1.18E-03	2.82E+00	2.63E+02	2.67E+02
75.00	6.45E-01	6.73E-04	1.60E+00	1.90E+02	1.92E+02
85.00	3.60E-01	3.76E-04	8.98E-01	1.30E+02	1.32E+02
95.00	3.94E-01	4.11E-04	9.82E-01	1.71E+02	1.72E+02
125.00	2.01E-01	2.10E-04	5.03E-01	1.30E+02	1.30E+02

325.714285731315600 total grams airborne in tank
3.398422635800671E-001 total g/s out riser
628.249369800090800 total grams lost out riser
5258.036459222436000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam	airborne	outflow	totalout	totalflr	source

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mcrn	g	g/s	g	g	g
.50	3.91E+00	1.64E-06	6.98E+00	2.89E-01	1.12E+01
1.50	1.47E+01	6.18E-06	3.20E+01	9.25E+00	5.59E+01
2.50	9.13E+00	3.84E-06	2.91E+01	2.02E+01	5.84E+01
3.50	8.57E+00	3.61E-06	4.85E+01	5.54E+01	1.12E+02
4.50	5.39E+00	2.27E-06	6.61E+01	1.02E+02	1.74E+02
5.50	1.93E+00	8.13E-07	6.30E+01	1.20E+02	1.84E+02
6.50	4.11E-01	1.73E-07	4.36E+01	9.64E+01	1.40E+02
7.50	7.60E-02	3.20E-08	3.19E+01	8.11E+01	1.13E+02
8.50	1.31E-02	5.49E-09	2.61E+01	7.63E+01	1.02E+02
9.50	1.64E-03	6.89E-10	1.89E+01	6.31E+01	8.20E+01
15.00	2.95E-08	1.24E-14	1.44E+02	9.54E+02	1.10E+03
25.00	3.77E-25	1.59E-31	6.09E+01	1.02E+03	1.08E+03
35.00	0.00E+00	0.00E+00	2.96E+01	9.40E+02	9.69E+02
45.00	0.00E+00	0.00E+00	1.99E+01	1.02E+03	1.04E+03
55.00	0.00E+00	0.00E+00	1.40E+00	9.99E+01	1.01E+02
65.00	0.00E+00	0.00E+00	2.82E+00	2.64E+02	2.67E+02
75.00	0.00E+00	0.00E+00	1.60E+00	1.90E+02	1.92E+02
85.00	0.00E+00	0.00E+00	8.98E-01	1.31E+02	1.32E+02
95.00	0.00E+00	0.00E+00	9.82E-01	1.71E+02	1.72E+02
125.00	0.00E+00	0.00E+00	5.03E-01	1.30E+02	1.30E+02

44.124851078324710 total grams airborne in tank
1.856402587628361E-005 total g/s out riser
628.393267214298200 total grams lost out riser
5539.482032179832000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.28E+00	4.47E-03	1.22E+01	3.33E-01	1.68E+01
1.50	1.93E+01	2.02E-02	5.39E+01	1.06E+01	8.39E+01
2.50	1.74E+01	1.82E-02	4.70E+01	2.32E+01	8.76E+01
3.50	2.91E+01	3.03E-02	7.54E+01	6.41E+01	1.69E+02
4.50	3.95E+01	4.12E-02	1.01E+02	1.21E+02	2.61E+02
5.50	3.71E+01	3.87E-02	9.50E+01	1.45E+02	2.77E+02
6.50	2.49E+01	2.60E-02	6.54E+01	1.20E+02	2.11E+02
7.50	1.76E+01	1.83E-02	4.78E+01	1.04E+02	1.70E+02
8.50	1.39E+01	1.45E-02	3.92E+01	1.01E+02	1.54E+02
9.50	9.73E+00	1.01E-02	2.83E+01	8.49E+01	1.23E+02
15.00	6.51E+01	6.80E-02	2.16E+02	1.37E+03	1.65E+03
25.00	2.55E+01	2.66E-02	9.13E+01	1.50E+03	1.61E+03
35.00	1.21E+01	1.26E-02	4.43E+01	1.40E+03	1.45E+03
45.00	8.06E+00	8.41E-03	2.98E+01	1.52E+03	1.56E+03
55.00	5.66E-01	5.90E-04	2.10E+00	1.49E+02	1.52E+02
65.00	1.14E+00	1.18E-03	4.23E+00	3.95E+02	4.01E+02
75.00	6.45E-01	6.73E-04	2.41E+00	2.85E+02	2.88E+02
85.00	3.60E-01	3.76E-04	1.35E+00	1.96E+02	1.98E+02
95.00	3.94E-01	4.11E-04	1.47E+00	2.56E+02	2.58E+02
125.00	2.01E-01	2.10E-04	7.54E-01	1.95E+02	1.96E+02

326.954204916954000 total grams airborne in tank
3.411359684250783E-001 total g/s out riser
958.312606692314100 total grams lost out riser

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8032.733341574669000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	1.74E-06	1.22E+01	4.69E-01	1.68E+01
1.50	1.52E+01	6.40E-06	5.39E+01	1.47E+01	8.39E+01
2.50	9.25E+00	3.89E-06	4.70E+01	3.13E+01	8.76E+01
3.50	8.60E+00	3.62E-06	7.55E+01	8.46E+01	1.69E+02
4.50	5.39E+00	2.27E-06	1.01E+02	1.55E+02	2.61E+02
5.50	1.93E+00	8.13E-07	9.51E+01	1.80E+02	2.77E+02
6.50	4.11E-01	1.73E-07	6.54E+01	1.45E+02	2.11E+02
7.50	7.60E-02	3.20E-08	4.78E+01	1.22E+02	1.70E+02
8.50	1.31E-02	5.49E-09	3.92E+01	1.15E+02	1.54E+02
9.50	1.64E-03	6.89E-10	2.83E+01	9.47E+01	1.23E+02
15.00	2.95E-08	1.24E-14	2.16E+02	1.43E+03	1.65E+03
25.00	3.77E-25	1.59E-31	9.13E+01	1.52E+03	1.61E+03
35.00	0.00E+00	0.00E+00	4.43E+01	1.41E+03	1.45E+03
45.00	0.00E+00	0.00E+00	2.98E+01	1.53E+03	1.56E+03
55.00	0.00E+00	0.00E+00	2.10E+00	1.50E+02	1.52E+02
65.00	0.00E+00	0.00E+00	4.23E+00	3.96E+02	4.01E+02
75.00	0.00E+00	0.00E+00	2.41E+00	2.86E+02	2.88E+02
85.00	0.00E+00	0.00E+00	1.35E+00	1.96E+02	1.98E+02
95.00	0.00E+00	0.00E+00	1.47E+00	2.57E+02	2.58E+02
125.00	0.00E+00	0.00E+00	7.54E-01	1.95E+02	1.96E+02

45.030088156991400 total grams airborne in tank
1.894487355678700E-005 total g/s out riser
958.458092212677000 total grams lost out riser
8314.512002140284000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.35E+00	4.53E-03	1.75E+01	5.15E-01	2.24E+01
1.50	1.95E+01	2.03E-02	7.62E+01	1.61E+01	1.12E+02
2.50	1.75E+01	1.82E-02	6.49E+01	3.44E+01	1.17E+02
3.50	2.91E+01	3.04E-02	1.02E+02	9.33E+01	2.25E+02
4.50	3.95E+01	4.12E-02	1.35E+02	1.73E+02	3.48E+02
5.50	3.71E+01	3.87E-02	1.27E+02	2.05E+02	3.69E+02
6.50	2.49E+01	2.60E-02	8.73E+01	1.69E+02	2.81E+02
7.50	1.76E+01	1.83E-02	6.37E+01	1.45E+02	2.26E+02
8.50	1.39E+01	1.45E-02	5.23E+01	1.39E+02	2.05E+02
9.50	9.73E+00	1.01E-02	3.78E+01	1.17E+02	1.64E+02
15.00	6.51E+01	6.80E-02	2.88E+02	1.84E+03	2.20E+03
25.00	2.55E+01	2.66E-02	1.22E+02	2.00E+03	2.15E+03
35.00	1.21E+01	1.26E-02	5.91E+01	1.87E+03	1.94E+03
45.00	8.06E+00	8.41E-03	3.97E+01	2.03E+03	2.08E+03
55.00	5.66E-01	5.90E-04	2.80E+00	1.99E+02	2.03E+02
65.00	1.14E+00	1.18E-03	5.64E+00	5.27E+02	5.34E+02

75.00	6.45E-01	6.73E-04	3.21E+00	3.80E+02	3.84E+02
85.00	3.60E-01	3.76E-04	1.80E+00	2.61E+02	2.63E+02
95.00	3.94E-01	4.11E-04	1.96E+00	3.42E+02	3.44E+02
125.00	2.01E-01	2.10E-04	1.01E+00	2.60E+02	2.61E+02

327.191442847251900 total grams airborne in tank
3.413834920793306E-001 total g/s out riser
1289.001636505127000 total grams lost out riser
10807.807153820990000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.20E+00	1.77E-06	1.75E+01	6.53E-01	2.24E+01
1.50	1.53E+01	6.45E-06	7.62E+01	2.03E+01	1.12E+02
2.50	9.27E+00	3.90E-06	6.50E+01	4.26E+01	1.17E+02
3.50	8.60E+00	3.62E-06	1.02E+02	1.14E+02	2.25E+02
4.50	5.39E+00	2.27E-06	1.35E+02	2.07E+02	3.48E+02
5.50	1.93E+00	8.13E-07	1.27E+02	2.40E+02	3.69E+02
6.50	4.11E-01	1.73E-07	8.73E+01	1.93E+02	2.81E+02
7.50	7.60E-02	3.20E-08	6.37E+01	1.62E+02	2.26E+02
8.50	1.31E-02	5.49E-09	5.23E+01	1.53E+02	2.05E+02
9.50	1.64E-03	6.89E-10	3.78E+01	1.26E+02	1.64E+02
15.00	2.95E-08	1.24E-14	2.88E+02	1.91E+03	2.20E+03
25.00	3.77E-25	1.59E-31	1.22E+02	2.03E+03	2.15E+03
35.00	0.00E+00	0.00E+00	5.91E+01	1.88E+03	1.94E+03
45.00	0.00E+00	0.00E+00	3.97E+01	2.04E+03	2.08E+03
55.00	0.00E+00	0.00E+00	2.80E+00	2.00E+02	2.03E+02
65.00	0.00E+00	0.00E+00	5.64E+00	5.29E+02	5.34E+02
75.00	0.00E+00	0.00E+00	3.21E+00	3.81E+02	3.84E+02
85.00	0.00E+00	0.00E+00	1.80E+00	2.62E+02	2.63E+02
95.00	0.00E+00	0.00E+00	1.96E+00	3.42E+02	3.44E+02
125.00	0.00E+00	0.00E+00	1.01E+00	2.60E+02	2.61E+02

45.218552679353150 total grams airborne in tank
1.902416273645338E-005 total g/s out riser
1289.147460103035000 total grams lost out riser
11089.634281933310000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.36E+00	4.55E-03	2.29E+01	6.99E-01	2.80E+01
1.50	1.95E+01	2.03E-02	9.86E+01	2.17E+01	1.40E+02
2.50	1.75E+01	1.82E-02	8.29E+01	4.56E+01	1.46E+02
3.50	2.91E+01	3.04E-02	1.29E+02	1.23E+02	2.81E+02
4.50	3.95E+01	4.12E-02	1.70E+02	2.26E+02	4.35E+02
5.50	3.71E+01	3.87E-02	1.59E+02	2.65E+02	4.61E+02
6.50	2.49E+01	2.60E-02	1.09E+02	2.17E+02	3.51E+02
7.50	1.76E+01	1.83E-02	7.97E+01	1.85E+02	2.83E+02

8.50	1.39E+01	1.45E-02	6.54E+01	1.77E+02	2.56E+02
9.50	9.73E+00	1.01E-02	4.72E+01	1.48E+02	2.05E+02
15.00	6.51E+01	6.80E-02	3.60E+02	2.32E+03	2.74E+03
25.00	2.55E+01	2.66E-02	1.52E+02	2.51E+03	2.69E+03
35.00	1.21E+01	1.26E-02	7.39E+01	2.34E+03	2.42E+03
45.00	8.06E+00	8.41E-03	4.96E+01	2.54E+03	2.60E+03
55.00	5.66E-01	5.90E-04	3.50E+00	2.49E+02	2.53E+02
65.00	1.14E+00	1.18E-03	7.05E+00	6.60E+02	6.68E+02
75.00	6.45E-01	6.73E-04	4.01E+00	4.75E+02	4.80E+02
85.00	3.60E-01	3.76E-04	2.24E+00	3.27E+02	3.29E+02
95.00	3.94E-01	4.11E-04	2.46E+00	4.27E+02	4.30E+02
125.00	2.01E-01	2.10E-04	1.26E+00	3.25E+02	3.26E+02

327.241793990135200 total grams airborne in tank
3.414360265887808E-001 total g/s out riser
1619.821965575218000 total grams lost out riser
13582.936586201190000 total grams settled on floor
15530.000019073490000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.22E+00	1.77E-06	2.29E+01	8.37E-01	2.80E+01
1.50	1.53E+01	6.45E-06	9.86E+01	2.58E+01	1.40E+02
2.50	9.27E+00	3.90E-06	8.29E+01	5.38E+01	1.46E+02
3.50	8.60E+00	3.62E-06	1.29E+02	1.43E+02	2.81E+02
4.50	5.39E+00	2.27E-06	1.70E+02	2.60E+02	4.35E+02
5.50	1.93E+00	8.13E-07	1.59E+02	3.00E+02	4.61E+02
6.50	4.11E-01	1.73E-07	1.09E+02	2.41E+02	3.51E+02
7.50	7.60E-02	3.20E-08	7.97E+01	2.03E+02	2.83E+02
8.50	1.31E-02	5.49E-09	6.54E+01	1.91E+02	2.56E+02
9.50	1.64E-03	6.89E-10	4.72E+01	1.58E+02	2.05E+02
15.00	2.95E-08	1.24E-14	3.60E+02	2.38E+03	2.74E+03
25.00	3.77E-25	1.59E-31	1.52E+02	2.54E+03	2.69E+03
35.00	0.00E+00	0.00E+00	7.39E+01	2.35E+03	2.42E+03
45.00	0.00E+00	0.00E+00	4.96E+01	2.55E+03	2.60E+03
55.00	0.00E+00	0.00E+00	3.50E+00	2.50E+02	2.53E+02
65.00	0.00E+00	0.00E+00	7.05E+00	6.61E+02	6.68E+02
75.00	0.00E+00	0.00E+00	4.01E+00	4.76E+02	4.80E+02
85.00	0.00E+00	0.00E+00	2.24E+00	3.27E+02	3.29E+02
95.00	0.00E+00	0.00E+00	2.46E+00	4.28E+02	4.30E+02
125.00	0.00E+00	0.00E+00	1.26E+00	3.25E+02	3.26E+02

45.260333627992070 total grams airborne in tank
1.904174099530189E-005 total g/s out riser
1619.967869758606000 total grams lost out riser
13864.772357165810000 total grams settled on floor
15530.000019073490000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g

.50	4.37E+00	4.56E-03	2.83E+01	8.84E-01	3.35E+01
1.50	1.95E+01	2.03E-02	1.21E+02	2.72E+01	1.68E+02
2.50	1.75E+01	1.82E-02	1.01E+02	5.68E+01	1.75E+02
3.50	2.91E+01	3.04E-02	1.56E+02	1.52E+02	3.37E+02
4.50	3.95E+01	4.12E-02	2.04E+02	2.78E+02	5.22E+02
5.50	3.71E+01	3.87E-02	1.91E+02	3.25E+02	5.53E+02
6.50	2.49E+01	2.60E-02	1.31E+02	2.65E+02	4.21E+02
7.50	1.76E+01	1.83E-02	9.56E+01	2.26E+02	3.39E+02
8.50	1.39E+01	1.45E-02	7.84E+01	2.15E+02	3.07E+02
9.50	9.73E+00	1.01E-02	5.66E+01	1.80E+02	2.46E+02
15.00	6.51E+01	6.80E-02	4.31E+02	2.80E+03	3.29E+03
25.00	2.55E+01	2.66E-02	1.83E+02	3.02E+03	3.23E+03
35.00	1.21E+01	1.26E-02	8.87E+01	2.81E+03	2.91E+03
45.00	8.06E+00	8.41E-03	5.96E+01	3.05E+03	3.12E+03
55.00	5.66E-01	5.90E-04	4.20E+00	2.99E+02	3.04E+02
65.00	1.14E+00	1.18E-03	8.46E+00	7.92E+02	8.01E+02
75.00	6.45E-01	6.73E-04	4.81E+00	5.70E+02	5.76E+02
85.00	3.60E-01	3.76E-04	2.69E+00	3.92E+02	3.95E+02
95.00	3.94E-01	4.11E-04	2.95E+00	5.13E+02	5.16E+02
125.00	2.01E-01	2.10E-04	1.51E+00	3.90E+02	3.91E+02

327.253082633018500 total grams airborne in tank
3.414478040940594E-001 total g/s out riser
1950.671613335609000 total grams lost out riser
16358.075891613960000 total grams settled on floor
18636.000000000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.22E+00	1.78E-06	2.83E+01	1.02E+00	3.35E+01
1.50	1.53E+01	6.46E-06	1.21E+02	3.14E+01	1.68E+02
2.50	9.27E+00	3.90E-06	1.01E+02	6.50E+01	1.75E+02
3.50	8.60E+00	3.62E-06	1.57E+02	1.72E+02	3.37E+02
4.50	5.39E+00	2.27E-06	2.04E+02	3.12E+02	5.22E+02
5.50	1.93E+00	8.13E-07	1.91E+02	3.60E+02	5.53E+02
6.50	4.11E-01	1.73E-07	1.31E+02	2.90E+02	4.21E+02
7.50	7.60E-02	3.20E-08	9.56E+01	2.43E+02	3.39E+02
8.50	1.31E-02	5.49E-09	7.84E+01	2.29E+02	3.07E+02
9.50	1.64E-03	6.89E-10	5.66E+01	1.89E+02	2.46E+02
15.00	2.95E-08	1.24E-14	4.31E+02	2.86E+03	3.29E+03
25.00	3.77E-25	1.59E-31	1.83E+02	3.05E+03	3.23E+03
35.00	0.00E+00	0.00E+00	8.87E+01	2.82E+03	2.91E+03
45.00	0.00E+00	0.00E+00	5.96E+01	3.06E+03	3.12E+03
55.00	0.00E+00	0.00E+00	4.20E+00	3.00E+02	3.04E+02
65.00	0.00E+00	0.00E+00	8.46E+00	7.93E+02	8.01E+02
75.00	0.00E+00	0.00E+00	4.81E+00	5.71E+02	5.76E+02
85.00	0.00E+00	0.00E+00	2.69E+00	3.92E+02	3.95E+02
95.00	0.00E+00	0.00E+00	2.95E+00	5.13E+02	5.16E+02
125.00	0.00E+00	0.00E+00	1.51E+00	3.90E+02	3.91E+02

45.269973844819460 total grams airborne in tank
1.904579688692445E-005 total g/s out riser
1950.817487001419000 total grams lost out riser
16639.913376808170000 total grams settled on floor
18636.000000000000000 total grams made airborne

0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.37E+00	4.56E-03	3.37E+01	1.07E+00	3.91E+01
1.50	1.95E+01	2.04E-02	1.43E+02	3.28E+01	1.96E+02
2.50	1.75E+01	1.82E-02	1.19E+02	6.80E+01	2.04E+02
3.50	2.91E+01	3.04E-02	1.83E+02	1.81E+02	3.94E+02
4.50	3.95E+01	4.12E-02	2.39E+02	3.30E+02	6.09E+02
5.50	3.71E+01	3.87E-02	2.23E+02	3.86E+02	6.46E+02
6.50	2.49E+01	2.60E-02	1.53E+02	3.14E+02	4.91E+02
7.50	1.76E+01	1.83E-02	1.12E+02	2.67E+02	3.96E+02
8.50	1.39E+01	1.45E-02	9.15E+01	2.53E+02	3.59E+02
9.50	9.73E+00	1.01E-02	6.61E+01	2.11E+02	2.87E+02
15.00	6.51E+01	6.80E-02	5.03E+02	3.27E+03	3.84E+03
25.00	2.55E+01	2.66E-02	2.13E+02	3.53E+03	3.77E+03
35.00	1.21E+01	1.26E-02	1.03E+02	3.28E+03	3.39E+03
45.00	8.06E+00	8.41E-03	6.95E+01	3.56E+03	3.64E+03
55.00	5.66E-01	5.90E-04	4.90E+00	3.49E+02	3.54E+02
65.00	1.14E+00	1.18E-03	9.87E+00	9.24E+02	9.35E+02
75.00	6.45E-01	6.73E-04	5.62E+00	6.66E+02	6.72E+02
85.00	3.60E-01	3.76E-04	3.14E+00	4.57E+02	4.61E+02
95.00	3.94E-01	4.11E-04	3.44E+00	5.98E+02	6.02E+02
125.00	2.01E-01	2.10E-04	1.76E+00	4.55E+02	4.57E+02

327.255708098411600 total grams airborne in tank
3.414505454420578E-001 total g/s out riser
2281.527927279472000 total grams lost out riser
19133.217174649240000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.22E+00	1.78E-06	3.37E+01	1.21E+00	3.91E+01
1.50	1.53E+01	6.46E-06	1.43E+02	3.69E+01	1.96E+02
2.50	9.27E+00	3.90E-06	1.19E+02	7.62E+01	2.04E+02
3.50	8.60E+00	3.62E-06	1.84E+02	2.01E+02	3.94E+02
4.50	5.39E+00	2.27E-06	2.39E+02	3.64E+02	6.09E+02
5.50	1.93E+00	8.13E-07	2.23E+02	4.21E+02	6.46E+02
6.50	4.11E-01	1.73E-07	1.53E+02	3.38E+02	4.91E+02
7.50	7.60E-02	3.20E-08	1.12E+02	2.84E+02	3.96E+02
8.50	1.31E-02	5.49E-09	9.15E+01	2.67E+02	3.59E+02
9.50	1.64E-03	6.89E-10	6.61E+01	2.21E+02	2.87E+02
15.00	2.95E-08	1.24E-14	5.03E+02	3.34E+03	3.84E+03
25.00	3.77E-25	1.59E-31	2.13E+02	3.55E+03	3.77E+03
35.00	0.00E+00	0.00E+00	1.03E+02	3.29E+03	3.39E+03
45.00	0.00E+00	0.00E+00	6.95E+01	3.57E+03	3.64E+03
55.00	0.00E+00	0.00E+00	4.90E+00	3.49E+02	3.54E+02
65.00	0.00E+00	0.00E+00	9.87E+00	9.25E+02	9.35E+02
75.00	0.00E+00	0.00E+00	5.62E+00	6.66E+02	6.72E+02
85.00	0.00E+00	0.00E+00	3.14E+00	4.58E+02	4.61E+02

95.00	0.00E+00	0.00E+00	3.44E+00	5.99E+02	6.02E+02
125.00	0.00E+00	0.00E+00	1.76E+00	4.55E+02	4.57E+02

45.272265524201790 total grams airborne in tank
1.904676151974252E-005 total g/s out riser
2281.673851966858000 total grams lost out riser
19415.054919242860000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.37E+00	4.56E-03	3.91E+01	1.25E+00	4.47E+01
1.50	1.95E+01	2.04E-02	1.66E+02	3.83E+01	2.24E+02
2.50	1.75E+01	1.82E-02	1.37E+02	7.92E+01	2.34E+02
3.50	2.91E+01	3.04E-02	2.11E+02	2.10E+02	4.50E+02
4.50	3.95E+01	4.12E-02	2.73E+02	3.83E+02	6.96E+02
5.50	3.71E+01	3.87E-02	2.55E+02	4.46E+02	7.38E+02
6.50	2.49E+01	2.60E-02	1.75E+02	3.62E+02	5.62E+02
7.50	1.76E+01	1.83E-02	1.27E+02	3.07E+02	4.52E+02
8.50	1.39E+01	1.45E-02	1.05E+02	2.91E+02	4.10E+02
9.50	9.73E+00	1.01E-02	7.55E+01	2.43E+02	3.28E+02
15.00	6.51E+01	6.80E-02	5.75E+02	3.75E+03	4.39E+03
25.00	2.55E+01	2.66E-02	2.44E+02	4.03E+03	4.30E+03
35.00	1.21E+01	1.26E-02	1.18E+02	3.75E+03	3.88E+03
45.00	8.06E+00	8.41E-03	7.94E+01	4.07E+03	4.16E+03
55.00	5.66E-01	5.90E-04	5.60E+00	3.99E+02	4.05E+02
65.00	1.14E+00	1.18E-03	1.13E+01	1.06E+03	1.07E+03
75.00	6.45E-01	6.73E-04	6.42E+00	7.61E+02	7.68E+02
85.00	3.60E-01	3.76E-04	3.59E+00	5.23E+02	5.27E+02
95.00	3.94E-01	4.11E-04	3.93E+00	6.84E+02	6.88E+02
125.00	2.01E-01	2.10E-04	2.01E+00	5.20E+02	5.22E+02

327.256336092948900 total grams airborne in tank
3.414511996961664E-001 total g/s out riser
2612.385892152786000 total grams lost out riser
21908.358863949780000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.22E+00	1.78E-06	3.91E+01	1.39E+00	4.47E+01
1.50	1.53E+01	6.46E-06	1.66E+02	4.24E+01	2.24E+02
2.50	9.27E+00	3.90E-06	1.37E+02	8.74E+01	2.34E+02
3.50	8.60E+00	3.62E-06	2.11E+02	2.31E+02	4.50E+02
4.50	5.39E+00	2.27E-06	2.74E+02	4.17E+02	6.96E+02
5.50	1.93E+00	8.13E-07	2.55E+02	4.81E+02	7.38E+02
6.50	4.11E-01	1.73E-07	1.75E+02	3.86E+02	5.62E+02
7.50	7.60E-02	3.20E-08	1.27E+02	3.25E+02	4.52E+02
8.50	1.31E-02	5.49E-09	1.05E+02	3.05E+02	4.10E+02
9.50	1.64E-03	6.89E-10	7.55E+01	2.52E+02	3.28E+02

15.00	2.95E-08	1.24E-14	5.75E+02	3.82E+03	4.39E+03
25.00	3.77E-25	1.59E-31	2.44E+02	4.06E+03	4.30E+03
35.00	0.00E+00	0.00E+00	1.18E+02	3.76E+03	3.88E+03
45.00	0.00E+00	0.00E+00	7.94E+01	4.08E+03	4.16E+03
55.00	0.00E+00	0.00E+00	5.60E+00	3.99E+02	4.05E+02
65.00	0.00E+00	0.00E+00	1.13E+01	1.06E+03	1.07E+03
75.00	0.00E+00	0.00E+00	6.42E+00	7.61E+02	7.68E+02
85.00	0.00E+00	0.00E+00	3.59E+00	5.23E+02	5.27E+02
95.00	0.00E+00	0.00E+00	3.93E+00	6.84E+02	6.88E+02
125.00	0.00E+00	0.00E+00	2.01E+00	5.20E+02	5.22E+02

45.272824377351200 total grams airborne in tank
1.904699605568874E-005 total g/s out riser
2612.531771421432000 total grams lost out riser
22190.196566820140000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.37E+00	4.56E-03	4.45E+01	1.44E+00	5.03E+01
1.50	1.95E+01	2.04E-02	1.88E+02	4.39E+01	2.52E+02
2.50	1.75E+01	1.82E-02	1.55E+02	9.05E+01	2.63E+02
3.50	2.91E+01	3.04E-02	2.38E+02	2.39E+02	5.06E+02
4.50	3.95E+01	4.12E-02	3.08E+02	4.35E+02	7.83E+02
5.50	3.71E+01	3.87E-02	2.87E+02	5.06E+02	8.30E+02
6.50	2.49E+01	2.60E-02	1.97E+02	4.10E+02	6.32E+02
7.50	1.76E+01	1.83E-02	1.43E+02	3.48E+02	5.09E+02
8.50	1.39E+01	1.45E-02	1.18E+02	3.30E+02	4.61E+02
9.50	9.73E+00	1.01E-02	8.50E+01	2.74E+02	3.69E+02
15.00	6.51E+01	6.80E-02	6.47E+02	4.23E+03	4.94E+03
25.00	2.55E+01	2.66E-02	2.74E+02	4.54E+03	4.84E+03
35.00	1.21E+01	1.26E-02	1.33E+02	4.22E+03	4.36E+03
45.00	8.06E+00	8.41E-03	8.94E+01	4.58E+03	4.68E+03
55.00	5.66E-01	5.90E-04	6.30E+00	4.49E+02	4.56E+02
65.00	1.14E+00	1.18E-03	1.27E+01	1.19E+03	1.20E+03
75.00	6.45E-01	6.73E-04	7.22E+00	8.56E+02	8.64E+02
85.00	3.60E-01	3.76E-04	4.04E+00	5.88E+02	5.93E+02
95.00	3.94E-01	4.11E-04	4.42E+00	7.70E+02	7.74E+02
125.00	2.01E-01	2.10E-04	2.26E+00	5.85E+02	5.87E+02

327.256490588188200 total grams airborne in tank
3.414513612806331E-001 total g/s out riser
2943.244235754013000 total grams lost out riser
24683.501009821890000 total grams settled on floor
27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.22E+00	1.78E-06	4.45E+01	1.58E+00	5.03E+01
1.50	1.53E+01	6.46E-06	1.88E+02	4.80E+01	2.52E+02

2.50	9.27E+00	3.90E-06	1.55E+02	9.87E+01	2.63E+02
3.50	8.60E+00	3.62E-06	2.38E+02	2.60E+02	5.06E+02
4.50	5.39E+00	2.27E-06	3.08E+02	4.69E+02	7.83E+02
5.50	1.93E+00	8.13E-07	2.87E+02	5.41E+02	8.30E+02
6.50	4.11E-01	1.73E-07	1.97E+02	4.35E+02	6.32E+02
7.50	7.60E-02	3.20E-08	1.43E+02	3.65E+02	5.09E+02
8.50	1.31E-02	5.49E-09	1.18E+02	3.44E+02	4.61E+02
9.50	1.64E-03	6.89E-10	8.50E+01	2.84E+02	3.69E+02
15.00	2.95E-08	1.24E-14	6.47E+02	4.29E+03	4.94E+03
25.00	3.77E-25	1.59E-31	2.74E+02	4.57E+03	4.84E+03
35.00	0.00E+00	0.00E+00	1.33E+02	4.23E+03	4.36E+03
45.00	0.00E+00	0.00E+00	8.94E+01	4.59E+03	4.68E+03
55.00	0.00E+00	0.00E+00	6.30E+00	4.49E+02	4.56E+02
65.00	0.00E+00	0.00E+00	1.27E+01	1.19E+03	1.20E+03
75.00	0.00E+00	0.00E+00	7.22E+00	8.57E+02	8.64E+02
85.00	0.00E+00	0.00E+00	4.04E+00	5.89E+02	5.93E+02
95.00	0.00E+00	0.00E+00	4.42E+00	7.70E+02	7.74E+02
125.00	0.00E+00	0.00E+00	2.26E+00	5.85E+02	5.87E+02

45.272962660127080 total grams airborne in tank
1.904705426334965E-005 total g/s out riser
2943.390186786652000 total grams lost out riser
24965.338040471080000 total grams settled on floor
27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 740.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.37E+00	4.56E-03	4.99E+01	1.62E+00	5.59E+01
1.50	1.95E+01	2.04E-02	2.11E+02	4.94E+01	2.80E+02
2.50	1.75E+01	1.82E-02	1.73E+02	1.02E+02	2.92E+02
3.50	2.91E+01	3.04E-02	2.65E+02	2.69E+02	5.62E+02
4.50	3.95E+01	4.12E-02	3.43E+02	4.88E+02	8.70E+02
5.50	3.71E+01	3.87E-02	3.19E+02	5.66E+02	9.22E+02
6.50	2.49E+01	2.60E-02	2.18E+02	4.59E+02	7.02E+02
7.50	1.76E+01	1.83E-02	1.59E+02	3.88E+02	5.65E+02
8.50	1.39E+01	1.45E-02	1.31E+02	3.68E+02	5.12E+02
9.50	9.73E+00	1.01E-02	9.44E+01	3.06E+02	4.10E+02
15.00	6.51E+01	6.80E-02	7.19E+02	4.70E+03	5.49E+03
25.00	2.55E+01	2.66E-02	3.04E+02	5.05E+03	5.38E+03
35.00	1.21E+01	1.26E-02	1.48E+02	4.69E+03	4.85E+03
45.00	8.06E+00	8.41E-03	9.93E+01	5.10E+03	5.20E+03
55.00	5.66E-01	5.90E-04	7.00E+00	4.99E+02	5.06E+02
65.00	1.14E+00	1.18E-03	1.41E+01	1.32E+03	1.34E+03
75.00	6.45E-01	6.73E-04	8.02E+00	9.51E+02	9.60E+02
85.00	3.60E-01	3.76E-04	4.49E+00	6.54E+02	6.58E+02
95.00	3.94E-01	4.11E-04	4.91E+00	8.55E+02	8.60E+02
125.00	2.01E-01	2.10E-04	2.51E+00	6.50E+02	6.52E+02

327.256529211998000 total grams airborne in tank
3.414514008618426E-001 total g/s out riser
3274.102753400803000 total grams lost out riser
27458.642209172250000 total grams settled on floor
31059.999252319340000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 800.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.22E+00	1.78E-06	4.99E+01	1.76E+00	5.59E+01
1.50	1.53E+01	6.46E-06	2.11E+02	5.35E+01	2.80E+02
2.50	9.27E+00	3.90E-06	1.73E+02	1.10E+02	2.92E+02
3.50	8.60E+00	3.62E-06	2.65E+02	2.89E+02	5.62E+02
4.50	5.39E+00	2.27E-06	3.43E+02	5.22E+02	8.70E+02
5.50	1.93E+00	8.13E-07	3.19E+02	6.01E+02	9.22E+02
6.50	4.11E-01	1.73E-07	2.18E+02	4.83E+02	7.02E+02
7.50	7.60E-02	3.20E-08	1.59E+02	4.06E+02	5.65E+02
8.50	1.31E-02	5.49E-09	1.31E+02	3.82E+02	5.12E+02
9.50	1.64E-03	6.89E-10	9.44E+01	3.16E+02	4.10E+02
15.00	2.95E-08	1.24E-14	7.19E+02	4.77E+03	5.49E+03
25.00	3.77E-25	1.59E-31	3.04E+02	5.08E+03	5.38E+03
35.00	0.00E+00	0.00E+00	1.48E+02	4.70E+03	4.85E+03
45.00	0.00E+00	0.00E+00	9.93E+01	5.10E+03	5.20E+03
55.00	0.00E+00	0.00E+00	7.00E+00	4.99E+02	5.06E+02
65.00	0.00E+00	0.00E+00	1.41E+01	1.32E+03	1.34E+03
75.00	0.00E+00	0.00E+00	8.02E+00	9.52E+02	9.60E+02
85.00	0.00E+00	0.00E+00	4.49E+00	6.54E+02	6.58E+02
95.00	0.00E+00	0.00E+00	4.91E+00	8.55E+02	8.60E+02
125.00	0.00E+00	0.00E+00	2.51E+00	6.50E+02	6.52E+02

45.272998422913940 total grams airborne in tank
1.904706881526488E-005 total g/s out riser
3274.248629093170000 total grams lost out riser
27740.479782581330000 total grams settled on floor
31059.999252319340000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 820.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.37E+00	4.56E-03	5.53E+01	1.81E+00	6.15E+01
1.50	1.95E+01	2.04E-02	2.33E+02	5.50E+01	3.07E+02
2.50	1.75E+01	1.82E-02	1.91E+02	1.13E+02	3.21E+02
3.50	2.91E+01	3.04E-02	2.92E+02	2.98E+02	6.18E+02
4.50	3.95E+01	4.12E-02	3.77E+02	5.40E+02	9.57E+02
5.50	3.71E+01	3.87E-02	3.51E+02	6.27E+02	1.01E+03
6.50	2.49E+01	2.60E-02	2.40E+02	5.07E+02	7.72E+02
7.50	1.76E+01	1.83E-02	1.75E+02	4.29E+02	6.22E+02
8.50	1.39E+01	1.45E-02	1.44E+02	4.06E+02	5.64E+02
9.50	9.73E+00	1.01E-02	1.04E+02	3.37E+02	4.51E+02
15.00	6.51E+01	6.80E-02	7.91E+02	5.18E+03	6.04E+03
25.00	2.55E+01	2.66E-02	3.35E+02	5.56E+03	5.92E+03
35.00	1.21E+01	1.26E-02	1.63E+02	5.16E+03	5.33E+03
45.00	8.06E+00	8.41E-03	1.09E+02	5.61E+03	5.72E+03
55.00	5.66E-01	5.90E-04	7.70E+00	5.49E+02	5.57E+02
65.00	1.14E+00	1.18E-03	1.55E+01	1.45E+03	1.47E+03
75.00	6.45E-01	6.73E-04	8.83E+00	1.05E+03	1.06E+03
85.00	3.60E-01	3.76E-04	4.94E+00	7.19E+02	7.24E+02
95.00	3.94E-01	4.11E-04	5.40E+00	9.41E+02	9.46E+02
125.00	2.01E-01	2.10E-04	2.76E+00	7.15E+02	7.17E+02

327.256538748741100 total grams airborne in tank
3.414514101750683E-001 total g/s out riser
3604.961260557175000 total grams lost out riser
30233.783936142920000 total grams settled on floor
34165.999111175540000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 880.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.22E+00	1.78E-06	5.53E+01	1.95E+00	6.15E+01
1.50	1.53E+01	6.46E-06	2.33E+02	5.91E+01	3.07E+02
2.50	9.27E+00	3.90E-06	1.91E+02	1.21E+02	3.21E+02
3.50	8.60E+00	3.62E-06	2.92E+02	3.18E+02	6.18E+02
4.50	5.39E+00	2.27E-06	3.77E+02	5.74E+02	9.57E+02
5.50	1.93E+00	8.13E-07	3.51E+02	6.62E+02	1.01E+03
6.50	4.11E-01	1.73E-07	2.40E+02	5.31E+02	7.72E+02
7.50	7.60E-02	3.20E-08	1.75E+02	4.46E+02	6.22E+02
8.50	1.31E-02	5.49E-09	1.44E+02	4.20E+02	5.64E+02
9.50	1.64E-03	6.89E-10	1.04E+02	3.47E+02	4.51E+02
15.00	2.95E-08	1.24E-14	7.91E+02	5.25E+03	6.04E+03
25.00	3.77E-25	1.59E-31	3.35E+02	5.58E+03	5.92E+03
35.00	0.00E+00	0.00E+00	1.63E+02	5.17E+03	5.33E+03
45.00	0.00E+00	0.00E+00	1.09E+02	5.61E+03	5.72E+03
55.00	0.00E+00	0.00E+00	7.70E+00	5.49E+02	5.57E+02
65.00	0.00E+00	0.00E+00	1.55E+01	1.45E+03	1.47E+03
75.00	0.00E+00	0.00E+00	8.83E+00	1.05E+03	1.06E+03
85.00	0.00E+00	0.00E+00	4.94E+00	7.19E+02	7.24E+02
95.00	0.00E+00	0.00E+00	5.40E+00	9.41E+02	9.46E+02
125.00	0.00E+00	0.00E+00	2.76E+00	7.15E+02	7.17E+02

45.273007482819950 total grams airborne in tank
1.904707279430420E-005 total g/s out riser
3605.107147693634000 total grams lost out riser
30515.621425867080000 total grams settled on floor
34165.999111175540000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 900.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.37E+00	4.56E-03	6.07E+01	1.99E+00	6.71E+01
1.50	1.95E+01	2.04E-02	2.55E+02	6.05E+01	3.35E+02
2.50	1.75E+01	1.82E-02	2.09E+02	1.24E+02	3.50E+02
3.50	2.91E+01	3.04E-02	3.19E+02	3.27E+02	6.75E+02
4.50	3.95E+01	4.12E-02	4.12E+02	5.92E+02	1.04E+03
5.50	3.71E+01	3.87E-02	3.83E+02	6.87E+02	1.11E+03
6.50	2.49E+01	2.60E-02	2.62E+02	5.55E+02	8.42E+02
7.50	1.76E+01	1.83E-02	1.91E+02	4.70E+02	6.78E+02
8.50	1.39E+01	1.45E-02	1.57E+02	4.44E+02	6.15E+02
9.50	9.73E+00	1.01E-02	1.13E+02	3.69E+02	4.92E+02
15.00	6.51E+01	6.80E-02	8.63E+02	5.66E+03	6.59E+03
25.00	2.55E+01	2.66E-02	3.65E+02	6.06E+03	6.46E+03

35.00	1.21E+01	1.26E-02	1.77E+02	5.63E+03	5.81E+03
45.00	8.06E+00	8.41E-03	1.19E+02	6.12E+03	6.24E+03
55.00	5.66E-01	5.90E-04	8.40E+00	5.99E+02	6.08E+02
65.00	1.14E+00	1.18E-03	1.69E+01	1.58E+03	1.60E+03
75.00	6.45E-01	6.73E-04	9.63E+00	1.14E+03	1.15E+03
85.00	3.60E-01	3.76E-04	5.39E+00	7.84E+02	7.90E+02
95.00	3.94E-01	4.11E-04	5.89E+00	1.03E+03	1.03E+03
125.00	2.01E-01	2.10E-04	3.02E+00	7.79E+02	7.83E+02

327.256540656089800 total grams airborne in tank
3.414514125033747E-001 total g/s out riser
3935.819649934769000 total grams lost out riser
33008.925594925880000 total grams settled on floor
37271.998817443850000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 960.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.22E+00	1.78E-06	6.07E+01	2.13E+00	6.71E+01
1.50	1.53E+01	6.46E-06	2.55E+02	6.46E+01	3.35E+02
2.50	9.27E+00	3.90E-06	2.09E+02	1.32E+02	3.50E+02
3.50	8.60E+00	3.62E-06	3.19E+02	3.47E+02	6.75E+02
4.50	5.39E+00	2.27E-06	4.12E+02	6.26E+02	1.04E+03
5.50	1.93E+00	8.13E-07	3.83E+02	7.22E+02	1.11E+03
6.50	4.11E-01	1.73E-07	2.62E+02	5.80E+02	8.42E+02
7.50	7.60E-02	3.20E-08	1.91E+02	4.87E+02	6.78E+02
8.50	1.31E-02	5.49E-09	1.57E+02	4.58E+02	6.15E+02
9.50	1.64E-03	6.89E-10	1.13E+02	3.79E+02	4.92E+02
15.00	2.95E-08	1.24E-14	8.63E+02	5.72E+03	6.59E+03
25.00	3.77E-25	1.59E-31	3.65E+02	6.09E+03	6.46E+03
35.00	0.00E+00	0.00E+00	1.77E+02	5.64E+03	5.81E+03
45.00	0.00E+00	0.00E+00	1.19E+02	6.12E+03	6.24E+03
55.00	0.00E+00	0.00E+00	8.40E+00	5.99E+02	6.08E+02
65.00	0.00E+00	0.00E+00	1.69E+01	1.59E+03	1.60E+03
75.00	0.00E+00	0.00E+00	9.63E+00	1.14E+03	1.15E+03
85.00	0.00E+00	0.00E+00	5.39E+00	7.85E+02	7.90E+02
95.00	0.00E+00	0.00E+00	5.89E+00	1.03E+03	1.03E+03
125.00	0.00E+00	0.00E+00	3.02E+00	7.80E+02	7.83E+02

45.273009390168580 total grams airborne in tank
1.904707359011206E-005 total g/s out riser
3935.965602397919000 total grams lost out riser
33290.763423919680000 total grams settled on floor
37271.998817443850000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 980.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.37E+00	4.56E-03	6.61E+01	2.18E+00	7.27E+01
1.50	1.95E+01	2.04E-02	2.78E+02	6.61E+01	3.63E+02
2.50	1.75E+01	1.82E-02	2.27E+02	1.35E+02	3.80E+02
3.50	2.91E+01	3.04E-02	3.46E+02	3.56E+02	7.31E+02

4.50	3.95E+01	4.12E-02	4.46E+02	6.45E+02	1.13E+03
5.50	3.71E+01	3.87E-02	4.15E+02	7.47E+02	1.20E+03
6.50	2.49E+01	2.60E-02	2.84E+02	6.04E+02	9.13E+02
7.50	1.76E+01	1.83E-02	2.07E+02	5.10E+02	7.35E+02
8.50	1.39E+01	1.45E-02	1.70E+02	4.82E+02	6.66E+02
9.50	9.73E+00	1.01E-02	1.23E+02	4.01E+02	5.33E+02
15.00	6.51E+01	6.80E-02	9.35E+02	6.13E+03	7.13E+03
25.00	2.55E+01	2.66E-02	3.96E+02	6.57E+03	6.99E+03
35.00	1.21E+01	1.26E-02	1.92E+02	6.09E+03	6.30E+03
45.00	8.06E+00	8.41E-03	1.29E+02	6.63E+03	6.76E+03
55.00	5.66E-01	5.90E-04	9.10E+00	6.48E+02	6.58E+02
65.00	1.14E+00	1.18E-03	1.83E+01	1.72E+03	1.74E+03
75.00	6.45E-01	6.73E-04	1.04E+01	1.24E+03	1.25E+03
85.00	3.60E-01	3.76E-04	5.83E+00	8.50E+02	8.56E+02
95.00	3.94E-01	4.11E-04	6.38E+00	1.11E+03	1.12E+03
125.00	2.01E-01	2.10E-04	3.27E+00	8.44E+02	8.48E+02

327.256543040275600 total grams airborne in tank
3.414514129690360E-001 total g/s out riser
4266.678219079971000 total grams lost out riser
35784.067650079730000 total grams settled on floor
40377.998489379880000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1040.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.22E+00	1.78E-06	6.61E+01	2.32E+00	7.27E+01
1.50	1.53E+01	6.46E-06	2.78E+02	7.02E+01	3.63E+02
2.50	9.27E+00	3.90E-06	2.27E+02	1.44E+02	3.80E+02
3.50	8.60E+00	3.62E-06	3.46E+02	3.77E+02	7.31E+02
4.50	5.39E+00	2.27E-06	4.46E+02	6.79E+02	1.13E+03
5.50	1.93E+00	8.13E-07	4.15E+02	7.82E+02	1.20E+03
6.50	4.11E-01	1.73E-07	2.84E+02	6.28E+02	9.13E+02
7.50	7.60E-02	3.20E-08	2.07E+02	5.28E+02	7.35E+02
8.50	1.31E-02	5.49E-09	1.70E+02	4.96E+02	6.66E+02
9.50	1.64E-03	6.89E-10	1.23E+02	4.10E+02	5.33E+02
15.00	2.95E-08	1.24E-14	9.35E+02	6.20E+03	7.13E+03
25.00	3.77E-25	1.59E-31	3.96E+02	6.60E+03	6.99E+03
35.00	0.00E+00	0.00E+00	1.92E+02	6.11E+03	6.30E+03
45.00	0.00E+00	0.00E+00	1.29E+02	6.63E+03	6.76E+03
55.00	0.00E+00	0.00E+00	9.10E+00	6.49E+02	6.58E+02
65.00	0.00E+00	0.00E+00	1.83E+01	1.72E+03	1.74E+03
75.00	0.00E+00	0.00E+00	1.04E+01	1.24E+03	1.25E+03
85.00	0.00E+00	0.00E+00	5.83E+00	8.50E+02	8.56E+02
95.00	0.00E+00	0.00E+00	6.38E+00	1.11E+03	1.12E+03
125.00	0.00E+00	0.00E+00	3.27E+00	8.45E+02	8.48E+02

45.273009867005740 total grams airborne in tank
1.904707427223309E-005 total g/s out riser
4266.824083805084000 total grams lost out riser
36065.905242919920000 total grams settled on floor
40377.998489379880000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1060.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.37E+00	4.56E-03	7.15E+01	2.36E+00	7.83E+01
1.50	1.95E+01	2.04E-02	3.00E+02	7.16E+01	3.91E+02
2.50	1.75E+01	1.82E-02	2.45E+02	1.47E+02	4.09E+02
3.50	2.91E+01	3.04E-02	3.73E+02	3.85E+02	7.87E+02
4.50	3.95E+01	4.12E-02	4.81E+02	6.97E+02	1.22E+03
5.50	3.71E+01	3.87E-02	4.47E+02	8.07E+02	1.29E+03
6.50	2.49E+01	2.60E-02	3.06E+02	6.52E+02	9.83E+02
7.50	1.76E+01	1.83E-02	2.23E+02	5.51E+02	7.91E+02
8.50	1.39E+01	1.45E-02	1.83E+02	5.21E+02	7.17E+02
9.50	9.73E+00	1.01E-02	1.32E+02	4.32E+02	5.74E+02
15.00	6.51E+01	6.80E-02	1.01E+03	6.61E+03	7.68E+03
25.00	2.55E+01	2.66E-02	4.26E+02	7.08E+03	7.53E+03
35.00	1.21E+01	1.26E-02	2.07E+02	6.56E+03	6.78E+03
45.00	8.06E+00	8.41E-03	1.39E+02	7.14E+03	7.28E+03
55.00	5.66E-01	5.90E-04	9.80E+00	6.98E+02	7.09E+02
65.00	1.14E+00	1.18E-03	1.97E+01	1.85E+03	1.87E+03
75.00	6.45E-01	6.73E-04	1.12E+01	1.33E+03	1.34E+03
85.00	3.60E-01	3.76E-04	6.28E+00	9.15E+02	9.22E+02
95.00	3.94E-01	4.11E-04	6.88E+00	1.20E+03	1.20E+03
125.00	2.01E-01	2.10E-04	3.52E+00	9.09E+02	9.13E+02

327.256543517112700 total grams airborne in tank
3.414514129690360E-001 total g/s out riser
4597.536681413651000 total grams lost out riser
38559.209446191790000 total grams settled on floor
43483.998191833500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1120.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.22E+00	1.78E-06	7.15E+01	2.50E+00	7.83E+01
1.50	1.53E+01	6.46E-06	3.00E+02	7.57E+01	3.91E+02
2.50	9.27E+00	3.90E-06	2.45E+02	1.55E+02	4.09E+02
3.50	8.60E+00	3.62E-06	3.73E+02	4.06E+02	7.87E+02
4.50	5.39E+00	2.27E-06	4.81E+02	7.31E+02	1.22E+03
5.50	1.93E+00	8.13E-07	4.47E+02	8.42E+02	1.29E+03
6.50	4.11E-01	1.73E-07	3.06E+02	6.76E+02	9.83E+02
7.50	7.60E-02	3.20E-08	2.23E+02	5.68E+02	7.91E+02
8.50	1.31E-02	5.49E-09	1.83E+02	5.34E+02	7.17E+02
9.50	1.64E-03	6.89E-10	1.32E+02	4.42E+02	5.74E+02
15.00	2.95E-08	1.24E-14	1.01E+03	6.68E+03	7.68E+03
25.00	3.77E-25	1.59E-31	4.26E+02	7.11E+03	7.53E+03
35.00	0.00E+00	0.00E+00	2.07E+02	6.58E+03	6.78E+03
45.00	0.00E+00	0.00E+00	1.39E+02	7.14E+03	7.28E+03
55.00	0.00E+00	0.00E+00	9.80E+00	6.99E+02	7.09E+02
65.00	0.00E+00	0.00E+00	1.97E+01	1.85E+03	1.87E+03
75.00	0.00E+00	0.00E+00	1.12E+01	1.33E+03	1.34E+03
85.00	0.00E+00	0.00E+00	6.28E+00	9.16E+02	9.22E+02
95.00	0.00E+00	0.00E+00	6.88E+00	1.20E+03	1.20E+03
125.00	0.00E+00	0.00E+00	3.52E+00	9.10E+02	9.13E+02

45.273010343842900 total grams airborne in tank

```
1.904707438591993E-005 total g/s out riser
  4597.682637691498000 total grams lost out riser
 38841.047137975690000 total grams settled on floor
 43483.998191833500000 total grams made airborne
0.000000000000000E+000 total grams bypassed
```

TABLE 3. 1,000,000 GALLON TANK

IL = In-leakage, cubic feet per minute @ 14.7 psia and 70°F
WH = Waste height, inches
PR = Penetration rate, inches per minute

Values are in total mass (grams) of dust flowing up the exhaust riser for the drilling of one complete core that is WH inches long.

	PR=.5	PR=1	PR=2	PR=3	PR=4
IL=0					
WH=19	39.2	26.8	17.7	11.4	11.2
WH=133	479.4	373.8	214.5	50.4	132.6
WH=247	1051.8	762.8	512.1	331.3	325.3
WH=361	1802.1	1396.1	1002.0	697.9	677.8
IL=500					
WH=19	88.3	61.2	40.6	26.2	25.6
WH=133	1001.1	810.4	480.0	114.7	299.8
WH=247	2899.1	1602.1	1118.9	736.9	726.6
WH=361	3501.0	2717.6	2131.0	1521.0	1488.0
IL=1000					
WH=19	134.9	94.5	63.0	40.7	39.9
WH=133	1442.5	1199.7	731.2	177.7	462.4
WH=247	2960.1	2329.8	1673.7	119.7	1108.6
WH=361	4868.4	3885.0	3138.8	2278.5	983.6
IL=1400					
WH=19	170.5	120.5	80.7	52.3	51.3
WH=133	1755.3	1483.9	922.9	227.1	589.4
WH=247	3464.1	2856.4	2088.4	1411.8	1402.2
WH=361	5811.0	4454.2	3882.4	2848.8	2813.0
IL=2100					
WH=19	229.6	164.7	111.2	72.3	71.0
WH=133	2240.3	1935.0	1241.4	311.9	805.4
WH=247	4494.2	3690.7	2764.4	1897.8	1893.7
WH=361	7236.0	6318.0	5080.1	3786.0	3758.5

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

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ADDITIONAL PARAMETERS:

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particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     1061.310000000000000
bypass fraction =   0.000000000000000E+000

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000
Output divisions in Period        3.000000000000000 =        1.000000
Output divisions in Period        4.000000000000000 =        1.000000
Output divisions in Period        5.000000000000000 =        1.000000
Output divisions in Period        6.000000000000000 =        1.000000
Output divisions in Period        7.000000000000000 =        1.000000
Output divisions in Period        8.000000000000000 =        1.000000
Output divisions in Period        9.000000000000000 =        1.000000
Output divisions in Period       10.000000000000000 =        1.000000
Output divisions in Period       11.000000000000000 =        1.000000
Output divisions in Period       12.000000000000000 =        1.000000
Output divisions in Period       13.000000000000000 =        1.000000
Output divisions in Period       14.000000000000000 =        1.000000
Output divisions in Period       15.000000000000000 =        1.000000
Output divisions in Period       16.000000000000000 =        1.000000
Output divisions in Period       17.000000000000000 =        1.000000
Output divisions in Period       18.000000000000000 =        1.000000
Output divisions in Period       19.000000000000000 =        1.000000
Output divisions in Period       20.000000000000000 =        1.000000
Output divisions in Period       21.000000000000000 =        1.000000
Output divisions in Period       22.000000000000000 =        1.000000
Output divisions in Period       23.000000000000000 =        1.000000
Output divisions in Period       24.000000000000000 =        1.000000
Output divisions in Period       25.000000000000000 =        1.000000
Output divisions in Period       26.000000000000000 =        1.000000
Output divisions in Period       27.000000000000000 =        1.000000
Output divisions in Period       28.000000000000000 =        1.000000
Output divisions in Period       29.000000000000000 =        1.000000
Output divisions in Period       30.000000000000000 =        1.000000
Output divisions in Period       31.000000000000000 =        1.000000
Output divisions in Period       32.000000000000000 =        1.000000
Output divisions in Period       33.000000000000000 =        1.000000
Output divisions in Period       34.000000000000000 =        1.000000
Output divisions in Period       35.000000000000000 =        1.000000
Output divisions in Period       36.000000000000000 =        1.000000
Output divisions in Period       37.000000000000000 =        1.000000
Output divisions in Period       38.000000000000000 =        1.000000

Flow out @    0.000000E+00 min =      880.000000 cfm &     155.300000g/m
Flow out @       20.000000 min =        1.000000 cfm &   0.000000E+00g/m
Flow out @       80.000000 min =      880.000000 cfm &     155.300000g/m
Flow out @      100.000000 min =        1.000000 cfm &   0.000000E+00g/m
Flow out @      160.000000 min =      880.000000 cfm &     155.300000g/m
Flow out @      180.000000 min =        1.000000 cfm &   0.000000E+00g/m
Flow out @      240.000000 min =      880.000000 cfm &     155.300000g/m
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Flow out @      260.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      320.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      340.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      420.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      500.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      580.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      640.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      660.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      740.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      800.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      820.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      880.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      900.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      960.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @      980.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1040.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @     1060.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1120.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @     1140.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1200.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @     1220.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1280.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @     1300.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1360.000000 min =      880.000000 cfm &      155.300000g/m
Flow out @     1380.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1440.000000 min =      880.000000 cfm &    0.000000E+00g/m
Flow out @     1460.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1520.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m


**** OUTPUT @        20.000000000000000 minutes ****
```

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.44E+00	1.74E-03	1.13E+00	2.72E-02	5.59E+00
1.50	2.15E+01	8.40E-03	5.50E+00	9.83E-01	2.80E+01
2.50	2.11E+01	8.24E-03	5.51E+00	2.62E+00	2.92E+01
3.50	3.71E+01	1.45E-02	1.00E+01	9.13E+00	5.62E+01
4.50	5.12E+01	2.01E-02	1.43E+01	2.14E+01	8.70E+01
5.50	4.76E+01	1.86E-02	1.39E+01	3.08E+01	9.22E+01
6.50	3.13E+01	1.22E-02	9.55E+00	2.94E+01	7.02E+01
7.50	2.15E+01	8.42E-03	6.89E+00	2.81E+01	5.65E+01
8.50	1.66E+01	6.49E-03	5.57E+00	2.91E+01	5.12E+01
9.50	1.13E+01	4.41E-03	3.95E+00	2.58E+01	4.10E+01
15.00	6.82E+01	2.67E-02	2.80E+01	4.53E+02	5.49E+02
25.00	2.51E+01	9.83E-03	1.12E+01	5.02E+02	5.38E+02
35.00	1.17E+01	4.57E-03	5.36E+00	4.67E+02	4.85E+02
45.00	7.72E+00	3.02E-03	3.57E+00	5.09E+02	5.20E+02
55.00	5.40E-01	2.11E-04	2.51E-01	4.98E+01	5.06E+01
65.00	1.08E+00	4.23E-04	5.04E-01	1.32E+02	1.34E+02
75.00	6.14E-01	2.40E-04	2.86E-01	9.51E+01	9.60E+01
85.00	3.43E-01	1.34E-04	1.60E-01	6.53E+01	6.58E+01
95.00	3.74E-01	1.46E-04	1.75E-01	8.55E+01	8.60E+01
125.00	1.91E-01	7.47E-05	8.94E-02	6.49E+01	6.52E+01

379.352850675582900 total grams airborne in tank
1.484487996349344E-001 total g/s out riser
125.986171722412100 total grams lost out riser
2600.661036796868000 total grams settled on floor
3106.000015735626000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.28E+00	1.90E-06	1.13E+00	1.76E-01	5.59E+00
1.50	1.67E+01	7.41E-06	5.53E+00	5.76E+00	2.80E+01
2.50	1.08E+01	4.79E-06	5.54E+00	1.29E+01	2.92E+01
3.50	1.02E+01	4.55E-06	1.00E+01	3.60E+01	5.62E+01
4.50	6.25E+00	2.78E-06	1.44E+01	6.64E+01	8.70E+01
5.50	2.10E+00	9.34E-07	1.39E+01	7.62E+01	9.22E+01
6.50	4.08E-01	1.82E-07	9.56E+00	6.02E+01	7.02E+01
7.50	6.82E-02	3.03E-08	6.90E+00	4.96E+01	5.65E+01
8.50	1.04E-02	4.65E-09	5.57E+00	4.57E+01	5.12E+01
9.50	1.16E-03	5.14E-10	3.96E+00	3.70E+01	4.10E+01
15.00	9.07E-09	4.03E-15	2.80E+01	5.21E+02	5.49E+02
25.00	1.25E-26	5.57E-33	1.12E+01	5.27E+02	5.38E+02
35.00	0.00E+00	0.00E+00	5.36E+00	4.79E+02	4.85E+02
45.00	0.00E+00	0.00E+00	3.57E+00	5.17E+02	5.20E+02
55.00	0.00E+00	0.00E+00	2.51E-01	5.04E+01	5.06E+01
65.00	0.00E+00	0.00E+00	5.04E-01	1.33E+02	1.34E+02
75.00	0.00E+00	0.00E+00	2.86E-01	9.57E+01	9.60E+01
85.00	0.00E+00	0.00E+00	1.60E-01	6.57E+01	6.58E+01
95.00	0.00E+00	0.00E+00	1.75E-01	8.59E+01	8.60E+01
125.00	0.00E+00	0.00E+00	8.94E-02	6.51E+01	6.52E+01

50.786896495484240 total grams airborne in tank
2.258407705316888E-005 total g/s out riser
126.167617440223700 total grams lost out riser
2929.045501306653000 total grams settled on floor
3106.000015735626000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	7.09E+00	2.77E-03	3.85E+00	2.42E-01	1.12E+01
1.50	3.10E+01	1.22E-02	1.70E+01	7.81E+00	5.59E+01
2.50	2.65E+01	1.04E-02	1.47E+01	1.72E+01	5.84E+01
3.50	4.13E+01	1.61E-02	2.32E+01	4.80E+01	1.12E+02
4.50	5.32E+01	2.08E-02	3.04E+01	9.03E+01	1.74E+02
5.50	4.81E+01	1.88E-02	2.83E+01	1.08E+02	1.84E+02
6.50	3.13E+01	1.23E-02	1.92E+01	8.99E+01	1.40E+02
7.50	2.15E+01	8.42E-03	1.38E+01	7.77E+01	1.13E+02
8.50	1.66E+01	6.49E-03	1.11E+01	7.48E+01	1.02E+02
9.50	1.13E+01	4.41E-03	7.91E+00	6.28E+01	8.20E+01
15.00	6.82E+01	2.67E-02	5.61E+01	9.73E+02	1.10E+03
25.00	2.51E+01	9.83E-03	2.25E+01	1.03E+03	1.08E+03

35.00	1.17E+01	4.57E-03	1.07E+01	9.47E+02	9.69E+02
45.00	7.72E+00	3.02E-03	7.14E+00	1.03E+03	1.04E+03
55.00	5.40E-01	2.11E-04	5.02E-01	1.00E+02	1.01E+02
65.00	1.08E+00	4.23E-04	1.01E+00	2.65E+02	2.67E+02
75.00	6.14E-01	2.40E-04	5.73E-01	1.91E+02	1.92E+02
85.00	3.43E-01	1.34E-04	3.20E-01	1.31E+02	1.32E+02
95.00	3.74E-01	1.46E-04	3.50E-01	1.71E+02	1.72E+02
125.00	1.91E-01	7.47E-05	1.79E-01	1.30E+02	1.30E+02

403.606860876083400 total grams airborne in tank
1.579399086913327E-001 total g/s out riser
268.917191356420500 total grams lost out riser
5539.475957334042000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	6.84E+00	3.04E-06	3.87E+00	4.79E-01	1.12E+01
1.50	2.41E+01	1.07E-05	1.71E+01	1.47E+01	5.59E+01
2.50	1.35E+01	6.02E-06	1.47E+01	3.01E+01	5.84E+01
3.50	1.14E+01	5.06E-06	2.32E+01	7.78E+01	1.12E+02
4.50	6.48E+00	2.88E-06	3.05E+01	1.37E+02	1.74E+02
5.50	2.12E+00	9.43E-07	2.83E+01	1.54E+02	1.84E+02
6.50	4.09E-01	1.82E-07	1.92E+01	1.21E+02	1.40E+02
7.50	6.82E-02	3.03E-08	1.38E+01	9.92E+01	1.13E+02
8.50	1.04E-02	4.65E-09	1.11E+01	9.13E+01	1.02E+02
9.50	1.16E-03	5.14E-10	7.91E+00	7.41E+01	8.20E+01
15.00	9.07E-09	4.03E-15	5.61E+01	1.04E+03	1.10E+03
25.00	1.25E-26	5.57E-33	2.25E+01	1.05E+03	1.08E+03
35.00	0.00E+00	0.00E+00	1.07E+01	9.58E+02	9.69E+02
45.00	0.00E+00	0.00E+00	7.14E+00	1.03E+03	1.04E+03
55.00	0.00E+00	0.00E+00	5.02E-01	1.01E+02	1.01E+02
65.00	0.00E+00	0.00E+00	1.01E+00	2.66E+02	2.67E+02
75.00	0.00E+00	0.00E+00	5.73E-01	1.91E+02	1.92E+02
85.00	0.00E+00	0.00E+00	3.20E-01	1.31E+02	1.32E+02
95.00	0.00E+00	0.00E+00	3.50E-01	1.72E+02	1.72E+02
125.00	0.00E+00	0.00E+00	1.79E-01	1.30E+02	1.30E+02

64.942239602199250 total grams airborne in tank
2.887871927462936E-005 total g/s out riser
269.127933025360100 total grams lost out riser
5877.929842472076000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.67E+00	3.39E-03	7.54E+00	5.68E-01	1.68E+01
1.50	3.53E+01	1.38E-02	3.13E+01	1.73E+01	8.39E+01
2.50	2.78E+01	1.09E-02	2.48E+01	3.49E+01	8.76E+01
3.50	4.17E+01	1.63E-02	3.68E+01	9.02E+01	1.69E+02

4.50	5.33E+01	2.08E-02	4.66E+01	1.61E+02	2.61E+02
5.50	4.81E+01	1.88E-02	4.27E+01	1.86E+02	2.77E+02
6.50	3.13E+01	1.23E-02	2.88E+01	1.50E+02	2.11E+02
7.50	2.15E+01	8.42E-03	2.07E+01	1.27E+02	1.70E+02
8.50	1.66E+01	6.49E-03	1.67E+01	1.20E+02	1.54E+02
9.50	1.13E+01	4.41E-03	1.19E+01	9.99E+01	1.23E+02
15.00	6.82E+01	2.67E-02	8.41E+01	1.49E+03	1.65E+03
25.00	2.51E+01	9.83E-03	3.37E+01	1.56E+03	1.61E+03
35.00	1.17E+01	4.57E-03	1.61E+01	1.43E+03	1.45E+03
45.00	7.72E+00	3.02E-03	1.07E+01	1.54E+03	1.56E+03
55.00	5.40E-01	2.11E-04	7.52E-01	1.51E+02	1.52E+02
65.00	1.08E+00	4.23E-04	1.51E+00	3.98E+02	4.01E+02
75.00	6.14E-01	2.40E-04	8.59E-01	2.86E+02	2.88E+02
85.00	3.43E-01	1.34E-04	4.80E-01	1.97E+02	1.98E+02
95.00	3.74E-01	1.46E-04	5.25E-01	2.57E+02	2.58E+02
125.00	1.91E-01	7.47E-05	2.68E-01	1.95E+02	1.96E+02

411.387247800827000 total grams airborne in tank
1.609845365310321E-001 total g/s out riser
416.872521191835400 total grams lost out riser
8489.740371286869000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.36E+00	3.72E-06	7.55E+00	8.58E-01	1.68E+01
1.50	2.74E+01	1.22E-05	3.13E+01	2.51E+01	8.39E+01
2.50	1.42E+01	6.33E-06	2.49E+01	4.85E+01	8.76E+01
3.50	1.15E+01	5.12E-06	3.68E+01	1.20E+02	1.69E+02
4.50	6.49E+00	2.89E-06	4.66E+01	2.08E+02	2.61E+02
5.50	2.12E+00	9.43E-07	4.28E+01	2.32E+02	2.77E+02
6.50	4.09E-01	1.82E-07	2.89E+01	1.81E+02	2.11E+02
7.50	6.82E-02	3.03E-08	2.07E+01	1.49E+02	1.70E+02
8.50	1.04E-02	4.65E-09	1.67E+01	1.37E+02	1.54E+02
9.50	1.16E-03	5.14E-10	1.19E+01	1.11E+02	1.23E+02
15.00	9.07E-09	4.03E-15	8.41E+01	1.56E+03	1.65E+03
25.00	1.25E-26	5.57E-33	3.37E+01	1.58E+03	1.61E+03
35.00	0.00E+00	0.00E+00	1.61E+01	1.44E+03	1.45E+03
45.00	0.00E+00	0.00E+00	1.07E+01	1.55E+03	1.56E+03
55.00	0.00E+00	0.00E+00	7.52E-01	1.51E+02	1.52E+02
65.00	0.00E+00	0.00E+00	1.51E+00	3.99E+02	4.01E+02
75.00	0.00E+00	0.00E+00	8.59E-01	2.87E+02	2.88E+02
85.00	0.00E+00	0.00E+00	4.80E-01	1.97E+02	1.98E+02
95.00	0.00E+00	0.00E+00	5.25E-01	2.58E+02	2.58E+02
125.00	0.00E+00	0.00E+00	2.68E-01	1.95E+02	1.96E+02

70.629042563131510 total grams airborne in tank
3.140754587342042E-005 total g/s out riser
417.093873530626300 total grams lost out riser
8830.276948273182000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	9.61E+00	3.76E-03	1.18E+01	9.61E-01	2.24E+01
1.50	3.72E+01	1.46E-02	4.67E+01	2.79E+01	1.12E+02
2.50	2.82E+01	1.10E-02	3.52E+01	5.34E+01	1.17E+02
3.50	4.18E+01	1.64E-02	5.04E+01	1.33E+02	2.25E+02
4.50	5.33E+01	2.08E-02	6.27E+01	2.32E+02	3.48E+02
5.50	4.81E+01	1.88E-02	5.72E+01	2.64E+02	3.69E+02
6.50	3.13E+01	1.23E-02	3.85E+01	2.11E+02	2.81E+02
7.50	2.15E+01	8.42E-03	2.76E+01	1.77E+02	2.26E+02
8.50	1.66E+01	6.49E-03	2.23E+01	1.66E+02	2.05E+02
9.50	1.13E+01	4.41E-03	1.58E+01	1.37E+02	1.64E+02
15.00	6.82E+01	2.67E-02	1.12E+02	2.01E+03	2.20E+03
25.00	2.51E+01	9.83E-03	4.50E+01	2.08E+03	2.15E+03
35.00	1.17E+01	4.57E-03	2.14E+01	1.91E+03	1.94E+03
45.00	7.72E+00	3.02E-03	1.43E+01	2.06E+03	2.08E+03
55.00	5.40E-01	2.11E-04	1.00E+00	2.01E+02	2.03E+02
65.00	1.08E+00	4.23E-04	2.02E+00	5.31E+02	5.34E+02
75.00	6.14E-01	2.40E-04	1.15E+00	3.82E+02	3.84E+02
85.00	3.43E-01	1.34E-04	6.40E-01	2.62E+02	2.63E+02
95.00	3.74E-01	1.46E-04	7.00E-01	3.43E+02	3.44E+02
125.00	1.91E-01	7.47E-05	3.58E-01	2.60E+02	2.61E+02

414.646038770675700 total grams airborne in tank
1.622597699897597E-001 total g/s out riser
566.885097920894600 total grams lost out riser
11442.468873143200000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	9.27E+00	4.12E-06	1.18E+01	1.28E+00	2.24E+01
1.50	2.89E+01	1.29E-05	4.68E+01	3.61E+01	1.12E+02
2.50	1.44E+01	6.41E-06	3.52E+01	6.71E+01	1.17E+02
3.50	1.15E+01	5.13E-06	5.04E+01	1.63E+02	2.25E+02
4.50	6.49E+00	2.89E-06	6.28E+01	2.79E+02	3.48E+02
5.50	2.12E+00	9.43E-07	5.72E+01	3.10E+02	3.69E+02
6.50	4.09E-01	1.82E-07	3.85E+01	2.42E+02	2.81E+02
7.50	6.82E-02	3.03E-08	2.76E+01	1.98E+02	2.26E+02
8.50	1.04E-02	4.65E-09	2.23E+01	1.83E+02	2.05E+02
9.50	1.16E-03	5.14E-10	1.58E+01	1.48E+02	1.64E+02
15.00	9.07E-09	4.03E-15	1.12E+02	2.08E+03	2.20E+03
25.00	1.25E-26	5.57E-33	4.50E+01	2.11E+03	2.15E+03
35.00	0.00E+00	0.00E+00	2.14E+01	1.92E+03	1.94E+03
45.00	0.00E+00	0.00E+00	1.43E+01	2.07E+03	2.08E+03
55.00	0.00E+00	0.00E+00	1.00E+00	2.02E+02	2.03E+02
65.00	0.00E+00	0.00E+00	2.02E+00	5.32E+02	5.34E+02
75.00	0.00E+00	0.00E+00	1.15E+00	3.83E+02	3.84E+02
85.00	0.00E+00	0.00E+00	6.40E-01	2.63E+02	2.63E+02
95.00	0.00E+00	0.00E+00	7.00E-01	3.43E+02	3.44E+02
125.00	0.00E+00	0.00E+00	3.58E-01	2.61E+02	2.61E+02

73.214882311514070 total grams airborne in tank

3.255742406075467E-005 total g/s out riser
567.111092567443800 total grams lost out riser
11783.674077510830000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.02E+01	3.98E-03	1.64E+01	1.39E+00	2.80E+01
1.50	3.81E+01	1.49E-02	6.27E+01	3.90E+01	1.40E+02
2.50	2.83E+01	1.11E-02	4.56E+01	7.21E+01	1.46E+02
3.50	4.18E+01	1.64E-02	6.40E+01	1.75E+02	2.81E+02
4.50	5.33E+01	2.08E-02	7.89E+01	3.03E+02	4.35E+02
5.50	4.81E+01	1.88E-02	7.16E+01	3.42E+02	4.61E+02
6.50	3.13E+01	1.23E-02	4.81E+01	2.72E+02	3.51E+02
7.50	2.15E+01	8.42E-03	3.45E+01	2.27E+02	2.83E+02
8.50	1.66E+01	6.49E-03	2.78E+01	2.12E+02	2.56E+02
9.50	1.13E+01	4.41E-03	1.98E+01	1.74E+02	2.05E+02
15.00	6.82E+01	2.67E-02	1.40E+02	2.54E+03	2.74E+03
25.00	2.51E+01	9.83E-03	5.62E+01	2.61E+03	2.69E+03
35.00	1.17E+01	4.57E-03	2.68E+01	2.38E+03	2.42E+03
45.00	7.72E+00	3.02E-03	1.79E+01	2.58E+03	2.60E+03
55.00	5.40E-01	2.11E-04	1.25E+00	2.51E+02	2.53E+02
65.00	1.08E+00	4.23E-04	2.52E+00	6.64E+02	6.68E+02
75.00	6.14E-01	2.40E-04	1.43E+00	4.78E+02	4.80E+02
85.00	3.43E-01	1.34E-04	8.00E-01	3.28E+02	3.29E+02
95.00	3.74E-01	1.46E-04	8.75E-01	4.29E+02	4.30E+02
125.00	1.91E-01	7.47E-05	4.47E-01	3.25E+02	3.26E+02

416.156090497970600 total grams airborne in tank
1.628506818233291E-001 total g/s out riser
717.841177403926800 total grams lost out riser
14396.002739071850000 total grams settled on floor
15530.000019073490000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	9.81E+00	4.36E-06	1.64E+01	1.73E+00	2.80E+01
1.50	2.96E+01	1.31E-05	6.28E+01	4.74E+01	1.40E+02
2.50	1.45E+01	6.43E-06	4.57E+01	8.59E+01	1.46E+02
3.50	1.15E+01	5.13E-06	6.40E+01	2.06E+02	2.81E+02
4.50	6.49E+00	2.89E-06	7.89E+01	3.49E+02	4.35E+02
5.50	2.12E+00	9.43E-07	7.16E+01	3.88E+02	4.61E+02
6.50	4.09E-01	1.82E-07	4.81E+01	3.02E+02	3.51E+02
7.50	6.82E-02	3.03E-08	3.45E+01	2.48E+02	2.83E+02
8.50	1.04E-02	4.65E-09	2.78E+01	2.28E+02	2.56E+02
9.50	1.16E-03	5.14E-10	1.98E+01	1.85E+02	2.05E+02
15.00	9.07E-09	4.03E-15	1.40E+02	2.60E+03	2.74E+03
25.00	1.25E-26	5.57E-33	5.62E+01	2.63E+03	2.69E+03
35.00	0.00E+00	0.00E+00	2.68E+01	2.40E+03	2.42E+03
45.00	0.00E+00	0.00E+00	1.79E+01	2.58E+03	2.60E+03

55.00	0.00E+00	0.00E+00	1.25E+00	2.52E+02	2.53E+02
65.00	0.00E+00	0.00E+00	2.52E+00	6.65E+02	6.68E+02
75.00	0.00E+00	0.00E+00	1.43E+00	4.78E+02	4.80E+02
85.00	0.00E+00	0.00E+00	8.00E-01	3.28E+02	3.29E+02
95.00	0.00E+00	0.00E+00	8.75E-01	4.29E+02	4.30E+02
125.00	0.00E+00	0.00E+00	4.47E-01	3.26E+02	3.26E+02

74.466178831747230 total grams airborne in tank
3.311385456775850E-005 total g/s out riser
718.069399833679200 total grams lost out riser
14737.464662194250000 total grams settled on floor
15530.000019073490000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.05E+01	4.11E-03	2.12E+01	1.85E+00	3.35E+01
1.50	3.85E+01	1.51E-02	7.89E+01	5.03E+01	1.68E+02
2.50	2.83E+01	1.11E-02	5.61E+01	9.08E+01	1.75E+02
3.50	4.18E+01	1.64E-02	7.76E+01	2.18E+02	3.37E+02
4.50	5.33E+01	2.08E-02	9.51E+01	3.73E+02	5.22E+02
5.50	4.81E+01	1.88E-02	8.60E+01	4.19E+02	5.53E+02
6.50	3.13E+01	1.23E-02	5.78E+01	3.32E+02	4.21E+02
7.50	2.15E+01	8.42E-03	4.14E+01	2.76E+02	3.39E+02
8.50	1.66E+01	6.49E-03	3.34E+01	2.57E+02	3.07E+02
9.50	1.13E+01	4.41E-03	2.37E+01	2.11E+02	2.46E+02
15.00	6.82E+01	2.67E-02	1.68E+02	3.06E+03	3.29E+03
25.00	2.51E+01	9.83E-03	6.74E+01	3.14E+03	3.23E+03
35.00	1.17E+01	4.57E-03	3.21E+01	2.86E+03	2.91E+03
45.00	7.72E+00	3.02E-03	2.14E+01	3.09E+03	3.12E+03
55.00	5.40E-01	2.11E-04	1.50E+00	3.02E+02	3.04E+02
65.00	1.08E+00	4.23E-04	3.02E+00	7.97E+02	8.01E+02
75.00	6.14E-01	2.40E-04	1.72E+00	5.74E+02	5.76E+02
85.00	3.43E-01	1.34E-04	9.60E-01	3.94E+02	3.95E+02
95.00	3.74E-01	1.46E-04	1.05E+00	5.15E+02	5.16E+02
125.00	1.91E-01	7.47E-05	5.36E-01	3.91E+02	3.91E+02

416.895249128341700 total grams airborne in tank
1.631399329198757E-001 total g/s out riser
869.256230711937000 total grams lost out riser
17349.848791837690000 total grams settled on floor
18636.000000000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.01E+01	4.51E-06	2.12E+01	2.20E+00	3.35E+01
1.50	2.99E+01	1.33E-05	7.90E+01	5.89E+01	1.68E+02
2.50	1.45E+01	6.44E-06	5.61E+01	1.05E+02	1.75E+02
3.50	1.15E+01	5.13E-06	7.76E+01	2.48E+02	3.37E+02
4.50	6.49E+00	2.89E-06	9.51E+01	4.20E+02	5.22E+02
5.50	2.12E+00	9.43E-07	8.60E+01	4.65E+02	5.53E+02

6.50	4.09E-01	1.82E-07	5.78E+01	3.63E+02	4.21E+02
7.50	6.82E-02	3.03E-08	4.14E+01	2.98E+02	3.39E+02
8.50	1.04E-02	4.65E-09	3.34E+01	2.74E+02	3.07E+02
9.50	1.16E-03	5.14E-10	2.37E+01	2.22E+02	2.46E+02
15.00	9.07E-09	4.03E-15	1.68E+02	3.12E+03	3.29E+03
25.00	1.25E-26	5.57E-33	6.74E+01	3.16E+03	3.23E+03
35.00	0.00E+00	0.00E+00	3.21E+01	2.88E+03	2.91E+03
45.00	0.00E+00	0.00E+00	2.14E+01	3.10E+03	3.12E+03
55.00	0.00E+00	0.00E+00	1.50E+00	3.02E+02	3.04E+02
65.00	0.00E+00	0.00E+00	3.02E+00	7.98E+02	8.01E+02
75.00	0.00E+00	0.00E+00	1.72E+00	5.74E+02	5.76E+02
85.00	0.00E+00	0.00E+00	9.60E-01	3.94E+02	3.95E+02
95.00	0.00E+00	0.00E+00	1.05E+00	5.15E+02	5.16E+02
125.00	0.00E+00	0.00E+00	5.36E-01	3.91E+02	3.91E+02

75.096760210684000 total grams airborne in tank
3.339426474461459E-005 total g/s out riser
869.485517561435700 total grams lost out riser
17691.418196201320000 total grams settled on floor
18636.000000000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.07E+01	4.19E-03	2.61E+01	2.32E+00	3.91E+01
1.50	3.86E+01	1.51E-02	9.53E+01	6.18E+01	1.96E+02
2.50	2.83E+01	1.11E-02	6.65E+01	1.10E+02	2.04E+02
3.50	4.18E+01	1.64E-02	9.12E+01	2.61E+02	3.94E+02
4.50	5.33E+01	2.08E-02	1.11E+02	4.44E+02	6.09E+02
5.50	4.81E+01	1.88E-02	1.00E+02	4.97E+02	6.46E+02
6.50	3.13E+01	1.23E-02	6.74E+01	3.93E+02	4.91E+02
7.50	2.15E+01	8.42E-03	4.83E+01	3.26E+02	3.96E+02
8.50	1.66E+01	6.49E-03	3.90E+01	3.03E+02	3.59E+02
9.50	1.13E+01	4.41E-03	2.77E+01	2.48E+02	2.87E+02
15.00	6.82E+01	2.67E-02	1.96E+02	3.58E+03	3.84E+03
25.00	2.51E+01	9.83E-03	7.87E+01	3.66E+03	3.77E+03
35.00	1.17E+01	4.57E-03	3.75E+01	3.34E+03	3.39E+03
45.00	7.72E+00	3.02E-03	2.50E+01	3.61E+03	3.64E+03
55.00	5.40E-01	2.11E-04	1.76E+00	3.52E+02	3.54E+02
65.00	1.08E+00	4.23E-04	3.53E+00	9.30E+02	9.35E+02
75.00	6.14E-01	2.40E-04	2.00E+00	6.69E+02	6.72E+02
85.00	3.43E-01	1.34E-04	1.12E+00	4.59E+02	4.61E+02
95.00	3.74E-01	1.46E-04	1.22E+00	6.01E+02	6.02E+02
125.00	1.91E-01	7.47E-05	6.26E-01	4.56E+02	4.57E+02

417.270876646041900 total grams airborne in tank
1.632869235618273E-001 total g/s out riser
1020.903418004513000 total grams lost out riser
20303.826202869420000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam	airborne	outflow	totalout	totalflr	source

mcrn	g	g/s	g	g	g
.50	1.03E+01	4.59E-06	2.61E+01	2.68E+00	3.91E+01
1.50	3.00E+01	1.33E-05	9.53E+01	7.04E+01	1.96E+02
2.50	1.45E+01	6.44E-06	6.65E+01	1.23E+02	2.04E+02
3.50	1.15E+01	5.13E-06	9.12E+01	2.91E+02	3.94E+02
4.50	6.49E+00	2.89E-06	1.11E+02	4.91E+02	6.09E+02
5.50	2.12E+00	9.43E-07	1.00E+02	5.43E+02	6.46E+02
6.50	4.09E-01	1.82E-07	6.74E+01	4.24E+02	4.91E+02
7.50	6.82E-02	3.03E-08	4.83E+01	3.47E+02	3.96E+02
8.50	1.04E-02	4.65E-09	3.90E+01	3.20E+02	3.59E+02
9.50	1.16E-03	5.14E-10	2.77E+01	2.59E+02	2.87E+02
15.00	9.07E-09	4.03E-15	1.96E+02	3.65E+03	3.84E+03
25.00	1.25E-26	5.57E-33	7.87E+01	3.69E+03	3.77E+03
35.00	0.00E+00	0.00E+00	3.75E+01	3.35E+03	3.39E+03
45.00	0.00E+00	0.00E+00	2.50E+01	3.62E+03	3.64E+03
55.00	0.00E+00	0.00E+00	1.76E+00	3.53E+02	3.54E+02
65.00	0.00E+00	0.00E+00	3.53E+00	9.31E+02	9.35E+02
75.00	0.00E+00	0.00E+00	2.00E+00	6.70E+02	6.72E+02
85.00	0.00E+00	0.00E+00	1.12E+00	4.60E+02	4.61E+02
95.00	0.00E+00	0.00E+00	1.22E+00	6.01E+02	6.02E+02
125.00	0.00E+00	0.00E+00	6.26E-01	4.56E+02	4.57E+02

75.424471316030680 total grams airborne in tank
3.353999262593232E-005 total g/s out riser
1021.133288621902000 total grams lost out riser
20645.443031311040000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.08E+01	4.24E-03	3.11E+01	2.80E+00	4.47E+01
1.50	3.87E+01	1.51E-02	1.12E+02	7.33E+01	2.24E+02
2.50	2.83E+01	1.11E-02	7.70E+01	1.28E+02	2.34E+02
3.50	4.18E+01	1.64E-02	1.05E+02	3.03E+02	4.50E+02
4.50	5.33E+01	2.08E-02	1.27E+02	5.15E+02	6.96E+02
5.50	4.81E+01	1.88E-02	1.15E+02	5.75E+02	7.38E+02
6.50	3.13E+01	1.23E-02	7.71E+01	4.53E+02	5.62E+02
7.50	2.15E+01	8.42E-03	5.52E+01	3.75E+02	4.52E+02
8.50	1.66E+01	6.49E-03	4.46E+01	3.49E+02	4.10E+02
9.50	1.13E+01	4.41E-03	3.16E+01	2.85E+02	3.28E+02
15.00	6.82E+01	2.67E-02	2.24E+02	4.10E+03	4.39E+03
25.00	2.51E+01	9.83E-03	8.99E+01	4.19E+03	4.30E+03
35.00	1.17E+01	4.57E-03	4.28E+01	3.82E+03	3.88E+03
45.00	7.72E+00	3.02E-03	2.86E+01	4.13E+03	4.16E+03
55.00	5.40E-01	2.11E-04	2.01E+00	4.02E+02	4.05E+02
65.00	1.08E+00	4.23E-04	4.03E+00	1.06E+03	1.07E+03
75.00	6.14E-01	2.40E-04	2.29E+00	7.65E+02	7.68E+02
85.00	3.43E-01	1.34E-04	1.28E+00	5.25E+02	5.27E+02
95.00	3.74E-01	1.46E-04	1.40E+00	6.87E+02	6.88E+02
125.00	1.91E-01	7.47E-05	7.15E-01	5.21E+02	5.22E+02

417.467408895492600 total grams airborne in tank
1.633638312487165E-001 total g/s out riser
1172.671655058861000 total grams lost out riser

23257.861812114720000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.04E+01	4.64E-06	3.11E+01	3.16E+00	4.47E+01
1.50	3.01E+01	1.34E-05	1.12E+02	8.19E+01	2.24E+02
2.50	1.45E+01	6.44E-06	7.70E+01	1.42E+02	2.34E+02
3.50	1.15E+01	5.13E-06	1.05E+02	3.33E+02	4.50E+02
4.50	6.49E+00	2.89E-06	1.27E+02	5.62E+02	6.96E+02
5.50	2.12E+00	9.43E-07	1.15E+02	6.21E+02	7.38E+02
6.50	4.09E-01	1.82E-07	7.71E+01	4.84E+02	5.62E+02
7.50	6.82E-02	3.03E-08	5.53E+01	3.97E+02	4.52E+02
8.50	1.04E-02	4.65E-09	4.46E+01	3.65E+02	4.10E+02
9.50	1.16E-03	5.14E-10	3.16E+01	2.96E+02	3.28E+02
15.00	9.07E-09	4.03E-15	2.24E+02	4.17E+03	4.39E+03
25.00	1.25E-26	5.57E-33	8.99E+01	4.21E+03	4.30E+03
35.00	0.00E+00	0.00E+00	4.28E+01	3.83E+03	3.88E+03
45.00	0.00E+00	0.00E+00	2.86E+01	4.13E+03	4.16E+03
55.00	0.00E+00	0.00E+00	2.01E+00	4.03E+02	4.05E+02
65.00	0.00E+00	0.00E+00	4.03E+00	1.06E+03	1.07E+03
75.00	0.00E+00	0.00E+00	2.29E+00	7.66E+02	7.68E+02
85.00	0.00E+00	0.00E+00	1.28E+00	5.25E+02	5.27E+02
95.00	0.00E+00	0.00E+00	1.40E+00	6.87E+02	6.88E+02
125.00	0.00E+00	0.00E+00	7.15E-01	5.21E+02	5.22E+02

75.599131998708900 total grams airborne in tank
3.361766119972697E-005 total g/s out riser
1172.901804149151000 total grams lost out riser
23599.499599933620000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.09E+01	4.26E-03	3.61E+01	3.28E+00	5.03E+01
1.50	3.87E+01	1.52E-02	1.28E+02	8.48E+01	2.52E+02
2.50	2.83E+01	1.11E-02	8.74E+01	1.47E+02	2.63E+02
3.50	4.18E+01	1.64E-02	1.18E+02	3.46E+02	5.06E+02
4.50	5.33E+01	2.08E-02	1.44E+02	5.86E+02	7.83E+02
5.50	4.81E+01	1.88E-02	1.29E+02	6.53E+02	8.30E+02
6.50	3.13E+01	1.23E-02	8.67E+01	5.14E+02	6.32E+02
7.50	2.15E+01	8.42E-03	6.22E+01	4.25E+02	5.09E+02
8.50	1.66E+01	6.49E-03	5.01E+01	3.95E+02	4.61E+02
9.50	1.13E+01	4.41E-03	3.56E+01	3.22E+02	3.69E+02
15.00	6.82E+01	2.67E-02	2.52E+02	4.62E+03	4.94E+03
25.00	2.51E+01	9.83E-03	1.01E+02	4.72E+03	4.84E+03
35.00	1.17E+01	4.57E-03	4.82E+01	4.30E+03	4.36E+03
45.00	7.72E+00	3.02E-03	3.21E+01	4.64E+03	4.68E+03
55.00	5.40E-01	2.11E-04	2.26E+00	4.53E+02	4.56E+02
65.00	1.08E+00	4.23E-04	4.53E+00	1.20E+03	1.20E+03

75.00	6.14E-01	2.40E-04	2.58E+00	8.61E+02	8.64E+02
85.00	3.43E-01	1.34E-04	1.44E+00	5.91E+02	5.93E+02
95.00	3.74E-01	1.46E-04	1.57E+00	7.72E+02	7.74E+02
125.00	1.91E-01	7.47E-05	8.05E-01	5.86E+02	5.87E+02

417.572746992111200 total grams airborne in tank
1.634050525171915E-001 total g/s out riser
1324.504541695118000 total grams lost out riser
26211.922928810120000 total grams settled on floor
27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.05E+01	4.67E-06	3.62E+01	3.65E+00	5.03E+01
1.50	3.01E+01	1.34E-05	1.28E+02	9.34E+01	2.52E+02
2.50	1.45E+01	6.44E-06	8.74E+01	1.61E+02	2.63E+02
3.50	1.15E+01	5.13E-06	1.18E+02	3.76E+02	5.06E+02
4.50	6.49E+00	2.89E-06	1.44E+02	6.33E+02	7.83E+02
5.50	2.12E+00	9.43E-07	1.29E+02	6.99E+02	8.30E+02
6.50	4.09E-01	1.82E-07	8.67E+01	5.45E+02	6.32E+02
7.50	6.82E-02	3.03E-08	6.22E+01	4.47E+02	5.09E+02
8.50	1.04E-02	4.65E-09	5.01E+01	4.11E+02	4.61E+02
9.50	1.16E-03	5.14E-10	3.56E+01	3.33E+02	3.69E+02
15.00	9.07E-09	4.03E-15	2.52E+02	4.69E+03	4.94E+03
25.00	1.25E-26	5.57E-33	1.01E+02	4.74E+03	4.84E+03
35.00	0.00E+00	0.00E+00	4.82E+01	4.31E+03	4.36E+03
45.00	0.00E+00	0.00E+00	3.21E+01	4.65E+03	4.68E+03
55.00	0.00E+00	0.00E+00	2.26E+00	4.53E+02	4.56E+02
65.00	0.00E+00	0.00E+00	4.53E+00	1.20E+03	1.20E+03
75.00	0.00E+00	0.00E+00	2.58E+00	8.61E+02	8.64E+02
85.00	0.00E+00	0.00E+00	1.44E+00	5.91E+02	5.93E+02
95.00	0.00E+00	0.00E+00	1.57E+00	7.73E+02	7.74E+02
125.00	0.00E+00	0.00E+00	8.05E-01	5.86E+02	5.87E+02

75.694227633169350 total grams airborne in tank
3.365994679164385E-005 total g/s out riser
1324.734847187996000 total grams lost out riser
26553.571683168410000 total grams settled on floor
27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 740.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.09E+01	4.28E-03	4.12E+01	3.77E+00	5.59E+01
1.50	3.88E+01	1.52E-02	1.44E+02	9.64E+01	2.80E+02
2.50	2.83E+01	1.11E-02	9.79E+01	1.66E+02	2.92E+02
3.50	4.18E+01	1.64E-02	1.32E+02	3.88E+02	5.62E+02
4.50	5.33E+01	2.08E-02	1.60E+02	6.57E+02	8.70E+02
5.50	4.81E+01	1.88E-02	1.44E+02	7.31E+02	9.22E+02
6.50	3.13E+01	1.23E-02	9.64E+01	5.74E+02	7.02E+02
7.50	2.15E+01	8.42E-03	6.91E+01	4.75E+02	5.65E+02

8.50	1.66E+01	6.49E-03	5.57E+01	4.40E+02	5.12E+02
9.50	1.13E+01	4.41E-03	3.96E+01	3.59E+02	4.10E+02
15.00	6.82E+01	2.67E-02	2.80E+02	5.14E+03	5.49E+03
25.00	2.51E+01	9.83E-03	1.12E+02	5.24E+03	5.38E+03
35.00	1.17E+01	4.57E-03	5.36E+01	4.78E+03	4.85E+03
45.00	7.72E+00	3.02E-03	3.57E+01	5.16E+03	5.20E+03
55.00	5.40E-01	2.11E-04	2.51E+00	5.03E+02	5.06E+02
65.00	1.08E+00	4.23E-04	5.04E+00	1.33E+03	1.34E+03
75.00	6.14E-01	2.40E-04	2.86E+00	9.56E+02	9.60E+02
85.00	3.43E-01	1.34E-04	1.60E+00	6.57E+02	6.58E+02
95.00	3.74E-01	1.46E-04	1.75E+00	8.58E+02	8.60E+02
125.00	1.91E-01	7.47E-05	8.94E-01	6.51E+02	6.52E+02

417.630379438400300 total grams airborne in tank
1.634276044933358E-001 total g/s out riser
1476.372731447220000 total grams lost out riser
29165.997142314910000 total grams settled on floor
31059.999252319340000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 800.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.06E+01	4.69E-06	4.12E+01	4.14E+00	5.59E+01
1.50	3.01E+01	1.34E-05	1.44E+02	1.05E+02	2.80E+02
2.50	1.45E+01	6.44E-06	9.79E+01	1.80E+02	2.92E+02
3.50	1.15E+01	5.13E-06	1.32E+02	4.19E+02	5.62E+02
4.50	6.49E+00	2.89E-06	1.60E+02	7.03E+02	8.70E+02
5.50	2.12E+00	9.43E-07	1.44E+02	7.77E+02	9.22E+02
6.50	4.09E-01	1.82E-07	9.64E+01	6.05E+02	7.02E+02
7.50	6.82E-02	3.03E-08	6.91E+01	4.96E+02	5.65E+02
8.50	1.04E-02	4.65E-09	5.57E+01	4.57E+02	5.12E+02
9.50	1.16E-03	5.14E-10	3.96E+01	3.70E+02	4.10E+02
15.00	9.07E-09	4.03E-15	2.80E+02	5.21E+03	5.49E+03
25.00	1.25E-26	5.57E-33	1.12E+02	5.27E+03	5.38E+03
35.00	0.00E+00	0.00E+00	5.36E+01	4.79E+03	4.85E+03
45.00	0.00E+00	0.00E+00	3.57E+01	5.17E+03	5.20E+03
55.00	0.00E+00	0.00E+00	2.51E+00	5.04E+02	5.06E+02
65.00	0.00E+00	0.00E+00	5.04E+00	1.33E+03	1.34E+03
75.00	0.00E+00	0.00E+00	2.86E+00	9.57E+02	9.60E+02
85.00	0.00E+00	0.00E+00	1.60E+00	6.57E+02	6.58E+02
95.00	0.00E+00	0.00E+00	1.75E+00	8.59E+02	8.60E+02
125.00	0.00E+00	0.00E+00	8.94E-01	6.51E+02	6.52E+02

75.746941027334390 total grams airborne in tank
3.368338901758205E-005 total g/s out riser
1476.603094160557000 total grams lost out riser
29507.650866031650000 total grams settled on floor
31059.999252319340000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 820.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g

.50	1.10E+01	4.29E-03	4.63E+01	4.26E+00	6.15E+01
1.50	3.88E+01	1.52E-02	1.61E+02	1.08E+02	3.07E+02
2.50	2.83E+01	1.11E-02	1.08E+02	1.85E+02	3.21E+02
3.50	4.18E+01	1.64E-02	1.46E+02	4.31E+02	6.18E+02
4.50	5.33E+01	2.08E-02	1.76E+02	7.28E+02	9.57E+02
5.50	4.81E+01	1.88E-02	1.58E+02	8.09E+02	1.01E+03
6.50	3.13E+01	1.23E-02	1.06E+02	6.35E+02	7.72E+02
7.50	2.15E+01	8.42E-03	7.60E+01	5.24E+02	6.22E+02
8.50	1.66E+01	6.49E-03	6.13E+01	4.86E+02	5.64E+02
9.50	1.13E+01	4.41E-03	4.35E+01	3.96E+02	4.51E+02
15.00	6.82E+01	2.67E-02	3.09E+02	5.66E+03	6.04E+03
25.00	2.51E+01	9.83E-03	1.24E+02	5.77E+03	5.92E+03
35.00	1.17E+01	4.57E-03	5.89E+01	5.26E+03	5.33E+03
45.00	7.72E+00	3.02E-03	3.93E+01	5.68E+03	5.72E+03
55.00	5.40E-01	2.11E-04	2.76E+00	5.54E+02	5.57E+02
65.00	1.08E+00	4.23E-04	5.54E+00	1.46E+03	1.47E+03
75.00	6.14E-01	2.40E-04	3.15E+00	1.05E+03	1.06E+03
85.00	3.43E-01	1.34E-04	1.76E+00	7.22E+02	7.24E+02
95.00	3.74E-01	1.46E-04	1.92E+00	9.44E+02	9.46E+02
125.00	1.91E-01	7.47E-05	9.83E-01	7.16E+02	7.17E+02

417.662453413009600 total grams airborne in tank
1.634401549963513E-001 total g/s out riser
1628.260467708111000 total grams lost out riser
32120.077266693120000 total grams settled on floor
34165.999111175540000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 880.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.06E+01	4.70E-06	4.63E+01	4.63E+00	6.15E+01
1.50	3.01E+01	1.34E-05	1.61E+02	1.17E+02	3.07E+02
2.50	1.45E+01	6.44E-06	1.08E+02	1.98E+02	3.21E+02
3.50	1.15E+01	5.13E-06	1.46E+02	4.61E+02	6.18E+02
4.50	6.49E+00	2.89E-06	1.76E+02	7.74E+02	9.57E+02
5.50	2.12E+00	9.43E-07	1.58E+02	8.54E+02	1.01E+03
6.50	4.09E-01	1.82E-07	1.06E+02	6.66E+02	7.72E+02
7.50	6.82E-02	3.03E-08	7.60E+01	5.46E+02	6.22E+02
8.50	1.04E-02	4.65E-09	6.13E+01	5.02E+02	5.64E+02
9.50	1.16E-03	5.14E-10	4.35E+01	4.07E+02	4.51E+02
15.00	9.07E-09	4.03E-15	3.09E+02	5.73E+03	6.04E+03
25.00	1.25E-26	5.57E-33	1.24E+02	5.79E+03	5.92E+03
35.00	0.00E+00	0.00E+00	5.89E+01	5.27E+03	5.33E+03
45.00	0.00E+00	0.00E+00	3.93E+01	5.68E+03	5.72E+03
55.00	0.00E+00	0.00E+00	2.76E+00	5.54E+02	5.57E+02
65.00	0.00E+00	0.00E+00	5.54E+00	1.46E+03	1.47E+03
75.00	0.00E+00	0.00E+00	3.15E+00	1.05E+03	1.06E+03
85.00	0.00E+00	0.00E+00	1.76E+00	7.23E+02	7.24E+02
95.00	0.00E+00	0.00E+00	1.92E+00	9.44E+02	9.46E+02
125.00	0.00E+00	0.00E+00	9.83E-01	7.17E+02	7.17E+02

75.776611742666420 total grams airborne in tank
3.369658214772596E-005 total g/s out riser
1628.490921974182000 total grams lost out riser
32461.733258247380000 total grams settled on floor
34165.999111175540000 total grams made airborne

0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 900.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.10E+01	4.30E-03	5.14E+01	4.75E+00	6.71E+01
1.50	3.88E+01	1.52E-02	1.77E+02	1.19E+02	3.35E+02
2.50	2.83E+01	1.11E-02	1.19E+02	2.03E+02	3.50E+02
3.50	4.18E+01	1.64E-02	1.59E+02	4.74E+02	6.75E+02
4.50	5.33E+01	2.08E-02	1.92E+02	7.98E+02	1.04E+03
5.50	4.81E+01	1.88E-02	1.73E+02	8.86E+02	1.11E+03
6.50	3.13E+01	1.23E-02	1.16E+02	6.95E+02	8.42E+02
7.50	2.15E+01	8.42E-03	8.29E+01	5.74E+02	6.78E+02
8.50	1.66E+01	6.49E-03	6.68E+01	5.32E+02	6.15E+02
9.50	1.13E+01	4.41E-03	4.75E+01	4.33E+02	4.92E+02
15.00	6.82E+01	2.67E-02	3.37E+02	6.18E+03	6.59E+03
25.00	2.51E+01	9.83E-03	1.35E+02	6.30E+03	6.46E+03
35.00	1.17E+01	4.57E-03	6.43E+01	5.74E+03	5.81E+03
45.00	7.72E+00	3.02E-03	4.28E+01	6.19E+03	6.24E+03
55.00	5.40E-01	2.11E-04	3.01E+00	6.04E+02	6.08E+02
65.00	1.08E+00	4.23E-04	6.05E+00	1.60E+03	1.60E+03
75.00	6.14E-01	2.40E-04	3.44E+00	1.15E+03	1.15E+03
85.00	3.43E-01	1.34E-04	1.92E+00	7.88E+02	7.90E+02
95.00	3.74E-01	1.46E-04	2.10E+00	1.03E+03	1.03E+03
125.00	1.91E-01	7.47E-05	1.07E+00	7.81E+02	7.83E+02

417.680563688278200 total grams airborne in tank
1.634472442237893E-001 total g/s out riser
1780.159297108650000 total grams lost out riser
35074.160290718080000 total grams settled on floor
37271.998817443850000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 960.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.06E+01	4.71E-06	5.14E+01	5.12E+00	6.71E+01
1.50	3.01E+01	1.34E-05	1.77E+02	1.28E+02	3.35E+02
2.50	1.45E+01	6.44E-06	1.19E+02	2.17E+02	3.50E+02
3.50	1.15E+01	5.13E-06	1.59E+02	5.04E+02	6.75E+02
4.50	6.49E+00	2.89E-06	1.92E+02	8.45E+02	1.04E+03
5.50	2.12E+00	9.43E-07	1.73E+02	9.32E+02	1.11E+03
6.50	4.09E-01	1.82E-07	1.16E+02	7.26E+02	8.42E+02
7.50	6.82E-02	3.03E-08	8.29E+01	5.95E+02	6.78E+02
8.50	1.04E-02	4.65E-09	6.68E+01	5.48E+02	6.15E+02
9.50	1.16E-03	5.14E-10	4.75E+01	4.45E+02	4.92E+02
15.00	9.07E-09	4.03E-15	3.37E+02	6.25E+03	6.59E+03
25.00	1.25E-26	5.57E-33	1.35E+02	6.32E+03	6.46E+03
35.00	0.00E+00	0.00E+00	6.43E+01	5.75E+03	5.81E+03
45.00	0.00E+00	0.00E+00	4.28E+01	6.20E+03	6.24E+03
55.00	0.00E+00	0.00E+00	3.01E+00	6.05E+02	6.08E+02
65.00	0.00E+00	0.00E+00	6.05E+00	1.60E+03	1.60E+03
75.00	0.00E+00	0.00E+00	3.44E+00	1.15E+03	1.15E+03
85.00	0.00E+00	0.00E+00	1.92E+00	7.88E+02	7.90E+02

95.00	0.00E+00	0.00E+00	2.10E+00	1.03E+03	1.03E+03
125.00	0.00E+00	0.00E+00	1.07E+00	7.82E+02	7.83E+02

75.793521341970620 total grams airborne in tank
3.370410184992022E-005 total g/s out riser
1780.389739990234000 total grams lost out riser
35415.817451953890000 total grams settled on floor
37271.998817443850000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 980.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.10E+01	4.30E-03	5.65E+01	5.24E+00	7.27E+01
1.50	3.88E+01	1.52E-02	1.94E+02	1.31E+02	3.63E+02
2.50	2.83E+01	1.11E-02	1.29E+02	2.22E+02	3.80E+02
3.50	4.18E+01	1.64E-02	1.73E+02	5.16E+02	7.31E+02
4.50	5.33E+01	2.08E-02	2.08E+02	8.69E+02	1.13E+03
5.50	4.81E+01	1.88E-02	1.87E+02	9.64E+02	1.20E+03
6.50	3.13E+01	1.23E-02	1.25E+02	7.56E+02	9.13E+02
7.50	2.15E+01	8.42E-03	8.98E+01	6.24E+02	7.35E+02
8.50	1.66E+01	6.49E-03	7.24E+01	5.77E+02	6.66E+02
9.50	1.13E+01	4.41E-03	5.14E+01	4.70E+02	5.33E+02
15.00	6.82E+01	2.67E-02	3.65E+02	6.70E+03	7.13E+03
25.00	2.51E+01	9.83E-03	1.46E+02	6.82E+03	6.99E+03
35.00	1.17E+01	4.57E-03	6.96E+01	6.22E+03	6.30E+03
45.00	7.72E+00	3.02E-03	4.64E+01	6.71E+03	6.76E+03
55.00	5.40E-01	2.11E-04	3.26E+00	6.54E+02	6.58E+02
65.00	1.08E+00	4.23E-04	6.55E+00	1.73E+03	1.74E+03
75.00	6.14E-01	2.40E-04	3.72E+00	1.24E+03	1.25E+03
85.00	3.43E-01	1.34E-04	2.08E+00	8.54E+02	8.56E+02
95.00	3.74E-01	1.46E-04	2.27E+00	1.12E+03	1.12E+03
125.00	1.91E-01	7.47E-05	1.16E+00	8.47E+02	8.48E+02

417.690916776657100 total grams airborne in tank
1.634512945456663E-001 total g/s out riser
1932.064420819283000 total grams lost out riser
38028.244624137880000 total grams settled on floor
40377.998489379880000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1040.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.06E+01	4.71E-06	5.65E+01	5.61E+00	7.27E+01
1.50	3.01E+01	1.34E-05	1.94E+02	1.40E+02	3.63E+02
2.50	1.45E+01	6.44E-06	1.29E+02	2.36E+02	3.80E+02
3.50	1.15E+01	5.13E-06	1.73E+02	5.46E+02	7.31E+02
4.50	6.49E+00	2.89E-06	2.08E+02	9.16E+02	1.13E+03
5.50	2.12E+00	9.43E-07	1.87E+02	1.01E+03	1.20E+03
6.50	4.09E-01	1.82E-07	1.25E+02	7.87E+02	9.13E+02
7.50	6.82E-02	3.03E-08	8.98E+01	6.45E+02	7.35E+02
8.50	1.04E-02	4.65E-09	7.24E+01	5.94E+02	6.66E+02
9.50	1.16E-03	5.14E-10	5.14E+01	4.82E+02	5.33E+02

15.00	9.07E-09	4.03E-15	3.65E+02	6.77E+03	7.13E+03
25.00	1.25E-26	5.57E-33	1.46E+02	6.85E+03	6.99E+03
35.00	0.00E+00	0.00E+00	6.96E+01	6.23E+03	6.30E+03
45.00	0.00E+00	0.00E+00	4.64E+01	6.72E+03	6.76E+03
55.00	0.00E+00	0.00E+00	3.26E+00	6.55E+02	6.58E+02
65.00	0.00E+00	0.00E+00	6.55E+00	1.73E+03	1.74E+03
75.00	0.00E+00	0.00E+00	3.72E+00	1.24E+03	1.25E+03
85.00	0.00E+00	0.00E+00	2.08E+00	8.54E+02	8.56E+02
95.00	0.00E+00	0.00E+00	2.27E+00	1.12E+03	1.12E+03
125.00	0.00E+00	0.00E+00	1.16E+00	8.47E+02	8.48E+02

75.803255495718180 total grams airborne in tank
3.370843058995331E-005 total g/s out riser
1932.294894218445000 total grams lost out riser
38369.902376651760000 total grams settled on floor
40377.998489379880000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1060.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.10E+01	4.30E-03	6.15E+01	5.73E+00	7.83E+01
1.50	3.88E+01	1.52E-02	2.10E+02	1.43E+02	3.91E+02
2.50	2.83E+01	1.11E-02	1.40E+02	2.41E+02	4.09E+02
3.50	4.18E+01	1.64E-02	1.86E+02	5.59E+02	7.87E+02
4.50	5.33E+01	2.08E-02	2.24E+02	9.40E+02	1.22E+03
5.50	4.81E+01	1.88E-02	2.01E+02	1.04E+03	1.29E+03
6.50	3.13E+01	1.23E-02	1.35E+02	8.16E+02	9.83E+02
7.50	2.15E+01	8.42E-03	9.67E+01	6.73E+02	7.91E+02
8.50	1.66E+01	6.49E-03	7.80E+01	6.23E+02	7.17E+02
9.50	1.13E+01	4.41E-03	5.54E+01	5.07E+02	5.74E+02
15.00	6.82E+01	2.67E-02	3.93E+02	7.22E+03	7.68E+03
25.00	2.51E+01	9.83E-03	1.57E+02	7.35E+03	7.53E+03
35.00	1.17E+01	4.57E-03	7.50E+01	6.70E+03	6.78E+03
45.00	7.72E+00	3.02E-03	5.00E+01	7.23E+03	7.28E+03
55.00	5.40E-01	2.11E-04	3.51E+00	7.05E+02	7.09E+02
65.00	1.08E+00	4.23E-04	7.05E+00	1.86E+03	1.87E+03
75.00	6.14E-01	2.40E-04	4.01E+00	1.34E+03	1.34E+03
85.00	3.43E-01	1.34E-04	2.24E+00	9.19E+02	9.22E+02
95.00	3.74E-01	1.46E-04	2.45E+00	1.20E+03	1.20E+03
125.00	1.91E-01	7.47E-05	1.25E+00	9.12E+02	9.13E+02

417.696895360946700 total grams airborne in tank
1.634536321653286E-001 total g/s out riser
2083.973122596741000 total grams lost out riser
40982.329703330990000 total grams settled on floor
43483.998191833500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1120.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.06E+01	4.72E-06	6.16E+01	6.10E+00	7.83E+01
1.50	3.01E+01	1.34E-05	2.10E+02	1.51E+02	3.91E+02

2.50	1.45E+01	6.44E-06	1.40E+02	2.55E+02	4.09E+02
3.50	1.15E+01	5.13E-06	1.86E+02	5.89E+02	7.87E+02
4.50	6.49E+00	2.89E-06	2.24E+02	9.87E+02	1.22E+03
5.50	2.12E+00	9.43E-07	2.01E+02	1.09E+03	1.29E+03
6.50	4.09E-01	1.82E-07	1.35E+02	8.47E+02	9.83E+02
7.50	6.82E-02	3.03E-08	9.67E+01	6.95E+02	7.91E+02
8.50	1.04E-02	4.65E-09	7.80E+01	6.39E+02	7.17E+02
9.50	1.16E-03	5.14E-10	5.54E+01	5.19E+02	5.74E+02
15.00	9.07E-09	4.03E-15	3.93E+02	7.29E+03	7.68E+03
25.00	1.25E-26	5.57E-33	1.57E+02	7.37E+03	7.53E+03
35.00	0.00E+00	0.00E+00	7.50E+01	6.71E+03	6.78E+03
45.00	0.00E+00	0.00E+00	5.00E+01	7.23E+03	7.28E+03
55.00	0.00E+00	0.00E+00	3.51E+00	7.05E+02	7.09E+02
65.00	0.00E+00	0.00E+00	7.05E+00	1.86E+03	1.87E+03
75.00	0.00E+00	0.00E+00	4.01E+00	1.34E+03	1.34E+03
85.00	0.00E+00	0.00E+00	2.24E+00	9.20E+02	9.22E+02
95.00	0.00E+00	0.00E+00	2.45E+00	1.20E+03	1.20E+03
125.00	0.00E+00	0.00E+00	1.25E+00	9.12E+02	9.13E+02

75.808904108694250 total grams airborne in tank
3.371094261431961E-005 total g/s out riser
2084.203634381294000 total grams lost out riser
41323.987773418430000 total grams settled on floor
43483.998191833500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1140.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.10E+01	4.30E-03	6.66E+01	6.22E+00	8.39E+01
1.50	3.88E+01	1.52E-02	2.26E+02	1.54E+02	4.19E+02
2.50	2.83E+01	1.11E-02	1.50E+02	2.60E+02	4.38E+02
3.50	4.18E+01	1.64E-02	2.00E+02	6.01E+02	8.43E+02
4.50	5.33E+01	2.08E-02	2.41E+02	1.01E+03	1.30E+03
5.50	4.81E+01	1.88E-02	2.16E+02	1.12E+03	1.38E+03
6.50	3.13E+01	1.23E-02	1.45E+02	8.77E+02	1.05E+03
7.50	2.15E+01	8.42E-03	1.04E+02	7.23E+02	8.48E+02
8.50	1.66E+01	6.49E-03	8.35E+01	6.69E+02	7.69E+02
9.50	1.13E+01	4.41E-03	5.93E+01	5.44E+02	6.15E+02
15.00	6.82E+01	2.67E-02	4.21E+02	7.74E+03	8.23E+03
25.00	2.51E+01	9.83E-03	1.69E+02	7.88E+03	8.07E+03
35.00	1.17E+01	4.57E-03	8.03E+01	7.18E+03	7.27E+03
45.00	7.72E+00	3.02E-03	5.36E+01	7.74E+03	7.80E+03
55.00	5.40E-01	2.11E-04	3.76E+00	7.55E+02	7.59E+02
65.00	1.08E+00	4.23E-04	7.56E+00	1.99E+03	2.00E+03
75.00	6.14E-01	2.40E-04	4.30E+00	1.43E+03	1.44E+03
85.00	3.43E-01	1.34E-04	2.40E+00	9.85E+02	9.88E+02
95.00	3.74E-01	1.46E-04	2.62E+00	1.29E+03	1.29E+03
125.00	1.91E-01	7.47E-05	1.34E+00	9.77E+02	9.78E+02

417.700367689132700 total grams airborne in tank
1.634549909649650E-001 total g/s out riser
2235.884006619453000 total grams lost out riser
43936.415254116060000 total grams settled on floor
46589.998382568360000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1200.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.06E+01	4.72E-06	6.67E+01	6.59E+00	8.39E+01
1.50	3.01E+01	1.34E-05	2.27E+02	1.63E+02	4.19E+02
2.50	1.45E+01	6.44E-06	1.50E+02	2.73E+02	4.38E+02
3.50	1.15E+01	5.13E-06	2.00E+02	6.32E+02	8.43E+02
4.50	6.49E+00	2.89E-06	2.41E+02	1.06E+03	1.30E+03
5.50	2.12E+00	9.43E-07	2.16E+02	1.17E+03	1.38E+03
6.50	4.09E-01	1.82E-07	1.45E+02	9.08E+02	1.05E+03
7.50	6.82E-02	3.03E-08	1.04E+02	7.44E+02	8.48E+02
8.50	1.04E-02	4.65E-09	8.36E+01	6.85E+02	7.69E+02
9.50	1.16E-03	5.14E-10	5.93E+01	5.56E+02	6.15E+02
15.00	9.07E-09	4.03E-15	4.21E+02	7.81E+03	8.23E+03
25.00	1.25E-26	5.57E-33	1.69E+02	7.90E+03	8.07E+03
35.00	0.00E+00	0.00E+00	8.03E+01	7.19E+03	7.27E+03
45.00	0.00E+00	0.00E+00	5.36E+01	7.75E+03	7.80E+03
55.00	0.00E+00	0.00E+00	3.76E+00	7.56E+02	7.59E+02
65.00	0.00E+00	0.00E+00	7.56E+00	2.00E+03	2.00E+03
75.00	0.00E+00	0.00E+00	4.30E+00	1.44E+03	1.44E+03
85.00	0.00E+00	0.00E+00	2.40E+00	9.85E+02	9.88E+02
95.00	0.00E+00	0.00E+00	2.62E+00	1.29E+03	1.29E+03
125.00	0.00E+00	0.00E+00	1.34E+00	9.77E+02	9.78E+02

75.812204775503330 total grams airborne in tank
3.371241099351562E-005 total g/s out riser
2236.114499330521000 total grams lost out riser
44278.073476791380000 total grams settled on floor
46589.998382568360000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1220.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.10E+01	4.30E-03	7.17E+01	6.71E+00	8.95E+01
1.50	3.88E+01	1.52E-02	2.43E+02	1.66E+02	4.47E+02
2.50	2.83E+01	1.11E-02	1.61E+02	2.78E+02	4.67E+02
3.50	4.18E+01	1.64E-02	2.14E+02	6.44E+02	8.99E+02
4.50	5.33E+01	2.08E-02	2.57E+02	1.08E+03	1.39E+03
5.50	4.81E+01	1.88E-02	2.30E+02	1.20E+03	1.48E+03
6.50	3.13E+01	1.23E-02	1.54E+02	9.38E+02	1.12E+03
7.50	2.15E+01	8.42E-03	1.11E+02	7.72E+02	9.04E+02
8.50	1.66E+01	6.49E-03	8.91E+01	7.14E+02	8.20E+02
9.50	1.13E+01	4.41E-03	6.33E+01	5.81E+02	6.56E+02
15.00	6.82E+01	2.67E-02	4.49E+02	8.26E+03	8.78E+03
25.00	2.51E+01	9.83E-03	1.80E+02	8.40E+03	8.61E+03
35.00	1.17E+01	4.57E-03	8.57E+01	7.66E+03	7.75E+03
45.00	7.72E+00	3.02E-03	5.71E+01	8.26E+03	8.32E+03
55.00	5.40E-01	2.11E-04	4.01E+00	8.05E+02	8.10E+02
65.00	1.08E+00	4.23E-04	8.06E+00	2.13E+03	2.14E+03
75.00	6.14E-01	2.40E-04	4.58E+00	1.53E+03	1.54E+03
85.00	3.43E-01	1.34E-04	2.56E+00	1.05E+03	1.05E+03
95.00	3.74E-01	1.46E-04	2.80E+00	1.37E+03	1.38E+03
125.00	1.91E-01	7.47E-05	1.43E+00	1.04E+03	1.04E+03

417.702395200729400 total grams airborne in tank
1.634557853831211E-001 total g/s out riser
2387.796088457108000 total grams lost out riser
46890.501091957090000 total grams settled on floor
49695.999061584470000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1280.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.06E+01	4.72E-06	7.18E+01	7.08E+00	8.95E+01
1.50	3.01E+01	1.34E-05	2.43E+02	1.74E+02	4.47E+02
2.50	1.45E+01	6.44E-06	1.61E+02	2.92E+02	4.67E+02
3.50	1.15E+01	5.13E-06	2.14E+02	6.74E+02	8.99E+02
4.50	6.49E+00	2.89E-06	2.57E+02	1.13E+03	1.39E+03
5.50	2.12E+00	9.43E-07	2.30E+02	1.24E+03	1.48E+03
6.50	4.09E-01	1.82E-07	1.54E+02	9.68E+02	1.12E+03
7.50	6.82E-02	3.03E-08	1.11E+02	7.94E+02	9.04E+02
8.50	1.04E-02	4.65E-09	8.91E+01	7.31E+02	8.20E+02
9.50	1.16E-03	5.14E-10	6.33E+01	5.93E+02	6.56E+02
15.00	9.07E-09	4.03E-15	4.49E+02	8.33E+03	8.78E+03
25.00	1.25E-26	5.57E-33	1.80E+02	8.43E+03	8.61E+03
35.00	0.00E+00	0.00E+00	8.57E+01	7.67E+03	7.75E+03
45.00	0.00E+00	0.00E+00	5.71E+01	8.27E+03	8.32E+03
55.00	0.00E+00	0.00E+00	4.01E+00	8.06E+02	8.10E+02
65.00	0.00E+00	0.00E+00	8.06E+00	2.13E+03	2.14E+03
75.00	0.00E+00	0.00E+00	4.58E+00	1.53E+03	1.54E+03
85.00	0.00E+00	0.00E+00	2.56E+00	1.05E+03	1.05E+03
95.00	0.00E+00	0.00E+00	2.80E+00	1.37E+03	1.38E+03
125.00	0.00E+00	0.00E+00	1.43E+00	1.04E+03	1.04E+03

75.814143595388590 total grams airborne in tank
3.371327137550350E-005 total g/s out riser
2388.026589035988000 total grams lost out riser
47232.157807350160000 total grams settled on floor
49695.999061584470000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1300.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.10E+01	4.30E-03	7.68E+01	7.20E+00	9.50E+01
1.50	3.88E+01	1.52E-02	2.59E+02	1.77E+02	4.75E+02
2.50	2.83E+01	1.11E-02	1.71E+02	2.97E+02	4.96E+02
3.50	4.18E+01	1.64E-02	2.27E+02	6.87E+02	9.56E+02
4.50	5.33E+01	2.08E-02	2.73E+02	1.15E+03	1.48E+03
5.50	4.81E+01	1.88E-02	2.45E+02	1.28E+03	1.57E+03
6.50	3.13E+01	1.23E-02	1.64E+02	9.98E+02	1.19E+03
7.50	2.15E+01	8.42E-03	1.17E+02	8.22E+02	9.61E+02
8.50	1.66E+01	6.49E-03	9.47E+01	7.60E+02	8.71E+02
9.50	1.13E+01	4.41E-03	6.72E+01	6.18E+02	6.97E+02
15.00	6.82E+01	2.67E-02	4.77E+02	8.79E+03	9.33E+03
25.00	2.51E+01	9.83E-03	1.91E+02	8.93E+03	9.15E+03

35.00	1.17E+01	4.57E-03	9.11E+01	8.13E+03	8.24E+03
45.00	7.72E+00	3.02E-03	6.07E+01	8.78E+03	8.84E+03
55.00	5.40E-01	2.11E-04	4.26E+00	8.56E+02	8.61E+02
65.00	1.08E+00	4.23E-04	8.56E+00	2.26E+03	2.27E+03
75.00	6.14E-01	2.40E-04	4.87E+00	1.63E+03	1.63E+03
85.00	3.43E-01	1.34E-04	2.72E+00	1.12E+03	1.12E+03
95.00	3.74E-01	1.46E-04	2.97E+00	1.46E+03	1.46E+03
125.00	1.91E-01	7.47E-05	1.52E+00	1.11E+03	1.11E+03

417.703589200973500 total grams airborne in tank
1.634562538383761E-001 total g/s out riser
2539.708915114403000 total grams lost out riser
49844.585790157320000 total grams settled on floor
52801.998275756840000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1360.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.06E+01	4.72E-06	7.69E+01	7.57E+00	9.50E+01
1.50	3.01E+01	1.34E-05	2.59E+02	1.86E+02	4.75E+02
2.50	1.45E+01	6.44E-06	1.71E+02	3.11E+02	4.96E+02
3.50	1.15E+01	5.13E-06	2.27E+02	7.17E+02	9.56E+02
4.50	6.49E+00	2.89E-06	2.73E+02	1.20E+03	1.48E+03
5.50	2.12E+00	9.43E-07	2.45E+02	1.32E+03	1.57E+03
6.50	4.09E-01	1.82E-07	1.64E+02	1.03E+03	1.19E+03
7.50	6.82E-02	3.03E-08	1.17E+02	8.43E+02	9.61E+02
8.50	1.04E-02	4.65E-09	9.47E+01	7.77E+02	8.71E+02
9.50	1.16E-03	5.14E-10	6.72E+01	6.30E+02	6.97E+02
15.00	9.07E-09	4.03E-15	4.77E+02	8.85E+03	9.33E+03
25.00	1.25E-26	5.57E-33	1.91E+02	8.95E+03	9.15E+03
35.00	0.00E+00	0.00E+00	9.11E+01	8.15E+03	8.24E+03
45.00	0.00E+00	0.00E+00	6.07E+01	8.78E+03	8.84E+03
55.00	0.00E+00	0.00E+00	4.26E+00	8.56E+02	8.61E+02
65.00	0.00E+00	0.00E+00	8.56E+00	2.26E+03	2.27E+03
75.00	0.00E+00	0.00E+00	4.87E+00	1.63E+03	1.63E+03
85.00	0.00E+00	0.00E+00	2.72E+00	1.12E+03	1.12E+03
95.00	0.00E+00	0.00E+00	2.97E+00	1.46E+03	1.46E+03
125.00	0.00E+00	0.00E+00	1.52E+00	1.11E+03	1.11E+03

75.815285143545320 total grams airborne in tank
3.371378023778914E-005 total g/s out riser
2539.939434289932000 total grams lost out riser
50186.243154525760000 total grams settled on floor
52801.998275756840000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1380.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.10E+01	4.30E-03	8.19E+01	7.70E+00	1.01E+02
1.50	3.88E+01	1.52E-02	2.76E+02	1.89E+02	5.03E+02
2.50	2.83E+01	1.11E-02	1.81E+02	3.16E+02	5.26E+02
3.50	4.18E+01	1.64E-02	2.41E+02	7.29E+02	1.01E+03

4.50	5.33E+01	2.08E-02	2.89E+02	1.22E+03	1.57E+03
5.50	4.81E+01	1.88E-02	2.59E+02	1.35E+03	1.66E+03
6.50	3.13E+01	1.23E-02	1.74E+02	1.06E+03	1.26E+03
7.50	2.15E+01	8.42E-03	1.24E+02	8.72E+02	1.02E+03
8.50	1.66E+01	6.49E-03	1.00E+02	8.06E+02	9.22E+02
9.50	1.13E+01	4.41E-03	7.12E+01	6.56E+02	7.38E+02
15.00	6.82E+01	2.67E-02	5.05E+02	9.31E+03	9.88E+03
25.00	2.51E+01	9.83E-03	2.02E+02	9.46E+03	9.68E+03
35.00	1.17E+01	4.57E-03	9.64E+01	8.61E+03	8.72E+03
45.00	7.72E+00	3.02E-03	6.43E+01	9.29E+03	9.36E+03
55.00	5.40E-01	2.11E-04	4.51E+00	9.06E+02	9.11E+02
65.00	1.08E+00	4.23E-04	9.07E+00	2.39E+03	2.40E+03
75.00	6.14E-01	2.40E-04	5.16E+00	1.72E+03	1.73E+03
85.00	3.43E-01	1.34E-04	2.88E+00	1.18E+03	1.19E+03
95.00	3.74E-01	1.46E-04	3.15E+00	1.55E+03	1.55E+03
125.00	1.91E-01	7.47E-05	1.61E+00	1.17E+03	1.17E+03

417.704292058944700 total grams airborne in tank
1.634565295098582E-001 total g/s out riser
2691.622157096863000 total grams lost out riser
52798.671436309810000 total grams settled on floor
55907.997978210450000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1440.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.06E+01	4.72E-06	8.20E+01	8.06E+00	1.01E+02
1.50	3.01E+01	1.34E-05	2.76E+02	1.97E+02	5.03E+02
2.50	1.45E+01	6.44E-06	1.81E+02	3.30E+02	5.26E+02
3.50	1.15E+01	5.13E-06	2.41E+02	7.60E+02	1.01E+03
4.50	6.49E+00	2.89E-06	2.89E+02	1.27E+03	1.57E+03
5.50	2.12E+00	9.43E-07	2.59E+02	1.40E+03	1.66E+03
6.50	4.09E-01	1.82E-07	1.74E+02	1.09E+03	1.26E+03
7.50	6.82E-02	3.03E-08	1.24E+02	8.93E+02	1.02E+03
8.50	1.04E-02	4.65E-09	1.00E+02	8.22E+02	9.22E+02
9.50	1.16E-03	5.14E-10	7.12E+01	6.67E+02	7.38E+02
15.00	9.07E-09	4.03E-15	5.05E+02	9.37E+03	9.88E+03
25.00	1.25E-26	5.57E-33	2.02E+02	9.48E+03	9.68E+03
35.00	0.00E+00	0.00E+00	9.64E+01	8.63E+03	8.72E+03
45.00	0.00E+00	0.00E+00	6.43E+01	9.30E+03	9.36E+03
55.00	0.00E+00	0.00E+00	4.51E+00	9.07E+02	9.11E+02
65.00	0.00E+00	0.00E+00	9.07E+00	2.39E+03	2.40E+03
75.00	0.00E+00	0.00E+00	5.16E+00	1.72E+03	1.73E+03
85.00	0.00E+00	0.00E+00	2.88E+00	1.18E+03	1.19E+03
95.00	0.00E+00	0.00E+00	3.15E+00	1.55E+03	1.55E+03
125.00	0.00E+00	0.00E+00	1.61E+00	1.17E+03	1.17E+03

75.815960344961340 total grams airborne in tank
3.371408037104072E-005 total g/s out riser
2691.852622866631000 total grams lost out riser
53140.328640937810000 total grams settled on floor
55907.997978210450000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1460.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	6.56E+00	2.57E-03	8.59E+01	8.16E+00	1.01E+02
1.50	1.73E+01	6.77E-03	2.87E+02	1.99E+02	5.03E+02
2.50	7.24E+00	2.83E-03	1.86E+02	3.32E+02	5.26E+02
3.50	4.70E+00	1.84E-03	2.44E+02	7.63E+02	1.01E+03
4.50	2.01E+00	7.88E-04	2.91E+02	1.27E+03	1.57E+03
5.50	4.69E-01	1.83E-04	2.60E+02	1.40E+03	1.66E+03
6.50	6.03E-02	2.36E-05	1.74E+02	1.09E+03	1.26E+03
7.50	6.27E-03	2.45E-06	1.24E+02	8.93E+02	1.02E+03
8.50	5.60E-04	2.19E-07	1.00E+02	8.22E+02	9.22E+02
9.50	3.39E-05	1.32E-08	7.12E+01	6.67E+02	7.38E+02
15.00	2.90E-12	1.13E-15	5.05E+02	9.37E+03	9.88E+03
25.00	6.21E-36	2.43E-39	2.02E+02	9.48E+03	9.68E+03
35.00	0.00E+00	0.00E+00	9.64E+01	8.63E+03	8.72E+03
45.00	0.00E+00	0.00E+00	6.43E+01	9.30E+03	9.36E+03
55.00	0.00E+00	0.00E+00	4.51E+00	9.07E+02	9.11E+02
65.00	0.00E+00	0.00E+00	9.07E+00	2.39E+03	2.40E+03
75.00	0.00E+00	0.00E+00	5.16E+00	1.72E+03	1.73E+03
85.00	0.00E+00	0.00E+00	2.88E+00	1.18E+03	1.19E+03
95.00	0.00E+00	0.00E+00	3.15E+00	1.55E+03	1.55E+03
125.00	0.00E+00	0.00E+00	1.61E+00	1.17E+03	1.17E+03

38.351858763376360 total grams airborne in tank
1.500789420741657E-002 total g/s out riser
2717.549407839775000 total grams lost out riser
53152.095977783200000 total grams settled on floor
55907.997978210450000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1520.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	6.33E+00	2.82E-06	8.59E+01	8.38E+00	1.01E+02
1.50	1.34E+01	5.97E-06	2.87E+02	2.03E+02	5.03E+02
2.50	3.70E+00	1.65E-06	1.86E+02	3.35E+02	5.26E+02
3.50	1.30E+00	5.76E-07	2.44E+02	7.66E+02	1.01E+03
4.50	2.45E-01	1.09E-07	2.91E+02	1.27E+03	1.57E+03
5.50	2.07E-02	9.19E-09	2.60E+02	1.40E+03	1.66E+03
6.50	7.88E-04	3.50E-10	1.74E+02	1.09E+03	1.26E+03
7.50	1.99E-05	8.84E-12	1.24E+02	8.93E+02	1.02E+03
8.50	3.53E-07	1.57E-13	1.00E+02	8.22E+02	9.22E+02
9.50	3.47E-09	1.54E-15	7.12E+01	6.67E+02	7.38E+02
15.00	3.85E-22	1.71E-28	5.05E+02	9.37E+03	9.88E+03
25.00	0.00E+00	0.00E+00	2.02E+02	9.48E+03	9.68E+03
35.00	0.00E+00	0.00E+00	9.64E+01	8.63E+03	8.72E+03
45.00	0.00E+00	0.00E+00	6.43E+01	9.30E+03	9.36E+03
55.00	0.00E+00	0.00E+00	4.51E+00	9.07E+02	9.11E+02
65.00	0.00E+00	0.00E+00	9.07E+00	2.39E+03	2.40E+03
75.00	0.00E+00	0.00E+00	5.16E+00	1.72E+03	1.73E+03
85.00	0.00E+00	0.00E+00	2.88E+00	1.18E+03	1.19E+03
95.00	0.00E+00	0.00E+00	3.15E+00	1.55E+03	1.55E+03
125.00	0.00E+00	0.00E+00	1.61E+00	1.17E+03	1.17E+03

25.029463485997820 total grams airborne in tank

```
1.113018078606447E-005 total g/s out riser
  2717.598525881767000 total grams lost out riser
 53165.369319915770000 total grams settled on floor
 55907.997978210450000 total grams made airborne
0.000000000000000E+000 total grams bypassed
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TABLE 3. 1,000,000 GALLON TANK

IL = In-leakage, cubic feet per minute @ 14.7 psia and 70°F
WH = Waste height, inches
PR = Penetration rate, inches per minute

Values are in total mass (grams) of dust flowing up the exhaust riser for the drilling of one complete core that is WH inches long.

	PR=.5	PR=1	PR=2	PR=3	PR=4
IL=0					
WH=19	39.2	26.8	17.7	11.4	11.2
WH=133	479.4	373.8	214.5	50.4	132.6
WH=247	1051.8	762.8	512.1	331.3	325.3
WH=361	1802.1	1396.1	1002.0	697.9	677.8
IL=500					
WH=19	88.3	61.2	40.6	26.2	25.6
WH=133	1001.1	810.4	480.0	114.7	299.8
WH=247	2899.1	1602.1	1118.9	736.9	726.6
WH=361	3501.0	2717.6	2131.0	1521.0	1488.0
IL=1000					
WH=19	134.9	94.5	63.0	40.7	39.9
WH=133	1442.5	1199.7	731.2	177.7	462.4
WH=247	2960.1	2329.8	1673.7	119.7	1108.6
WH=361	4868.4	3885.0	3138.8	2278.5	983.6
IL=1400					
WH=19	170.5	120.5	80.7	52.3	51.3
WH=133	1755.3	1483.9	922.9	227.1	589.4
WH=247	3464.1	2856.4	2088.4	1411.8	1402.2
WH=361	5811.0	4454.2	3882.4	2848.8	2813.0
IL=2100					
WH=19	229.6	164.7	111.2	72.3	71.0
WH=133	2240.3	1935.0	1241.4	311.9	805.4
WH=247	4494.2	3690.7	2764.4	1897.8	1893.7
WH=361	7236.0	6318.0	5080.1	3786.0	3758.5

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

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ADDITIONAL PARAMETERS:

```
particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     1061.310000000000000
bypass fraction =   0.000000000000000E+000

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000
Output divisions in Period        3.000000000000000 =        1.000000
Output divisions in Period        4.000000000000000 =        1.000000
Output divisions in Period        5.000000000000000 =        1.000000
Output divisions in Period        6.000000000000000 =        1.000000
Output divisions in Period        7.000000000000000 =        1.000000
Output divisions in Period        8.000000000000000 =        1.000000
Output divisions in Period        9.000000000000000 =        1.000000
Output divisions in Period       10.000000000000000 =        1.000000
Output divisions in Period       11.000000000000000 =        1.000000
Output divisions in Period       12.000000000000000 =        1.000000
Output divisions in Period       13.000000000000000 =        1.000000
Output divisions in Period       14.000000000000000 =        1.000000
Output divisions in Period       15.000000000000000 =        1.000000
Output divisions in Period       16.000000000000000 =        1.000000
Output divisions in Period       17.000000000000000 =        1.000000
Output divisions in Period       18.000000000000000 =        1.000000
Output divisions in Period       19.000000000000000 =        1.000000
Output divisions in Period       20.000000000000000 =        1.000000
Output divisions in Period       21.000000000000000 =        1.000000
Output divisions in Period       22.000000000000000 =        1.000000
Output divisions in Period       23.000000000000000 =        1.000000
Output divisions in Period       24.000000000000000 =        1.000000
Output divisions in Period       25.000000000000000 =        1.000000
Output divisions in Period       26.000000000000000 =        1.000000
Output divisions in Period       27.000000000000000 =        1.000000
Output divisions in Period       28.000000000000000 =        1.000000
Output divisions in Period       29.000000000000000 =        1.000000
Output divisions in Period       30.000000000000000 =        1.000000
Output divisions in Period       31.000000000000000 =        1.000000
Output divisions in Period       32.000000000000000 =        1.000000
Output divisions in Period       33.000000000000000 =        1.000000
Output divisions in Period       34.000000000000000 =        1.000000
Output divisions in Period       35.000000000000000 =        1.000000
Output divisions in Period       36.000000000000000 =        1.000000
Output divisions in Period       37.000000000000000 =        1.000000
Output divisions in Period       38.000000000000000 =        1.000000

Flow out @    0.000000E+00 min =     2480.000000 cfm &      155.300000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      100.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      180.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      240.000000 min =     2480.000000 cfm &      155.300000g/m
```

```
Flow out @      260.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      320.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      340.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      420.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      500.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      580.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      640.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      660.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      740.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      800.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      820.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      880.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      900.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      960.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      980.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1040.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1060.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1120.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1140.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1200.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1220.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1280.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1300.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1360.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1380.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1440.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1460.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1520.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m


**** OUTPUT @       20.000000000000000 minutes ****
```

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.09E+00	3.40E-03	2.48E+00	2.13E-02	5.59E+00
1.50	1.50E+01	1.65E-02	1.22E+01	7.72E-01	2.80E+01
2.50	1.49E+01	1.64E-02	1.23E+01	2.07E+00	2.92E+01
3.50	2.65E+01	2.92E-02	2.24E+01	7.27E+00	5.62E+01
4.50	3.73E+01	4.11E-02	3.25E+01	1.72E+01	8.70E+01
5.50	3.54E+01	3.90E-02	3.19E+01	2.50E+01	9.22E+01
6.50	2.38E+01	2.62E-02	2.22E+01	2.42E+01	7.02E+01
7.50	1.68E+01	1.85E-02	1.62E+01	2.35E+01	5.65E+01
8.50	1.33E+01	1.46E-02	1.33E+01	2.47E+01	5.12E+01
9.50	9.23E+00	1.02E-02	9.59E+00	2.22E+01	4.10E+01
15.00	6.16E+01	6.80E-02	7.24E+01	4.15E+02	5.49E+02
25.00	2.41E+01	2.66E-02	3.05E+01	4.83E+02	5.38E+02
35.00	1.15E+01	1.26E-02	1.48E+01	4.58E+02	4.85E+02
45.00	7.62E+00	8.41E-03	9.94E+00	5.03E+02	5.20E+02
55.00	5.35E-01	5.90E-04	7.01E-01	4.94E+01	5.06E+01
65.00	1.07E+00	1.18E-03	1.41E+00	1.31E+02	1.34E+02
75.00	6.10E-01	6.73E-04	8.03E-01	9.46E+01	9.60E+01
85.00	3.41E-01	3.76E-04	4.49E-01	6.51E+01	6.58E+01
95.00	3.73E-01	4.11E-04	4.91E-01	8.52E+01	8.60E+01
125.00	1.90E-01	2.10E-04	2.51E-01	6.48E+01	6.52E+01

```
   303.103585869073900 total grams airborne in tank
3.342669181292877E-001 total g/s out riser
   306.803908705711400 total grams lost out riser
  2496.092574089766000 total grams settled on floor
  3106.000015735626000 total grams made airborne
0.000000000000000E+000 total grams bypassed
```

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	2.98E+00	1.32E-06	2.49E+00	1.25E-01	5.59E+00
1.50	1.16E+01	5.18E-06	1.22E+01	4.11E+00	2.80E+01
2.50	7.60E+00	3.38E-06	1.23E+01	9.31E+00	2.92E+01
3.50	7.32E+00	3.25E-06	2.25E+01	2.64E+01	5.62E+01
4.50	4.54E+00	2.02E-06	3.25E+01	4.99E+01	8.70E+01
5.50	1.56E+00	6.93E-07	3.19E+01	5.88E+01	9.22E+01
6.50	3.11E-01	1.38E-07	2.22E+01	4.77E+01	7.02E+01
7.50	5.31E-02	2.36E-08	1.62E+01	4.02E+01	5.65E+01
8.50	8.35E-03	3.71E-09	1.33E+01	3.79E+01	5.12E+01
9.50	9.47E-04	4.21E-10	9.59E+00	3.14E+01	4.10E+01
15.00	8.20E-09	3.65E-15	7.24E+01	4.76E+02	5.49E+02
25.00	1.20E-26	5.35E-33	3.05E+01	5.07E+02	5.38E+02
35.00	0.00E+00	0.00E+00	1.48E+01	4.70E+02	4.85E+02
45.00	0.00E+00	0.00E+00	9.94E+00	5.10E+02	5.20E+02
55.00	0.00E+00	0.00E+00	7.01E-01	4.99E+01	5.06E+01
65.00	0.00E+00	0.00E+00	1.41E+00	1.32E+02	1.34E+02
75.00	0.00E+00	0.00E+00	8.03E-01	9.52E+01	9.60E+01
85.00	0.00E+00	0.00E+00	4.49E-01	6.54E+01	6.58E+01
95.00	0.00E+00	0.00E+00	4.91E-01	8.55E+01	8.60E+01
125.00	0.00E+00	0.00E+00	2.51E-01	6.50E+01	6.52E+01

```
    36.014255744222040 total grams airborne in tank
1.601493262024958E-005 total g/s out riser
   306.936385959386800 total grams lost out riser
  2763.049429178238000 total grams settled on floor
  3106.000015735626000 total grams made airborne
0.000000000000000E+000 total grams bypassed
```

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.87E+00	4.27E-03	7.15E+00	1.65E-01	1.12E+01
1.50	1.79E+01	1.97E-02	3.27E+01	5.40E+00	5.59E+01
2.50	1.65E+01	1.82E-02	2.97E+01	1.22E+01	5.84E+01
3.50	2.78E+01	3.06E-02	4.95E+01	3.52E+01	1.12E+02
4.50	3.79E+01	4.18E-02	6.76E+01	6.85E+01	1.74E+02
5.50	3.55E+01	3.92E-02	6.45E+01	8.45E+01	1.84E+02
6.50	2.38E+01	2.62E-02	4.45E+01	7.21E+01	1.40E+02
7.50	1.68E+01	1.85E-02	3.25E+01	6.38E+01	1.13E+02
8.50	1.33E+01	1.46E-02	2.66E+01	6.26E+01	1.02E+02
9.50	9.23E+00	1.02E-02	1.92E+01	5.36E+01	8.20E+01
15.00	6.16E+01	6.80E-02	1.45E+02	8.91E+02	1.10E+03
25.00	2.41E+01	2.66E-02	6.10E+01	9.91E+02	1.08E+03

35.00	1.15E+01	1.26E-02	2.96E+01	9.28E+02	9.69E+02
45.00	7.62E+00	8.41E-03	1.99E+01	1.01E+03	1.04E+03
55.00	5.35E-01	5.90E-04	1.40E+00	9.93E+01	1.01E+02
65.00	1.07E+00	1.18E-03	2.82E+00	2.63E+02	2.67E+02
75.00	6.10E-01	6.73E-04	1.61E+00	1.90E+02	1.92E+02
85.00	3.41E-01	3.76E-04	8.98E-01	1.30E+02	1.32E+02
95.00	3.73E-01	4.11E-04	9.82E-01	1.71E+02	1.72E+02
125.00	1.90E-01	2.10E-04	5.03E-01	1.30E+02	1.30E+02

310.394212633371400 total grams airborne in tank
3.423071248689666E-001 total g/s out riser
637.403214871883400 total grams lost out riser
5264.202629610896000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.73E+00	1.66E-06	7.15E+00	2.94E-01	1.12E+01
1.50	1.39E+01	6.16E-06	3.27E+01	9.37E+00	5.59E+01
2.50	8.43E+00	3.75E-06	2.97E+01	2.03E+01	5.84E+01
3.50	7.67E+00	3.41E-06	4.95E+01	5.53E+01	1.12E+02
4.50	4.62E+00	2.05E-06	6.76E+01	1.02E+02	1.74E+02
5.50	1.57E+00	6.96E-07	6.45E+01	1.18E+02	1.84E+02
6.50	3.11E-01	1.38E-07	4.45E+01	9.55E+01	1.40E+02
7.50	5.32E-02	2.36E-08	3.25E+01	8.05E+01	1.13E+02
8.50	8.35E-03	3.71E-09	2.66E+01	7.59E+01	1.02E+02
9.50	9.47E-04	4.21E-10	1.92E+01	6.28E+01	8.20E+01
15.00	8.20E-09	3.65E-15	1.45E+02	9.53E+02	1.10E+03
25.00	1.20E-26	5.35E-33	6.10E+01	1.01E+03	1.08E+03
35.00	0.00E+00	0.00E+00	2.96E+01	9.39E+02	9.69E+02
45.00	0.00E+00	0.00E+00	1.99E+01	1.02E+03	1.04E+03
55.00	0.00E+00	0.00E+00	1.40E+00	9.99E+01	1.01E+02
65.00	0.00E+00	0.00E+00	2.82E+00	2.64E+02	2.67E+02
75.00	0.00E+00	0.00E+00	1.61E+00	1.90E+02	1.92E+02
85.00	0.00E+00	0.00E+00	8.98E-01	1.31E+02	1.32E+02
95.00	0.00E+00	0.00E+00	9.82E-01	1.71E+02	1.72E+02
125.00	0.00E+00	0.00E+00	5.03E-01	1.30E+02	1.30E+02

40.241169176172420 total grams airborne in tank
1.789457014573662E-005 total g/s out riser
637.544472873210900 total grams lost out riser
5534.214518636465000 total grams settled on floor
6212.000031471252000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.07E+00	4.49E-03	1.24E+01	3.39E-01	1.68E+01
1.50	1.84E+01	2.03E-02	5.47E+01	1.08E+01	8.39E+01
2.50	1.67E+01	1.84E-02	4.76E+01	2.33E+01	8.76E+01
3.50	2.79E+01	3.07E-02	7.67E+01	6.41E+01	1.69E+02

4.50	3.79E+01	4.18E-02	1.03E+02	1.20E+02	2.61E+02
5.50	3.55E+01	3.92E-02	9.72E+01	1.44E+02	2.77E+02
6.50	2.38E+01	2.62E-02	6.69E+01	1.20E+02	2.11E+02
7.50	1.68E+01	1.85E-02	4.88E+01	1.04E+02	1.70E+02
8.50	1.33E+01	1.46E-02	3.99E+01	1.01E+02	1.54E+02
9.50	9.23E+00	1.02E-02	2.88E+01	8.50E+01	1.23E+02
15.00	6.16E+01	6.80E-02	2.17E+02	1.37E+03	1.65E+03
25.00	2.41E+01	2.66E-02	9.16E+01	1.50E+03	1.61E+03
35.00	1.15E+01	1.26E-02	4.44E+01	1.40E+03	1.45E+03
45.00	7.62E+00	8.41E-03	2.98E+01	1.52E+03	1.56E+03
55.00	5.35E-01	5.90E-04	2.10E+00	1.49E+02	1.52E+02
65.00	1.07E+00	1.18E-03	4.23E+00	3.95E+02	4.01E+02
75.00	6.10E-01	6.73E-04	2.41E+00	2.85E+02	2.88E+02
85.00	3.41E-01	3.76E-04	1.35E+00	1.96E+02	1.98E+02
95.00	3.73E-01	4.11E-04	1.47E+00	2.56E+02	2.58E+02
125.00	1.90E-01	2.10E-04	7.54E-01	1.95E+02	1.96E+02

311.382358938455600 total grams airborne in tank
3.433968677418306E-001 total g/s out riser
970.956273674964900 total grams lost out riser
8035.661545425653000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.93E+00	1.75E-06	1.24E+01	4.75E-01	1.68E+01
1.50	1.43E+01	6.35E-06	5.47E+01	1.49E+01	8.39E+01
2.50	8.52E+00	3.79E-06	4.77E+01	3.14E+01	8.76E+01
3.50	7.68E+00	3.42E-06	7.67E+01	8.43E+01	1.69E+02
4.50	4.62E+00	2.05E-06	1.03E+02	1.54E+02	2.61E+02
5.50	1.57E+00	6.96E-07	9.72E+01	1.78E+02	2.77E+02
6.50	3.11E-01	1.38E-07	6.69E+01	1.43E+02	2.11E+02
7.50	5.32E-02	2.36E-08	4.88E+01	1.21E+02	1.70E+02
8.50	8.35E-03	3.71E-09	3.99E+01	1.14E+02	1.54E+02
9.50	9.47E-04	4.21E-10	2.88E+01	9.42E+01	1.23E+02
15.00	8.20E-09	3.65E-15	2.17E+02	1.43E+03	1.65E+03
25.00	1.20E-26	5.35E-33	9.16E+01	1.52E+03	1.61E+03
35.00	0.00E+00	0.00E+00	4.44E+01	1.41E+03	1.45E+03
45.00	0.00E+00	0.00E+00	2.98E+01	1.53E+03	1.56E+03
55.00	0.00E+00	0.00E+00	2.10E+00	1.50E+02	1.52E+02
65.00	0.00E+00	0.00E+00	4.23E+00	3.96E+02	4.01E+02
75.00	0.00E+00	0.00E+00	2.41E+00	2.86E+02	2.88E+02
85.00	0.00E+00	0.00E+00	1.35E+00	1.96E+02	1.98E+02
95.00	0.00E+00	0.00E+00	1.47E+00	2.57E+02	2.58E+02
125.00	0.00E+00	0.00E+00	7.54E-01	1.95E+02	1.96E+02

40.961947257738520 total grams airborne in tank
1.821508764627714E-005 total g/s out riser
971.098869144916500 total grams lost out riser
8305.939459860325000 total grams settled on floor
9318.000015258789000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.12E+00	4.54E-03	1.77E+01	5.21E-01	2.24E+01
1.50	1.85E+01	2.04E-02	7.70E+01	1.63E+01	1.12E+02
2.50	1.67E+01	1.84E-02	6.57E+01	3.44E+01	1.17E+02
3.50	2.79E+01	3.07E-02	1.04E+02	9.31E+01	2.25E+02
4.50	3.79E+01	4.18E-02	1.38E+02	1.72E+02	3.48E+02
5.50	3.55E+01	3.92E-02	1.30E+02	2.04E+02	3.69E+02
6.50	2.38E+01	2.62E-02	8.92E+01	1.68E+02	2.81E+02
7.50	1.68E+01	1.85E-02	6.50E+01	1.44E+02	2.26E+02
8.50	1.33E+01	1.46E-02	5.32E+01	1.39E+02	2.05E+02
9.50	9.23E+00	1.02E-02	3.84E+01	1.16E+02	1.64E+02
15.00	6.16E+01	6.80E-02	2.90E+02	1.84E+03	2.20E+03
25.00	2.41E+01	2.66E-02	1.22E+02	2.01E+03	2.15E+03
35.00	1.15E+01	1.26E-02	5.92E+01	1.87E+03	1.94E+03
45.00	7.62E+00	8.41E-03	3.98E+01	2.03E+03	2.08E+03
55.00	5.35E-01	5.90E-04	2.80E+00	1.99E+02	2.03E+02
65.00	1.07E+00	1.18E-03	5.64E+00	5.28E+02	5.34E+02
75.00	6.10E-01	6.73E-04	3.21E+00	3.80E+02	3.84E+02
85.00	3.41E-01	3.76E-04	1.80E+00	2.61E+02	2.63E+02
95.00	3.73E-01	4.11E-04	1.96E+00	3.42E+02	3.44E+02
125.00	1.90E-01	2.10E-04	1.01E+00	2.60E+02	2.61E+02

311.558152586221700 total grams airborne in tank
3.435907355742529E-001 total g/s out riser
1305.021561384201000 total grams lost out riser
10807.420621395110000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.98E+00	1.77E-06	1.77E+01	6.59E-01	2.24E+01
1.50	1.44E+01	6.38E-06	7.71E+01	2.04E+01	1.12E+02
2.50	8.53E+00	3.79E-06	6.57E+01	4.26E+01	1.17E+02
3.50	7.68E+00	3.42E-06	1.04E+02	1.13E+02	2.25E+02
4.50	4.62E+00	2.05E-06	1.38E+02	2.05E+02	3.48E+02
5.50	1.57E+00	6.96E-07	1.30E+02	2.38E+02	3.69E+02
6.50	3.11E-01	1.38E-07	8.92E+01	1.91E+02	2.81E+02
7.50	5.32E-02	2.36E-08	6.50E+01	1.61E+02	2.26E+02
8.50	8.35E-03	3.71E-09	5.32E+01	1.52E+02	2.05E+02
9.50	9.47E-04	4.21E-10	3.84E+01	1.26E+02	1.64E+02
15.00	8.20E-09	3.65E-15	2.90E+02	1.91E+03	2.20E+03
25.00	1.20E-26	5.35E-33	1.22E+02	2.03E+03	2.15E+03
35.00	0.00E+00	0.00E+00	5.92E+01	1.88E+03	1.94E+03
45.00	0.00E+00	0.00E+00	3.98E+01	2.04E+03	2.08E+03
55.00	0.00E+00	0.00E+00	2.80E+00	2.00E+02	2.03E+02
65.00	0.00E+00	0.00E+00	5.64E+00	5.29E+02	5.34E+02
75.00	0.00E+00	0.00E+00	3.21E+00	3.81E+02	3.84E+02
85.00	0.00E+00	0.00E+00	1.80E+00	2.62E+02	2.63E+02
95.00	0.00E+00	0.00E+00	1.96E+00	3.42E+02	3.44E+02
125.00	0.00E+00	0.00E+00	1.01E+00	2.60E+02	2.61E+02

41.101307089548510 total grams airborne in tank

1.827705908048363E-005 total g/s out riser
1305.164403319359000 total grams lost out riser
11077.734610795970000 total grams settled on floor
12424.000062942500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.13E+00	4.56E-03	2.31E+01	7.06E-01	2.80E+01
1.50	1.85E+01	2.04E-02	9.95E+01	2.18E+01	1.40E+02
2.50	1.67E+01	1.84E-02	8.37E+01	4.56E+01	1.46E+02
3.50	2.79E+01	3.07E-02	1.31E+02	1.22E+02	2.81E+02
4.50	3.79E+01	4.18E-02	1.73E+02	2.24E+02	4.35E+02
5.50	3.55E+01	3.92E-02	1.63E+02	2.63E+02	4.61E+02
6.50	2.38E+01	2.62E-02	1.12E+02	2.16E+02	3.51E+02
7.50	1.68E+01	1.85E-02	8.13E+01	1.85E+02	2.83E+02
8.50	1.33E+01	1.46E-02	6.66E+01	1.76E+02	2.56E+02
9.50	9.23E+00	1.02E-02	4.79E+01	1.48E+02	2.05E+02
15.00	6.16E+01	6.80E-02	3.62E+02	2.32E+03	2.74E+03
25.00	2.41E+01	2.66E-02	1.53E+02	2.51E+03	2.69E+03
35.00	1.15E+01	1.26E-02	7.40E+01	2.34E+03	2.42E+03
45.00	7.62E+00	8.41E-03	4.97E+01	2.54E+03	2.60E+03
55.00	5.35E-01	5.90E-04	3.50E+00	2.49E+02	2.53E+02
65.00	1.07E+00	1.18E-03	7.05E+00	6.60E+02	6.68E+02
75.00	6.10E-01	6.73E-04	4.01E+00	4.75E+02	4.80E+02
85.00	3.41E-01	3.76E-04	2.24E+00	3.27E+02	3.29E+02
95.00	3.73E-01	4.11E-04	2.46E+00	4.27E+02	4.30E+02
125.00	1.90E-01	2.10E-04	1.26E+00	3.25E+02	3.26E+02

311.592797666788100 total grams airborne in tank
3.436289430828765E-001 total g/s out riser
1639.186596274376000 total grams lost out riser
13579.220974564550000 total grams settled on floor
15530.000019073490000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.77E-06	2.31E+01	8.44E-01	2.80E+01
1.50	1.44E+01	6.39E-06	9.95E+01	2.59E+01	1.40E+02
2.50	8.53E+00	3.79E-06	8.37E+01	5.37E+01	1.46E+02
3.50	7.68E+00	3.42E-06	1.31E+02	1.42E+02	2.81E+02
4.50	4.62E+00	2.05E-06	1.73E+02	2.57E+02	4.35E+02
5.50	1.57E+00	6.96E-07	1.63E+02	2.97E+02	4.61E+02
6.50	3.11E-01	1.38E-07	1.12E+02	2.39E+02	3.51E+02
7.50	5.32E-02	2.36E-08	8.13E+01	2.01E+02	2.83E+02
8.50	8.35E-03	3.71E-09	6.66E+01	1.90E+02	2.56E+02
9.50	9.47E-04	4.21E-10	4.79E+01	1.57E+02	2.05E+02
15.00	8.20E-09	3.65E-15	3.62E+02	2.38E+03	2.74E+03
25.00	1.20E-26	5.35E-33	1.53E+02	2.54E+03	2.69E+03
35.00	0.00E+00	0.00E+00	7.40E+01	2.35E+03	2.42E+03
45.00	0.00E+00	0.00E+00	4.97E+01	2.55E+03	2.60E+03

55.00	0.00E+00	0.00E+00	3.50E+00	2.50E+02	2.53E+02
65.00	0.00E+00	0.00E+00	7.05E+00	6.61E+02	6.68E+02
75.00	0.00E+00	0.00E+00	4.01E+00	4.76E+02	4.80E+02
85.00	0.00E+00	0.00E+00	2.24E+00	3.27E+02	3.29E+02
95.00	0.00E+00	0.00E+00	2.46E+00	4.28E+02	4.30E+02
125.00	0.00E+00	0.00E+00	1.26E+00	3.25E+02	3.26E+02

41.129999096613330 total grams airborne in tank
1.828981701741275E-005 total g/s out riser
1639.329527616501000 total grams lost out riser
13849.540839672090000 total grams settled on floor
15530.000019073490000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	2.85E+01	8.90E-01	3.35E+01
1.50	1.85E+01	2.04E-02	1.22E+02	2.73E+01	1.68E+02
2.50	1.67E+01	1.84E-02	1.02E+02	5.68E+01	1.75E+02
3.50	2.79E+01	3.07E-02	1.58E+02	1.51E+02	3.37E+02
4.50	3.79E+01	4.18E-02	2.08E+02	2.76E+02	5.22E+02
5.50	3.55E+01	3.92E-02	1.95E+02	3.23E+02	5.53E+02
6.50	2.38E+01	2.62E-02	1.34E+02	2.63E+02	4.21E+02
7.50	1.68E+01	1.85E-02	9.76E+01	2.25E+02	3.39E+02
8.50	1.33E+01	1.46E-02	7.99E+01	2.14E+02	3.07E+02
9.50	9.23E+00	1.02E-02	5.75E+01	1.79E+02	2.46E+02
15.00	6.16E+01	6.80E-02	4.35E+02	2.80E+03	3.29E+03
25.00	2.41E+01	2.66E-02	1.83E+02	3.02E+03	3.23E+03
35.00	1.15E+01	1.26E-02	8.88E+01	2.81E+03	2.91E+03
45.00	7.62E+00	8.41E-03	5.96E+01	3.05E+03	3.12E+03
55.00	5.35E-01	5.90E-04	4.20E+00	2.99E+02	3.04E+02
65.00	1.07E+00	1.18E-03	8.46E+00	7.92E+02	8.01E+02
75.00	6.10E-01	6.73E-04	4.82E+00	5.70E+02	5.76E+02
85.00	3.41E-01	3.76E-04	2.69E+00	3.92E+02	3.95E+02
95.00	3.73E-01	4.11E-04	2.95E+00	5.13E+02	5.16E+02
125.00	1.90E-01	2.10E-04	1.51E+00	3.90E+02	3.91E+02

311.600012212991700 total grams airborne in tank
3.436369012342766E-001 total g/s out riser
1973.372290492058000 total grams lost out riser
16351.028276920320000 total grams settled on floor
18636.000000000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.77E-06	2.85E+01	1.03E+00	3.35E+01
1.50	1.44E+01	6.39E-06	1.22E+02	3.15E+01	1.68E+02
2.50	8.53E+00	3.79E-06	1.02E+02	6.49E+01	1.75E+02
3.50	7.68E+00	3.42E-06	1.58E+02	1.71E+02	3.37E+02
4.50	4.62E+00	2.05E-06	2.08E+02	3.09E+02	5.22E+02
5.50	1.57E+00	6.96E-07	1.95E+02	3.57E+02	5.53E+02

6.50	3.11E-01	1.38E-07	1.34E+02	2.87E+02	4.21E+02
7.50	5.32E-02	2.36E-08	9.76E+01	2.42E+02	3.39E+02
8.50	8.35E-03	3.71E-09	7.99E+01	2.28E+02	3.07E+02
9.50	9.47E-04	4.21E-10	5.75E+01	1.88E+02	2.46E+02
15.00	8.20E-09	3.65E-15	4.35E+02	2.86E+03	3.29E+03
25.00	1.20E-26	5.35E-33	1.83E+02	3.04E+03	3.23E+03
35.00	0.00E+00	0.00E+00	8.88E+01	2.82E+03	2.91E+03
45.00	0.00E+00	0.00E+00	5.96E+01	3.06E+03	3.12E+03
55.00	0.00E+00	0.00E+00	4.20E+00	3.00E+02	3.04E+02
65.00	0.00E+00	0.00E+00	8.46E+00	7.93E+02	8.01E+02
75.00	0.00E+00	0.00E+00	4.82E+00	5.71E+02	5.76E+02
85.00	0.00E+00	0.00E+00	2.69E+00	3.92E+02	3.95E+02
95.00	0.00E+00	0.00E+00	2.95E+00	5.13E+02	5.16E+02
125.00	0.00E+00	0.00E+00	1.51E+00	3.90E+02	3.91E+02

41.136151011209890 total grams airborne in tank
1.829255300484936E-005 total g/s out riser
1973.515174865723000 total grams lost out riser
16621.348979949950000 total grams settled on floor
18636.000000000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	3.39E+01	1.08E+00	3.91E+01
1.50	1.85E+01	2.04E-02	1.44E+02	3.29E+01	1.96E+02
2.50	1.67E+01	1.84E-02	1.20E+02	6.79E+01	2.04E+02
3.50	2.79E+01	3.07E-02	1.86E+02	1.80E+02	3.94E+02
4.50	3.79E+01	4.18E-02	2.43E+02	3.28E+02	6.09E+02
5.50	3.55E+01	3.92E-02	2.28E+02	3.82E+02	6.46E+02
6.50	2.38E+01	2.62E-02	1.56E+02	3.11E+02	4.91E+02
7.50	1.68E+01	1.85E-02	1.14E+02	2.65E+02	3.96E+02
8.50	1.33E+01	1.46E-02	9.32E+01	2.52E+02	3.59E+02
9.50	9.23E+00	1.02E-02	6.71E+01	2.11E+02	2.87E+02
15.00	6.16E+01	6.80E-02	5.07E+02	3.27E+03	3.84E+03
25.00	2.41E+01	2.66E-02	2.14E+02	3.53E+03	3.77E+03
35.00	1.15E+01	1.26E-02	1.04E+02	3.28E+03	3.39E+03
45.00	7.62E+00	8.41E-03	6.96E+01	3.56E+03	3.64E+03
55.00	5.35E-01	5.90E-04	4.90E+00	3.49E+02	3.54E+02
65.00	1.07E+00	1.18E-03	9.87E+00	9.24E+02	9.35E+02
75.00	6.10E-01	6.73E-04	5.62E+00	6.66E+02	6.72E+02
85.00	3.41E-01	3.76E-04	3.14E+00	4.57E+02	4.61E+02
95.00	3.73E-01	4.11E-04	3.44E+00	5.98E+02	6.02E+02
125.00	1.90E-01	2.10E-04	1.76E+00	4.55E+02	4.57E+02

311.601574808359100 total grams airborne in tank
3.436386218527332E-001 total g/s out riser
2307.562417149544000 total grams lost out riser
19122.836641073230000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam	airborne	outflow	totalout	totalflr	source

mcrn	g	g/s	g	g	g
.50	3.99E+00	1.77E-06	3.39E+01	1.21E+00	3.91E+01
1.50	1.44E+01	6.39E-06	1.44E+02	3.70E+01	1.96E+02
2.50	8.53E+00	3.79E-06	1.20E+02	7.61E+01	2.04E+02
3.50	7.68E+00	3.42E-06	1.86E+02	2.00E+02	3.94E+02
4.50	4.62E+00	2.05E-06	2.43E+02	3.61E+02	6.09E+02
5.50	1.57E+00	6.96E-07	2.28E+02	4.16E+02	6.46E+02
6.50	3.11E-01	1.38E-07	1.56E+02	3.35E+02	4.91E+02
7.50	5.32E-02	2.36E-08	1.14E+02	2.82E+02	3.96E+02
8.50	8.35E-03	3.71E-09	9.32E+01	2.66E+02	3.59E+02
9.50	9.47E-04	4.21E-10	6.71E+01	2.20E+02	2.87E+02
15.00	8.20E-09	3.65E-15	5.07E+02	3.33E+03	3.84E+03
25.00	1.20E-26	5.35E-33	2.14E+02	3.55E+03	3.77E+03
35.00	0.00E+00	0.00E+00	1.04E+02	3.29E+03	3.39E+03
45.00	0.00E+00	0.00E+00	6.96E+01	3.57E+03	3.64E+03
55.00	0.00E+00	0.00E+00	4.90E+00	3.49E+02	3.54E+02
65.00	0.00E+00	0.00E+00	9.87E+00	9.25E+02	9.35E+02
75.00	0.00E+00	0.00E+00	5.62E+00	6.66E+02	6.72E+02
85.00	0.00E+00	0.00E+00	3.14E+00	4.58E+02	4.61E+02
95.00	0.00E+00	0.00E+00	3.44E+00	5.99E+02	6.02E+02
125.00	0.00E+00	0.00E+00	1.76E+00	4.55E+02	4.57E+02

41.137512142877980 total grams airborne in tank
1.829315850094707E-005 total g/s out riser
2307.705362081528000 total grams lost out riser
19393.157510995860000 total grams settled on floor
21741.999965667720000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	3.93E+01	1.26E+00	4.47E+01
1.50	1.85E+01	2.04E-02	1.67E+02	3.84E+01	2.24E+02
2.50	1.67E+01	1.84E-02	1.38E+02	7.91E+01	2.34E+02
3.50	2.79E+01	3.07E-02	2.13E+02	2.09E+02	4.50E+02
4.50	3.79E+01	4.18E-02	2.78E+02	3.80E+02	6.96E+02
5.50	3.55E+01	3.92E-02	2.61E+02	4.42E+02	7.38E+02
6.50	2.38E+01	2.62E-02	1.79E+02	3.59E+02	5.62E+02
7.50	1.68E+01	1.85E-02	1.30E+02	3.05E+02	4.52E+02
8.50	1.33E+01	1.46E-02	1.06E+02	2.90E+02	4.10E+02
9.50	9.23E+00	1.02E-02	7.67E+01	2.42E+02	3.28E+02
15.00	6.16E+01	6.80E-02	5.79E+02	3.75E+03	4.39E+03
25.00	2.41E+01	2.66E-02	2.44E+02	4.04E+03	4.30E+03
35.00	1.15E+01	1.26E-02	1.18E+02	3.75E+03	3.88E+03
45.00	7.62E+00	8.41E-03	7.95E+01	4.07E+03	4.16E+03
55.00	5.35E-01	5.90E-04	5.60E+00	3.99E+02	4.05E+02
65.00	1.07E+00	1.18E-03	1.13E+01	1.06E+03	1.07E+03
75.00	6.10E-01	6.73E-04	6.42E+00	7.61E+02	7.68E+02
85.00	3.41E-01	3.76E-04	3.59E+00	5.23E+02	5.27E+02
95.00	3.73E-01	4.11E-04	3.93E+00	6.84E+02	6.88E+02
125.00	1.90E-01	2.10E-04	2.01E+00	5.20E+02	5.22E+02

311.601920992136000 total grams airborne in tank
3.436390064889565E-001 total g/s out riser
2641.753519535065000 total grams lost out riser

21894.645253419880000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	3.93E+01	1.40E+00	4.47E+01
1.50	1.44E+01	6.39E-06	1.67E+02	4.25E+01	2.24E+02
2.50	8.53E+00	3.79E-06	1.38E+02	8.72E+01	2.34E+02
3.50	7.68E+00	3.42E-06	2.13E+02	2.29E+02	4.50E+02
4.50	4.62E+00	2.05E-06	2.78E+02	4.13E+02	6.96E+02
5.50	1.57E+00	6.96E-07	2.61E+02	4.76E+02	7.38E+02
6.50	3.11E-01	1.38E-07	1.79E+02	3.83E+02	5.62E+02
7.50	5.32E-02	2.36E-08	1.30E+02	3.22E+02	4.52E+02
8.50	8.35E-03	3.71E-09	1.06E+02	3.03E+02	4.10E+02
9.50	9.47E-04	4.21E-10	7.67E+01	2.51E+02	3.28E+02
15.00	8.20E-09	3.65E-15	5.79E+02	3.81E+03	4.39E+03
25.00	1.20E-26	5.35E-33	2.44E+02	4.06E+03	4.30E+03
35.00	0.00E+00	0.00E+00	1.18E+02	3.76E+03	3.88E+03
45.00	0.00E+00	0.00E+00	7.95E+01	4.08E+03	4.16E+03
55.00	0.00E+00	0.00E+00	5.60E+00	3.99E+02	4.05E+02
65.00	0.00E+00	0.00E+00	1.13E+01	1.06E+03	1.07E+03
75.00	0.00E+00	0.00E+00	6.42E+00	7.61E+02	7.68E+02
85.00	0.00E+00	0.00E+00	3.59E+00	5.23E+02	5.27E+02
95.00	0.00E+00	0.00E+00	3.93E+00	6.84E+02	6.88E+02
125.00	0.00E+00	0.00E+00	2.01E+00	5.20E+02	5.22E+02

41.137821133356500 total grams airborne in tank
1.829329583464703E-005 total g/s out riser
2641.896441936493000 total grams lost out riser
22164.966050505640000 total grams settled on floor
24847.999763488770000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	4.47E+01	1.45E+00	5.03E+01
1.50	1.85E+01	2.04E-02	1.89E+02	4.39E+01	2.52E+02
2.50	1.67E+01	1.84E-02	1.56E+02	9.03E+01	2.63E+02
3.50	2.79E+01	3.07E-02	2.40E+02	2.38E+02	5.06E+02
4.50	3.79E+01	4.18E-02	3.13E+02	4.31E+02	7.83E+02
5.50	3.55E+01	3.92E-02	2.93E+02	5.02E+02	8.30E+02
6.50	2.38E+01	2.62E-02	2.01E+02	4.07E+02	6.32E+02
7.50	1.68E+01	1.85E-02	1.46E+02	3.46E+02	5.09E+02
8.50	1.33E+01	1.46E-02	1.20E+02	3.28E+02	4.61E+02
9.50	9.23E+00	1.02E-02	8.63E+01	2.73E+02	3.69E+02
15.00	6.16E+01	6.80E-02	6.52E+02	4.23E+03	4.94E+03
25.00	2.41E+01	2.66E-02	2.75E+02	4.54E+03	4.84E+03
35.00	1.15E+01	1.26E-02	1.33E+02	4.22E+03	4.36E+03
45.00	7.62E+00	8.41E-03	8.94E+01	4.59E+03	4.68E+03
55.00	5.35E-01	5.90E-04	6.31E+00	4.49E+02	4.56E+02
65.00	1.07E+00	1.18E-03	1.27E+01	1.19E+03	1.20E+03

75.00	6.10E-01	6.73E-04	7.22E+00	8.56E+02	8.64E+02
85.00	3.41E-01	3.76E-04	4.04E+00	5.88E+02	5.93E+02
95.00	3.73E-01	4.11E-04	4.42E+00	7.70E+02	7.74E+02
125.00	1.90E-01	2.10E-04	2.26E+00	5.85E+02	5.87E+02

311.602001100778600 total grams airborne in tank
3.436390935676172E-001 total g/s out riser
2975.944843769073000 total grams lost out riser
24666.453065514560000 total grams settled on floor
27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	4.47E+01	1.58E+00	5.03E+01
1.50	1.44E+01	6.39E-06	1.89E+02	4.81E+01	2.52E+02
2.50	8.53E+00	3.79E-06	1.56E+02	9.84E+01	2.63E+02
3.50	7.68E+00	3.42E-06	2.40E+02	2.58E+02	5.06E+02
4.50	4.62E+00	2.05E-06	3.13E+02	4.65E+02	7.83E+02
5.50	1.57E+00	6.96E-07	2.93E+02	5.35E+02	8.30E+02
6.50	3.11E-01	1.38E-07	2.01E+02	4.31E+02	6.32E+02
7.50	5.32E-02	2.36E-08	1.46E+02	3.62E+02	5.09E+02
8.50	8.35E-03	3.71E-09	1.20E+02	3.41E+02	4.61E+02
9.50	9.47E-04	4.21E-10	8.63E+01	2.83E+02	3.69E+02
15.00	8.20E-09	3.65E-15	6.52E+02	4.29E+03	4.94E+03
25.00	1.20E-26	5.35E-33	2.75E+02	4.57E+03	4.84E+03
35.00	0.00E+00	0.00E+00	1.33E+02	4.23E+03	4.36E+03
45.00	0.00E+00	0.00E+00	8.94E+01	4.59E+03	4.68E+03
55.00	0.00E+00	0.00E+00	6.31E+00	4.49E+02	4.56E+02
65.00	0.00E+00	0.00E+00	1.27E+01	1.19E+03	1.20E+03
75.00	0.00E+00	0.00E+00	7.22E+00	8.57E+02	8.64E+02
85.00	0.00E+00	0.00E+00	4.04E+00	5.89E+02	5.93E+02
95.00	0.00E+00	0.00E+00	4.42E+00	7.70E+02	7.74E+02
125.00	0.00E+00	0.00E+00	2.26E+00	5.85E+02	5.87E+02

41.137892658930230 total grams airborne in tank
1.829332766696160E-005 total g/s out riser
2976.087731599808000 total grams lost out riser
24936.774608135220000 total grams settled on floor
27953.999469757080000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 740.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	5.01E+01	1.63E+00	5.59E+01
1.50	1.85E+01	2.04E-02	2.12E+02	4.95E+01	2.80E+02
2.50	1.67E+01	1.84E-02	1.74E+02	1.01E+02	2.92E+02
3.50	2.79E+01	3.07E-02	2.67E+02	2.67E+02	5.62E+02
4.50	3.79E+01	4.18E-02	3.49E+02	4.83E+02	8.70E+02
5.50	3.55E+01	3.92E-02	3.26E+02	5.61E+02	9.22E+02
6.50	2.38E+01	2.62E-02	2.23E+02	4.55E+02	7.02E+02
7.50	1.68E+01	1.85E-02	1.63E+02	3.86E+02	5.65E+02

8.50	1.33E+01	1.46E-02	1.33E+02	3.66E+02	5.12E+02
9.50	9.23E+00	1.02E-02	9.59E+01	3.05E+02	4.10E+02
15.00	6.16E+01	6.80E-02	7.24E+02	4.70E+03	5.49E+03
25.00	2.41E+01	2.66E-02	3.05E+02	5.05E+03	5.38E+03
35.00	1.15E+01	1.26E-02	1.48E+02	4.69E+03	4.85E+03
45.00	7.62E+00	8.41E-03	9.94E+01	5.10E+03	5.20E+03
55.00	5.35E-01	5.90E-04	7.01E+00	4.99E+02	5.06E+02
65.00	1.07E+00	1.18E-03	1.41E+01	1.32E+03	1.34E+03
75.00	6.10E-01	6.73E-04	8.03E+00	9.51E+02	9.60E+02
85.00	3.41E-01	3.76E-04	4.49E+00	6.54E+02	6.58E+02
95.00	3.73E-01	4.11E-04	4.91E+00	8.55E+02	8.60E+02
125.00	1.90E-01	2.10E-04	2.51E+00	6.50E+02	6.52E+02

311.602018266916300 total grams airborne in tank
3.436391140567139E-001 total g/s out riser
3310.136259078979000 total grams lost out riser
27438.261863827710000 total grams settled on floor
31059.999252319340000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 800.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	5.01E+01	1.77E+00	5.59E+01
1.50	1.44E+01	6.39E-06	2.12E+02	5.36E+01	2.80E+02
2.50	8.53E+00	3.79E-06	1.74E+02	1.10E+02	2.92E+02
3.50	7.68E+00	3.42E-06	2.67E+02	2.87E+02	5.62E+02
4.50	4.62E+00	2.05E-06	3.49E+02	5.16E+02	8.70E+02
5.50	1.57E+00	6.96E-07	3.26E+02	5.95E+02	9.22E+02
6.50	3.11E-01	1.38E-07	2.23E+02	4.78E+02	7.02E+02
7.50	5.32E-02	2.36E-08	1.63E+02	4.03E+02	5.65E+02
8.50	8.35E-03	3.71E-09	1.33E+02	3.79E+02	5.12E+02
9.50	9.47E-04	4.21E-10	9.59E+01	3.14E+02	4.10E+02
15.00	8.20E-09	3.65E-15	7.24E+02	4.76E+03	5.49E+03
25.00	1.20E-26	5.35E-33	3.05E+02	5.07E+03	5.38E+03
35.00	0.00E+00	0.00E+00	1.48E+02	4.70E+03	4.85E+03
45.00	0.00E+00	0.00E+00	9.94E+01	5.10E+03	5.20E+03
55.00	0.00E+00	0.00E+00	7.01E+00	4.99E+02	5.06E+02
65.00	0.00E+00	0.00E+00	1.41E+01	1.32E+03	1.34E+03
75.00	0.00E+00	0.00E+00	8.03E+00	9.52E+02	9.60E+02
85.00	0.00E+00	0.00E+00	4.49E+00	6.54E+02	6.58E+02
95.00	0.00E+00	0.00E+00	4.91E+00	8.55E+02	8.60E+02
125.00	0.00E+00	0.00E+00	2.51E+00	6.50E+02	6.52E+02

41.137909825067920 total grams airborne in tank
1.829333528397972E-005 total g/s out riser
3310.279127836227000 total grams lost out riser
27708.583425998690000 total grams settled on floor
31059.999252319340000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 820.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g

.50	4.14E+00	4.56E-03	5.55E+01	1.82E+00	6.15E+01
1.50	1.85E+01	2.04E-02	2.34E+02	5.50E+01	3.07E+02
2.50	1.67E+01	1.84E-02	1.92E+02	1.13E+02	3.21E+02
3.50	2.79E+01	3.07E-02	2.95E+02	2.96E+02	6.18E+02
4.50	3.79E+01	4.18E-02	3.84E+02	5.35E+02	9.57E+02
5.50	3.55E+01	3.92E-02	3.59E+02	6.21E+02	1.01E+03
6.50	2.38E+01	2.62E-02	2.46E+02	5.03E+02	7.72E+02
7.50	1.68E+01	1.85E-02	1.79E+02	4.26E+02	6.22E+02
8.50	1.33E+01	1.46E-02	1.46E+02	4.04E+02	5.64E+02
9.50	9.23E+00	1.02E-02	1.05E+02	3.36E+02	4.51E+02
15.00	6.16E+01	6.80E-02	7.97E+02	5.18E+03	6.04E+03
25.00	2.41E+01	2.66E-02	3.36E+02	5.56E+03	5.92E+03
35.00	1.15E+01	1.26E-02	1.63E+02	5.16E+03	5.33E+03
45.00	7.62E+00	8.41E-03	1.09E+02	5.61E+03	5.72E+03
55.00	5.35E-01	5.90E-04	7.71E+00	5.49E+02	5.57E+02
65.00	1.07E+00	1.18E-03	1.55E+01	1.45E+03	1.47E+03
75.00	6.10E-01	6.73E-04	8.83E+00	1.05E+03	1.06E+03
85.00	3.41E-01	3.76E-04	4.94E+00	7.19E+02	7.24E+02
95.00	3.73E-01	4.11E-04	5.40E+00	9.41E+02	9.46E+02
125.00	1.90E-01	2.10E-04	2.76E+00	7.15E+02	7.17E+02

311.602023988962200 total grams airborne in tank
3.436391177820042E-001 total g/s out riser
3644.327636241913000 total grams lost out riser
30210.070704698560000 total grams settled on floor
34165.999111175540000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 880.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	5.56E+01	1.95E+00	6.15E+01
1.50	1.44E+01	6.39E-06	2.34E+02	5.91E+01	3.07E+02
2.50	8.53E+00	3.79E-06	1.92E+02	1.21E+02	3.21E+02
3.50	7.68E+00	3.42E-06	2.95E+02	3.16E+02	6.18E+02
4.50	4.62E+00	2.05E-06	3.84E+02	5.68E+02	9.57E+02
5.50	1.57E+00	6.96E-07	3.59E+02	6.55E+02	1.01E+03
6.50	3.11E-01	1.38E-07	2.46E+02	5.26E+02	7.72E+02
7.50	5.32E-02	2.36E-08	1.79E+02	4.43E+02	6.22E+02
8.50	8.35E-03	3.71E-09	1.46E+02	4.17E+02	5.64E+02
9.50	9.47E-04	4.21E-10	1.05E+02	3.46E+02	4.51E+02
15.00	8.20E-09	3.65E-15	7.97E+02	5.24E+03	6.04E+03
25.00	1.20E-26	5.35E-33	3.36E+02	5.58E+03	5.92E+03
35.00	0.00E+00	0.00E+00	1.63E+02	5.17E+03	5.33E+03
45.00	0.00E+00	0.00E+00	1.09E+02	5.61E+03	5.72E+03
55.00	0.00E+00	0.00E+00	7.71E+00	5.49E+02	5.57E+02
65.00	0.00E+00	0.00E+00	1.55E+01	1.45E+03	1.47E+03
75.00	0.00E+00	0.00E+00	8.83E+00	1.05E+03	1.06E+03
85.00	0.00E+00	0.00E+00	4.94E+00	7.19E+02	7.24E+02
95.00	0.00E+00	0.00E+00	5.40E+00	9.41E+02	9.46E+02
125.00	0.00E+00	0.00E+00	2.76E+00	7.15E+02	7.17E+02

41.137912924509450 total grams airborne in tank
1.829333721665597E-005 total g/s out riser
3644.470493555069000 total grams lost out riser
30480.392209768300000 total grams settled on floor
34165.999111175540000 total grams made airborne

0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 900.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	6.10E+01	2.00E+00	6.71E+01
1.50	1.85E+01	2.04E-02	2.56E+02	6.06E+01	3.35E+02
2.50	1.67E+01	1.84E-02	2.10E+02	1.24E+02	3.50E+02
3.50	2.79E+01	3.07E-02	3.22E+02	3.25E+02	6.75E+02
4.50	3.79E+01	4.18E-02	4.19E+02	5.87E+02	1.04E+03
5.50	3.55E+01	3.92E-02	3.91E+02	6.80E+02	1.11E+03
6.50	2.38E+01	2.62E-02	2.68E+02	5.51E+02	8.42E+02
7.50	1.68E+01	1.85E-02	1.95E+02	4.66E+02	6.78E+02
8.50	1.33E+01	1.46E-02	1.60E+02	4.42E+02	6.15E+02
9.50	9.23E+00	1.02E-02	1.15E+02	3.68E+02	4.92E+02
15.00	6.16E+01	6.80E-02	8.69E+02	5.66E+03	6.59E+03
25.00	2.41E+01	2.66E-02	3.66E+02	6.07E+03	6.46E+03
35.00	1.15E+01	1.26E-02	1.78E+02	5.63E+03	5.81E+03
45.00	7.62E+00	8.41E-03	1.19E+02	6.12E+03	6.24E+03
55.00	5.35E-01	5.90E-04	8.41E+00	5.99E+02	6.08E+02
65.00	1.07E+00	1.18E-03	1.69E+01	1.58E+03	1.60E+03
75.00	6.10E-01	6.73E-04	9.63E+00	1.14E+03	1.15E+03
85.00	3.41E-01	3.76E-04	5.39E+00	7.84E+02	7.90E+02
95.00	3.73E-01	4.11E-04	5.89E+00	1.03E+03	1.03E+03
125.00	1.90E-01	2.10E-04	3.02E+00	7.80E+02	7.83E+02

311.602024942636500 total grams airborne in tank
3.436391187133268E-001 total g/s out riser
3978.519032955170000 total grams lost out riser
32981.879499912260000 total grams settled on floor
37271.998817443850000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 960.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	6.10E+01	2.14E+00	6.71E+01
1.50	1.44E+01	6.39E-06	2.56E+02	6.47E+01	3.35E+02
2.50	8.53E+00	3.79E-06	2.10E+02	1.32E+02	3.50E+02
3.50	7.68E+00	3.42E-06	3.22E+02	3.45E+02	6.75E+02
4.50	4.62E+00	2.05E-06	4.19E+02	6.20E+02	1.04E+03
5.50	1.57E+00	6.96E-07	3.91E+02	7.14E+02	1.11E+03
6.50	3.11E-01	1.38E-07	2.68E+02	5.74E+02	8.42E+02
7.50	5.32E-02	2.36E-08	1.95E+02	4.83E+02	6.78E+02
8.50	8.35E-03	3.71E-09	1.60E+02	4.55E+02	6.15E+02
9.50	9.47E-04	4.21E-10	1.15E+02	3.77E+02	4.92E+02
15.00	8.20E-09	3.65E-15	8.69E+02	5.72E+03	6.59E+03
25.00	1.20E-26	5.35E-33	3.66E+02	6.09E+03	6.46E+03
35.00	0.00E+00	0.00E+00	1.78E+02	5.64E+03	5.81E+03
45.00	0.00E+00	0.00E+00	1.19E+02	6.12E+03	6.24E+03
55.00	0.00E+00	0.00E+00	8.41E+00	5.99E+02	6.08E+02
65.00	0.00E+00	0.00E+00	1.69E+01	1.59E+03	1.60E+03
75.00	0.00E+00	0.00E+00	9.63E+00	1.14E+03	1.15E+03
85.00	0.00E+00	0.00E+00	5.39E+00	7.85E+02	7.90E+02

95.00	0.00E+00	0.00E+00	5.89E+00	1.03E+03	1.03E+03
125.00	0.00E+00	0.00E+00	3.02E+00	7.80E+02	7.83E+02

41.137913878183770 total grams airborne in tank
1.829333767140332E-005 total g/s out riser
3978.661873579025000 total grams lost out riser
33252.201149940490000 total grams settled on floor
37271.998817443850000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 980.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	6.64E+01	2.19E+00	7.27E+01
1.50	1.85E+01	2.04E-02	2.79E+02	6.61E+01	3.63E+02
2.50	1.67E+01	1.84E-02	2.28E+02	1.35E+02	3.80E+02
3.50	2.79E+01	3.07E-02	3.49E+02	3.54E+02	7.31E+02
4.50	3.79E+01	4.18E-02	4.54E+02	6.39E+02	1.13E+03
5.50	3.55E+01	3.92E-02	4.24E+02	7.40E+02	1.20E+03
6.50	2.38E+01	2.62E-02	2.90E+02	5.98E+02	9.13E+02
7.50	1.68E+01	1.85E-02	2.11E+02	5.07E+02	7.35E+02
8.50	1.33E+01	1.46E-02	1.73E+02	4.80E+02	6.66E+02
9.50	9.23E+00	1.02E-02	1.25E+02	3.99E+02	5.33E+02
15.00	6.16E+01	6.80E-02	9.41E+02	6.13E+03	7.13E+03
25.00	2.41E+01	2.66E-02	3.97E+02	6.57E+03	6.99E+03
35.00	1.15E+01	1.26E-02	1.92E+02	6.10E+03	6.30E+03
45.00	7.62E+00	8.41E-03	1.29E+02	6.63E+03	6.76E+03
55.00	5.35E-01	5.90E-04	9.11E+00	6.49E+02	6.58E+02
65.00	1.07E+00	1.18E-03	1.83E+01	1.72E+03	1.74E+03
75.00	6.10E-01	6.73E-04	1.04E+01	1.24E+03	1.25E+03
85.00	3.41E-01	3.76E-04	5.84E+00	8.50E+02	8.56E+02
95.00	3.73E-01	4.11E-04	6.39E+00	1.11E+03	1.12E+03
125.00	1.90E-01	2.10E-04	3.27E+00	8.44E+02	8.48E+02

311.602024942636500 total grams airborne in tank
3.436391191789880E-001 total g/s out riser
4312.710482597351000 total grams lost out riser
35753.688352346420000 total grams settled on floor
40377.998489379880000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1040.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	6.64E+01	2.32E+00	7.27E+01
1.50	1.44E+01	6.39E-06	2.79E+02	7.02E+01	3.63E+02
2.50	8.53E+00	3.79E-06	2.28E+02	1.43E+02	3.80E+02
3.50	7.68E+00	3.42E-06	3.49E+02	3.74E+02	7.31E+02
4.50	4.62E+00	2.05E-06	4.54E+02	6.72E+02	1.13E+03
5.50	1.57E+00	6.96E-07	4.24E+02	7.74E+02	1.20E+03
6.50	3.11E-01	1.38E-07	2.90E+02	6.22E+02	9.13E+02
7.50	5.32E-02	2.36E-08	2.11E+02	5.23E+02	7.35E+02
8.50	8.35E-03	3.71E-09	1.73E+02	4.93E+02	6.66E+02
9.50	9.47E-04	4.21E-10	1.25E+02	4.08E+02	5.33E+02

15.00	8.20E-09	3.65E-15	9.41E+02	6.19E+03	7.13E+03
25.00	1.20E-26	5.35E-33	3.97E+02	6.60E+03	6.99E+03
35.00	0.00E+00	0.00E+00	1.92E+02	6.11E+03	6.30E+03
45.00	0.00E+00	0.00E+00	1.29E+02	6.63E+03	6.76E+03
55.00	0.00E+00	0.00E+00	9.11E+00	6.49E+02	6.58E+02
65.00	0.00E+00	0.00E+00	1.83E+01	1.72E+03	1.74E+03
75.00	0.00E+00	0.00E+00	1.04E+01	1.24E+03	1.25E+03
85.00	0.00E+00	0.00E+00	5.84E+00	8.50E+02	8.56E+02
95.00	0.00E+00	0.00E+00	6.39E+00	1.11E+03	1.12E+03
125.00	0.00E+00	0.00E+00	3.27E+00	8.45E+02	8.48E+02

41.137914116602350 total grams airborne in tank
1.829333767140332E-005 total g/s out riser
4312.853292703629000 total grams lost out riser
36024.009998321530000 total grams settled on floor
40377.998489379880000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1060.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	7.18E+01	2.37E+00	7.83E+01
1.50	1.85E+01	2.04E-02	3.01E+02	7.16E+01	3.91E+02
2.50	1.67E+01	1.84E-02	2.46E+02	1.46E+02	4.09E+02
3.50	2.79E+01	3.07E-02	3.76E+02	3.83E+02	7.87E+02
4.50	3.79E+01	4.18E-02	4.89E+02	6.91E+02	1.22E+03
5.50	3.55E+01	3.92E-02	4.57E+02	7.99E+02	1.29E+03
6.50	2.38E+01	2.62E-02	3.13E+02	6.46E+02	9.83E+02
7.50	1.68E+01	1.85E-02	2.28E+02	5.47E+02	7.91E+02
8.50	1.33E+01	1.46E-02	1.86E+02	5.18E+02	7.17E+02
9.50	9.23E+00	1.02E-02	1.34E+02	4.31E+02	5.74E+02
15.00	6.16E+01	6.80E-02	1.01E+03	6.61E+03	7.68E+03
25.00	2.41E+01	2.66E-02	4.27E+02	7.08E+03	7.53E+03
35.00	1.15E+01	1.26E-02	2.07E+02	6.56E+03	6.78E+03
45.00	7.62E+00	8.41E-03	1.39E+02	7.14E+03	7.28E+03
55.00	5.35E-01	5.90E-04	9.81E+00	6.98E+02	7.09E+02
65.00	1.07E+00	1.18E-03	1.97E+01	1.85E+03	1.87E+03
75.00	6.10E-01	6.73E-04	1.12E+01	1.33E+03	1.34E+03
85.00	3.41E-01	3.76E-04	6.29E+00	9.15E+02	9.22E+02
95.00	3.73E-01	4.11E-04	6.88E+00	1.20E+03	1.20E+03
125.00	1.90E-01	2.10E-04	3.52E+00	9.09E+02	9.13E+02

311.602024942636500 total grams airborne in tank
3.436391191789880E-001 total g/s out riser
4646.901915073395000 total grams lost out riser
38525.497200965880000 total grams settled on floor
43483.998191833500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1120.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	7.18E+01	2.51E+00	7.83E+01
1.50	1.44E+01	6.39E-06	3.01E+02	7.57E+01	3.91E+02

2.50	8.53E+00	3.79E-06	2.46E+02	1.54E+02	4.09E+02
3.50	7.68E+00	3.42E-06	3.76E+02	4.03E+02	7.87E+02
4.50	4.62E+00	2.05E-06	4.89E+02	7.24E+02	1.22E+03
5.50	1.57E+00	6.96E-07	4.57E+02	8.33E+02	1.29E+03
6.50	3.11E-01	1.38E-07	3.13E+02	6.70E+02	9.83E+02
7.50	5.32E-02	2.36E-08	2.28E+02	5.64E+02	7.91E+02
8.50	8.35E-03	3.71E-09	1.86E+02	5.31E+02	7.17E+02
9.50	9.47E-04	4.21E-10	1.34E+02	4.40E+02	5.74E+02
15.00	8.20E-09	3.65E-15	1.01E+03	6.67E+03	7.68E+03
25.00	1.20E-26	5.35E-33	4.27E+02	7.10E+03	7.53E+03
35.00	0.00E+00	0.00E+00	2.07E+02	6.58E+03	6.78E+03
45.00	0.00E+00	0.00E+00	1.39E+02	7.14E+03	7.28E+03
55.00	0.00E+00	0.00E+00	9.81E+00	6.99E+02	7.09E+02
65.00	0.00E+00	0.00E+00	1.97E+01	1.85E+03	1.87E+03
75.00	0.00E+00	0.00E+00	1.12E+01	1.33E+03	1.34E+03
85.00	0.00E+00	0.00E+00	6.29E+00	9.16E+02	9.22E+02
95.00	0.00E+00	0.00E+00	6.88E+00	1.20E+03	1.20E+03
125.00	0.00E+00	0.00E+00	3.52E+00	9.10E+02	9.13E+02

41.137914116602350 total grams airborne in tank
1.829333767140332E-005 total g/s out riser
4647.044704198837000 total grams lost out riser
38795.818877696990000 total grams settled on floor
43483.998191833500000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1140.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	7.72E+01	2.55E+00	8.39E+01
1.50	1.85E+01	2.04E-02	3.24E+02	7.72E+01	4.19E+02
2.50	1.67E+01	1.84E-02	2.64E+02	1.57E+02	4.38E+02
3.50	2.79E+01	3.07E-02	4.04E+02	4.12E+02	8.43E+02
4.50	3.79E+01	4.18E-02	5.24E+02	7.42E+02	1.30E+03
5.50	3.55E+01	3.92E-02	4.89E+02	8.59E+02	1.38E+03
6.50	2.38E+01	2.62E-02	3.35E+02	6.94E+02	1.05E+03
7.50	1.68E+01	1.85E-02	2.44E+02	5.87E+02	8.48E+02
8.50	1.33E+01	1.46E-02	2.00E+02	5.56E+02	7.69E+02
9.50	9.23E+00	1.02E-02	1.44E+02	4.62E+02	6.15E+02
15.00	6.16E+01	6.80E-02	1.09E+03	7.08E+03	8.23E+03
25.00	2.41E+01	2.66E-02	4.58E+02	7.59E+03	8.07E+03
35.00	1.15E+01	1.26E-02	2.22E+02	7.03E+03	7.27E+03
45.00	7.62E+00	8.41E-03	1.49E+02	7.65E+03	7.80E+03
55.00	5.35E-01	5.90E-04	1.05E+01	7.48E+02	7.59E+02
65.00	1.07E+00	1.18E-03	2.12E+01	1.98E+03	2.00E+03
75.00	6.10E-01	6.73E-04	1.20E+01	1.43E+03	1.44E+03
85.00	3.41E-01	3.76E-04	6.73E+00	9.81E+02	9.88E+02
95.00	3.73E-01	4.11E-04	7.37E+00	1.28E+03	1.29E+03
125.00	1.90E-01	2.10E-04	3.77E+00	9.74E+02	9.78E+02

311.602024942636500 total grams airborne in tank
3.436391191789880E-001 total g/s out riser
4981.093297958374000 total grams lost out riser
41297.306064844130000 total grams settled on floor
46589.998382568360000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1200.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	7.72E+01	2.69E+00	8.39E+01
1.50	1.44E+01	6.39E-06	3.24E+02	8.13E+01	4.19E+02
2.50	8.53E+00	3.79E-06	2.64E+02	1.65E+02	4.38E+02
3.50	7.68E+00	3.42E-06	4.04E+02	4.32E+02	8.43E+02
4.50	4.62E+00	2.05E-06	5.24E+02	7.76E+02	1.30E+03
5.50	1.57E+00	6.96E-07	4.89E+02	8.93E+02	1.38E+03
6.50	3.11E-01	1.38E-07	3.35E+02	7.18E+02	1.05E+03
7.50	5.32E-02	2.36E-08	2.44E+02	6.04E+02	8.48E+02
8.50	8.35E-03	3.71E-09	2.00E+02	5.69E+02	7.69E+02
9.50	9.47E-04	4.21E-10	1.44E+02	4.71E+02	6.15E+02
15.00	8.20E-09	3.65E-15	1.09E+03	7.15E+03	8.23E+03
25.00	1.20E-26	5.35E-33	4.58E+02	7.61E+03	8.07E+03
35.00	0.00E+00	0.00E+00	2.22E+02	7.05E+03	7.27E+03
45.00	0.00E+00	0.00E+00	1.49E+02	7.65E+03	7.80E+03
55.00	0.00E+00	0.00E+00	1.05E+01	7.49E+02	7.59E+02
65.00	0.00E+00	0.00E+00	2.12E+01	1.98E+03	2.00E+03
75.00	0.00E+00	0.00E+00	1.20E+01	1.43E+03	1.44E+03
85.00	0.00E+00	0.00E+00	6.73E+00	9.81E+02	9.88E+02
95.00	0.00E+00	0.00E+00	7.37E+00	1.28E+03	1.29E+03
125.00	0.00E+00	0.00E+00	3.77E+00	9.75E+02	9.78E+02

41.137914116602350 total grams airborne in tank
1.829333767140332E-005 total g/s out riser
4981.236184358597000 total grams lost out riser
41567.627726316450000 total grams settled on floor
46589.998382568360000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1220.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	8.26E+01	2.74E+00	8.95E+01
1.50	1.85E+01	2.04E-02	3.46E+02	8.27E+01	4.47E+02
2.50	1.67E+01	1.84E-02	2.82E+02	1.68E+02	4.67E+02
3.50	2.79E+01	3.07E-02	4.31E+02	4.41E+02	8.99E+02
4.50	3.79E+01	4.18E-02	5.59E+02	7.94E+02	1.39E+03
5.50	3.55E+01	3.92E-02	5.22E+02	9.19E+02	1.48E+03
6.50	2.38E+01	2.62E-02	3.57E+02	7.42E+02	1.12E+03
7.50	1.68E+01	1.85E-02	2.60E+02	6.27E+02	9.04E+02
8.50	1.33E+01	1.46E-02	2.13E+02	5.94E+02	8.20E+02
9.50	9.23E+00	1.02E-02	1.53E+02	4.93E+02	6.56E+02
15.00	6.16E+01	6.80E-02	1.16E+03	7.56E+03	8.78E+03
25.00	2.41E+01	2.66E-02	4.88E+02	8.09E+03	8.61E+03
35.00	1.15E+01	1.26E-02	2.37E+02	7.50E+03	7.75E+03
45.00	7.62E+00	8.41E-03	1.59E+02	8.16E+03	8.32E+03
55.00	5.35E-01	5.90E-04	1.12E+01	7.98E+02	8.10E+02
65.00	1.07E+00	1.18E-03	2.26E+01	2.11E+03	2.14E+03
75.00	6.10E-01	6.73E-04	1.28E+01	1.52E+03	1.54E+03
85.00	3.41E-01	3.76E-04	7.18E+00	1.05E+03	1.05E+03
95.00	3.73E-01	4.11E-04	7.86E+00	1.37E+03	1.38E+03
125.00	1.90E-01	2.10E-04	4.02E+00	1.04E+03	1.04E+03

311.602024942636500 total grams airborne in tank
3.436391191789880E-001 total g/s out riser
5315.284715175629000 total grams lost out riser
44069.114913702010000 total grams settled on floor
49695.999061584470000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1280.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	8.26E+01	2.88E+00	8.95E+01
1.50	1.44E+01	6.39E-06	3.46E+02	8.68E+01	4.47E+02
2.50	8.53E+00	3.79E-06	2.82E+02	1.77E+02	4.67E+02
3.50	7.68E+00	3.42E-06	4.31E+02	4.61E+02	8.99E+02
4.50	4.62E+00	2.05E-06	5.59E+02	8.28E+02	1.39E+03
5.50	1.57E+00	6.96E-07	5.22E+02	9.53E+02	1.48E+03
6.50	3.11E-01	1.38E-07	3.57E+02	7.65E+02	1.12E+03
7.50	5.32E-02	2.36E-08	2.60E+02	6.44E+02	9.04E+02
8.50	8.35E-03	3.71E-09	2.13E+02	6.07E+02	8.20E+02
9.50	9.47E-04	4.21E-10	1.53E+02	5.03E+02	6.56E+02
15.00	8.20E-09	3.65E-15	1.16E+03	7.62E+03	8.78E+03
25.00	1.20E-26	5.35E-33	4.88E+02	8.12E+03	8.61E+03
35.00	0.00E+00	0.00E+00	2.37E+02	7.52E+03	7.75E+03
45.00	0.00E+00	0.00E+00	1.59E+02	8.17E+03	8.32E+03
55.00	0.00E+00	0.00E+00	1.12E+01	7.99E+02	8.10E+02
65.00	0.00E+00	0.00E+00	2.26E+01	2.11E+03	2.14E+03
75.00	0.00E+00	0.00E+00	1.28E+01	1.52E+03	1.54E+03
85.00	0.00E+00	0.00E+00	7.18E+00	1.05E+03	1.05E+03
95.00	0.00E+00	0.00E+00	7.86E+00	1.37E+03	1.38E+03
125.00	0.00E+00	0.00E+00	4.02E+00	1.04E+03	1.04E+03

41.137914116602350 total grams airborne in tank
1.829333767140332E-005 total g/s out riser
5315.427557468414000 total grams lost out riser
44339.436506271360000 total grams settled on floor
49695.999061584470000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1300.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	8.80E+01	2.92E+00	9.50E+01
1.50	1.85E+01	2.04E-02	3.68E+02	8.82E+01	4.75E+02
2.50	1.67E+01	1.84E-02	3.00E+02	1.80E+02	4.96E+02
3.50	2.79E+01	3.07E-02	4.58E+02	4.70E+02	9.56E+02
4.50	3.79E+01	4.18E-02	5.94E+02	8.46E+02	1.48E+03
5.50	3.55E+01	3.92E-02	5.55E+02	9.78E+02	1.57E+03
6.50	2.38E+01	2.62E-02	3.80E+02	7.90E+02	1.19E+03
7.50	1.68E+01	1.85E-02	2.76E+02	6.68E+02	9.61E+02
8.50	1.33E+01	1.46E-02	2.26E+02	6.32E+02	8.71E+02
9.50	9.23E+00	1.02E-02	1.63E+02	5.25E+02	6.97E+02
15.00	6.16E+01	6.80E-02	1.23E+03	8.04E+03	9.33E+03
25.00	2.41E+01	2.66E-02	5.19E+02	8.60E+03	9.15E+03

35.00	1.15E+01	1.26E-02	2.52E+02	7.97E+03	8.24E+03
45.00	7.62E+00	8.41E-03	1.69E+02	8.67E+03	8.84E+03
55.00	5.35E-01	5.90E-04	1.19E+01	8.48E+02	8.61E+02
65.00	1.07E+00	1.18E-03	2.40E+01	2.25E+03	2.27E+03
75.00	6.10E-01	6.73E-04	1.36E+01	1.62E+03	1.63E+03
85.00	3.41E-01	3.76E-04	7.63E+00	1.11E+03	1.12E+03
95.00	3.73E-01	4.11E-04	8.35E+00	1.45E+03	1.46E+03
125.00	1.90E-01	2.10E-04	4.27E+00	1.10E+03	1.11E+03

311.602024942636500 total grams airborne in tank
3.436391191789880E-001 total g/s out riser
5649.476119995117000 total grams lost out riser
46840.923586845400000 total grams settled on floor
52801.998275756840000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1360.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	8.80E+01	3.06E+00	9.50E+01
1.50	1.44E+01	6.39E-06	3.68E+02	9.24E+01	4.75E+02
2.50	8.53E+00	3.79E-06	3.00E+02	1.88E+02	4.96E+02
3.50	7.68E+00	3.42E-06	4.58E+02	4.90E+02	9.56E+02
4.50	4.62E+00	2.05E-06	5.94E+02	8.79E+02	1.48E+03
5.50	1.57E+00	6.96E-07	5.55E+02	1.01E+03	1.57E+03
6.50	3.11E-01	1.38E-07	3.80E+02	8.13E+02	1.19E+03
7.50	5.32E-02	2.36E-08	2.76E+02	6.84E+02	9.61E+02
8.50	8.35E-03	3.71E-09	2.26E+02	6.45E+02	8.71E+02
9.50	9.47E-04	4.21E-10	1.63E+02	5.34E+02	6.97E+02
15.00	8.20E-09	3.65E-15	1.23E+03	8.10E+03	9.33E+03
25.00	1.20E-26	5.35E-33	5.19E+02	8.63E+03	9.15E+03
35.00	0.00E+00	0.00E+00	2.52E+02	7.99E+03	8.24E+03
45.00	0.00E+00	0.00E+00	1.69E+02	8.68E+03	8.84E+03
55.00	0.00E+00	0.00E+00	1.19E+01	8.49E+02	8.61E+02
65.00	0.00E+00	0.00E+00	2.40E+01	2.25E+03	2.27E+03
75.00	0.00E+00	0.00E+00	1.36E+01	1.62E+03	1.63E+03
85.00	0.00E+00	0.00E+00	7.63E+00	1.11E+03	1.12E+03
95.00	0.00E+00	0.00E+00	8.35E+00	1.45E+03	1.46E+03
125.00	0.00E+00	0.00E+00	4.27E+00	1.10E+03	1.11E+03

41.137914116602350 total grams airborne in tank
1.829333767140332E-005 total g/s out riser
5649.619021892548000 total grams lost out riser
47111.244462251660000 total grams settled on floor
52801.998275756840000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1380.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	9.34E+01	3.11E+00	1.01E+02
1.50	1.85E+01	2.04E-02	3.91E+02	9.38E+01	5.03E+02
2.50	1.67E+01	1.84E-02	3.18E+02	1.91E+02	5.26E+02
3.50	2.79E+01	3.07E-02	4.85E+02	4.99E+02	1.01E+03

4.50	3.79E+01	4.18E-02	6.30E+02	8.98E+02	1.57E+03
5.50	3.55E+01	3.92E-02	5.87E+02	1.04E+03	1.66E+03
6.50	2.38E+01	2.62E-02	4.02E+02	8.38E+02	1.26E+03
7.50	1.68E+01	1.85E-02	2.93E+02	7.08E+02	1.02E+03
8.50	1.33E+01	1.46E-02	2.40E+02	6.70E+02	9.22E+02
9.50	9.23E+00	1.02E-02	1.73E+02	5.56E+02	7.38E+02
15.00	6.16E+01	6.80E-02	1.30E+03	8.51E+03	9.88E+03
25.00	2.41E+01	2.66E-02	5.49E+02	9.11E+03	9.68E+03
35.00	1.15E+01	1.26E-02	2.66E+02	8.44E+03	8.72E+03
45.00	7.62E+00	8.41E-03	1.79E+02	9.18E+03	9.36E+03
55.00	5.35E-01	5.90E-04	1.26E+01	8.98E+02	9.11E+02
65.00	1.07E+00	1.18E-03	2.54E+01	2.38E+03	2.40E+03
75.00	6.10E-01	6.73E-04	1.44E+01	1.71E+03	1.73E+03
85.00	3.41E-01	3.76E-04	8.08E+00	1.18E+03	1.19E+03
95.00	3.73E-01	4.11E-04	8.84E+00	1.54E+03	1.55E+03
125.00	1.90E-01	2.10E-04	4.52E+00	1.17E+03	1.17E+03

311.602024942636500 total grams airborne in tank
3.436391191789880E-001 total g/s out riser
5983.667597770691000 total grams lost out riser
49612.732000589370000 total grams settled on floor
55907.997978210450000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1440.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	9.34E+01	3.25E+00	1.01E+02
1.50	1.44E+01	6.39E-06	3.91E+02	9.79E+01	5.03E+02
2.50	8.53E+00	3.79E-06	3.18E+02	1.99E+02	5.26E+02
3.50	7.68E+00	3.42E-06	4.86E+02	5.19E+02	1.01E+03
4.50	4.62E+00	2.05E-06	6.30E+02	9.31E+02	1.57E+03
5.50	1.57E+00	6.96E-07	5.87E+02	1.07E+03	1.66E+03
6.50	3.11E-01	1.38E-07	4.02E+02	8.61E+02	1.26E+03
7.50	5.32E-02	2.36E-08	2.93E+02	7.25E+02	1.02E+03
8.50	8.35E-03	3.71E-09	2.40E+02	6.83E+02	9.22E+02
9.50	9.47E-04	4.21E-10	1.73E+02	5.65E+02	7.38E+02
15.00	8.20E-09	3.65E-15	1.30E+03	8.58E+03	9.88E+03
25.00	1.20E-26	5.35E-33	5.49E+02	9.13E+03	9.68E+03
35.00	0.00E+00	0.00E+00	2.66E+02	8.46E+03	8.72E+03
45.00	0.00E+00	0.00E+00	1.79E+02	9.19E+03	9.36E+03
55.00	0.00E+00	0.00E+00	1.26E+01	8.99E+02	9.11E+02
65.00	0.00E+00	0.00E+00	2.54E+01	2.38E+03	2.40E+03
75.00	0.00E+00	0.00E+00	1.44E+01	1.71E+03	1.73E+03
85.00	0.00E+00	0.00E+00	8.08E+00	1.18E+03	1.19E+03
95.00	0.00E+00	0.00E+00	8.84E+00	1.54E+03	1.55E+03
125.00	0.00E+00	0.00E+00	4.52E+00	1.17E+03	1.17E+03

41.137914116602350 total grams airborne in tank
1.829333767140332E-005 total g/s out riser
5983.810562610626000 total grams lost out riser
49883.052357196810000 total grams settled on floor
55907.997978210450000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1460.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.14E+00	4.56E-03	9.88E+01	3.29E+00	1.06E+02
1.50	1.85E+01	2.04E-02	4.13E+02	9.93E+01	5.31E+02
2.50	1.67E+01	1.84E-02	3.36E+02	2.02E+02	5.55E+02
3.50	2.79E+01	3.07E-02	5.13E+02	5.28E+02	1.07E+03
4.50	3.79E+01	4.18E-02	6.65E+02	9.50E+02	1.65E+03
5.50	3.55E+01	3.92E-02	6.20E+02	1.10E+03	1.75E+03
6.50	2.38E+01	2.62E-02	4.24E+02	8.86E+02	1.33E+03
7.50	1.68E+01	1.85E-02	3.09E+02	7.48E+02	1.07E+03
8.50	1.33E+01	1.46E-02	2.53E+02	7.08E+02	9.74E+02
9.50	9.23E+00	1.02E-02	1.82E+02	5.88E+02	7.79E+02
15.00	6.16E+01	6.80E-02	1.38E+03	8.99E+03	1.04E+04
25.00	2.41E+01	2.66E-02	5.80E+02	9.62E+03	1.02E+04
35.00	1.15E+01	1.26E-02	2.81E+02	8.91E+03	9.21E+03
45.00	7.62E+00	8.41E-03	1.89E+02	9.69E+03	9.88E+03
55.00	5.35E-01	5.90E-04	1.33E+01	9.48E+02	9.62E+02
65.00	1.07E+00	1.18E-03	2.68E+01	2.51E+03	2.54E+03
75.00	6.10E-01	6.73E-04	1.53E+01	1.81E+03	1.82E+03
85.00	3.41E-01	3.76E-04	8.53E+00	1.24E+03	1.25E+03
95.00	3.73E-01	4.11E-04	9.33E+00	1.62E+03	1.63E+03
125.00	1.90E-01	2.10E-04	4.77E+00	1.23E+03	1.24E+03

311.602024942636500 total grams airborne in tank
3.436391191789880E-001 total g/s out riser
6317.858972549438000 total grams lost out riser
52384.539872646330000 total grams settled on floor
59013.997650146480000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 1520.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.99E+00	1.78E-06	9.88E+01	3.43E+00	1.06E+02
1.50	1.44E+01	6.39E-06	4.13E+02	1.03E+02	5.31E+02
2.50	8.53E+00	3.79E-06	3.36E+02	2.10E+02	5.55E+02
3.50	7.68E+00	3.42E-06	5.13E+02	5.48E+02	1.07E+03
4.50	4.62E+00	2.05E-06	6.65E+02	9.83E+02	1.65E+03
5.50	1.57E+00	6.96E-07	6.20E+02	1.13E+03	1.75E+03
6.50	3.11E-01	1.38E-07	4.24E+02	9.09E+02	1.33E+03
7.50	5.32E-02	2.36E-08	3.09E+02	7.65E+02	1.07E+03
8.50	8.35E-03	3.71E-09	2.53E+02	7.21E+02	9.74E+02
9.50	9.47E-04	4.21E-10	1.82E+02	5.97E+02	7.79E+02
15.00	8.20E-09	3.65E-15	1.38E+03	9.05E+03	1.04E+04
25.00	1.20E-26	5.35E-33	5.80E+02	9.64E+03	1.02E+04
35.00	0.00E+00	0.00E+00	2.81E+02	8.93E+03	9.21E+03
45.00	0.00E+00	0.00E+00	1.89E+02	9.70E+03	9.88E+03
55.00	0.00E+00	0.00E+00	1.33E+01	9.49E+02	9.62E+02
65.00	0.00E+00	0.00E+00	2.68E+01	2.51E+03	2.54E+03
75.00	0.00E+00	0.00E+00	1.53E+01	1.81E+03	1.82E+03
85.00	0.00E+00	0.00E+00	8.53E+00	1.24E+03	1.25E+03
95.00	0.00E+00	0.00E+00	9.33E+00	1.63E+03	1.63E+03
125.00	0.00E+00	0.00E+00	4.77E+00	1.23E+03	1.24E+03

41.137914116602350 total grams airborne in tank

```
1.829333767140332E-005 total g/s out riser
  6318.001965999603000 total grams lost out riser
 52654.860282659530000 total grams settled on floor
 59013.997650146480000 total grams made airborne
0.000000000000000E+000 total grams bypassed
```

Table 4. Comparison of Aerosols With and Without Bypass Fraction
(IL=2100 cfm, PR=1 in./min. for all cases)

WH (in.)	Distance to Riser (m)	Bypass Fraction	Aerosol w/Bypass (g)	Aerosol No Bypass (g)	Percent Increase w/Bypass
500,000 gallon tank					
19.0	5.0874	0.0119	249.4	215.5	13.5926
76.0	3.6397	0.0166	943.7	802.3	14.9836
140.0	2.0142	0.0301	2301.9	1794.9	22.0253
171.0	1.2268	0.0494	4210.2	2976.3	29.3074
181.8	0.9525	0.0636	4882.6	3213.0	34.1949
750,000 gallon tank					
19.0	7.3974	0.0082	211.5	187.5	11.3475
95.0	5.4671	0.0111	1450.5	1292.4	10.8997
171.0	3.5368	0.0171	3049.8	2616.5	14.2075
266.0	1.1239	0.0539	6693.7	4597.7	31.3130
272.7	0.9538	0.0635	7263.8	4808.0	33.8088
1,000,000 gallon tank					
19.0	9.7074	0.0062	183.0	164.7	10.0000
133.0	6.8120	0.0089	2111.3	1935.0	8.3503
247.0	3.9165	0.0155	4259.3	3690.7	13.3496
361.0	1.0210	0.0594	9448.1	6318.0	33.1294
363.6	0.9550	0.0635	9917.4	6556.8	33.8859

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

177B

ADDITIONAL PARAMETERS:

```
particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     4636.660000000000000
bypass fraction =   6.200000000000000E-003

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000


Flow out @    0.000000E+00 min =     2480.000000 cfm &      155.300000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m
```

**** OUTPUT @ 20.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.79E+00	1.24E-03	7.97E-01	6.54E-03	5.56E+00
1.50	2.38E+01	6.14E-03	3.96E+00	2.40E-01	2.78E+01
2.50	2.44E+01	6.32E-03	4.10E+00	6.60E-01	2.90E+01
3.50	4.60E+01	1.19E-02	7.78E+00	2.41E+00	5.59E+01
4.50	6.92E+01	1.79E-02	1.18E+01	5.98E+00	8.64E+01
5.50	7.08E+01	1.84E-02	1.23E+01	9.18E+00	9.17E+01
6.50	5.17E+01	1.34E-02	9.08E+00	9.44E+00	6.98E+01
7.50	3.97E+01	1.03E-02	7.09E+00	9.77E+00	5.62E+01
8.50	3.41E+01	8.87E-03	6.22E+00	1.09E+01	5.09E+01
9.50	2.57E+01	6.70E-03	4.79E+00	1.05E+01	4.07E+01
15.00	2.33E+02	6.16E-02	4.99E+01	2.66E+02	5.45E+02
25.00	1.04E+02	2.91E-02	2.89E+01	4.05E+02	5.35E+02
35.00	4.97E+01	1.51E-02	1.65E+01	4.18E+02	4.82E+02
45.00	3.31E+01	1.10E-02	1.26E+01	4.75E+02	5.17E+02
55.00	2.32E+00	8.48E-04	9.85E-01	4.73E+01	5.03E+01
65.00	4.66E+00	1.87E-03	2.19E+00	1.27E+02	1.33E+02
75.00	2.65E+00	1.16E-03	1.38E+00	9.19E+01	9.54E+01
85.00	1.48E+00	7.14E-04	8.47E-01	6.35E+01	6.54E+01
95.00	1.62E+00	8.53E-04	1.01E+00	8.34E+01	8.55E+01
125.00	8.27E-01	5.46E-04	6.52E-01	6.37E+01	6.48E+01

```
   823.458643674850500 total grams airborne in tank
 2.239125518244691E-001 total g/s out riser
   182.868957638740500 total grams lost out riser
  2099.672458080575000 total grams settled on floor
  3086.742866516113000 total grams made airborne
    19.257200416177510 total grams bypassed
```

**** OUTPUT @ 80.000000000000000 minutes ****

diam	airborne	outflow	totalout	totalflr	source

mcrn	g	g/s	g	g	g
.50	4.75E+00	4.83E-07	7.98E-01	4.38E-02	5.56E+00
1.50	2.24E+01	2.28E-06	3.97E+00	1.57E+00	2.78E+01
2.50	2.10E+01	2.13E-06	4.11E+00	4.13E+00	2.90E+01
3.50	3.43E+01	3.49E-06	7.80E+00	1.41E+01	5.59E+01
4.50	4.27E+01	4.35E-06	1.18E+01	3.24E+01	8.64E+01
5.50	3.47E+01	3.53E-06	1.23E+01	4.53E+01	9.17E+01
6.50	1.91E+01	1.95E-06	9.09E+00	4.20E+01	6.98E+01
7.50	1.06E+01	1.08E-06	7.10E+00	3.88E+01	5.62E+01
8.50	6.31E+00	6.42E-07	6.22E+00	3.87E+01	5.09E+01
9.50	3.14E+00	3.20E-07	4.79E+00	3.31E+01	4.07E+01
15.00	1.28E+00	1.30E-07	4.99E+01	4.98E+02	5.45E+02
25.00	5.87E-05	5.97E-12	2.89E+01	5.09E+02	5.35E+02
35.00	2.97E-11	3.02E-18	1.65E+01	4.68E+02	4.82E+02
45.00	3.60E-19	3.67E-26	1.26E+01	5.08E+02	5.17E+02
55.00	3.47E-28	3.53E-35	9.85E-01	4.96E+01	5.03E+01
65.00	9.60E-37	9.81E-44	2.19E+00	1.31E+02	1.33E+02
75.00	0.00E+00	0.00E+00	1.38E+00	9.46E+01	9.54E+01
85.00	0.00E+00	0.00E+00	8.47E-01	6.50E+01	6.54E+01
95.00	0.00E+00	0.00E+00	1.01E+00	8.50E+01	8.55E+01
125.00	0.00E+00	0.00E+00	6.52E-01	6.46E+01	6.48E+01

200.278461965274500 total grams airborne in tank
2.038552601846569E-005 total g/s out riser
182.990684807300600 total grams lost out riser
2722.730909489095000 total grams settled on floor
3086.742866516113000 total grams made airborne
19.257200416177510 total grams bypassed

Table 4. Comparison of Aerosols With and Without Bypass Fraction
(IL=2100 cfm, PR=1 in./min. for all cases)

WH (in.)	Distance to Riser (m)	Bypass Fraction	Aerosol w/Bypass (g)	Aerosol No Bypass (g)	Percent Increase w/Bypass
500,000 gallon tank					
19.0	5.0874	0.0119	249.4	215.5	13.5926
76.0	3.6397	0.0166	943.7	802.3	14.9836
140.0	2.0142	0.0301	2301.9	1794.9	22.0253
171.0	1.2268	0.0494	4210.2	2976.3	29.3074
181.8	0.9525	0.0636	4882.6	3213.0	34.1949
750,000 gallon tank					
19.0	7.3974	0.0082	211.5	187.5	11.3475
95.0	5.4671	0.0111	1450.5	1292.4	10.8997
171.0	3.5368	0.0171	3049.8	2616.5	14.2075
266.0	1.1239	0.0539	6693.7	4597.7	31.3130
272.7	0.9538	0.0635	7263.8	4808.0	33.8088
1,000,000 gallon tank					
19.0	9.7074	0.0062	183.0	164.7	10.0000
133.0	6.8120	0.0089	2111.3	1935.0	8.3503
247.0	3.9165	0.0155	4259.3	3690.7	13.3496
361.0	1.0210	0.0594	9448.1	6318.0	33.1294
363.6	0.9550	0.0635	9917.4	6556.8	33.8859

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

178B

ADDITIONAL PARAMETERS:

```
particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     3427.500000000000000
bypass fraction =   8.900000000000000E-003

Output divisions in Period      1.000000000000000 =        1.000000
Output divisions in Period      2.000000000000000 =        1.000000
Output divisions in Period      3.000000000000000 =        1.000000
Output divisions in Period      4.000000000000000 =        1.000000
Output divisions in Period      5.000000000000000 =        1.000000
Output divisions in Period      6.000000000000000 =        1.000000
Output divisions in Period      7.000000000000000 =        1.000000
Output divisions in Period      8.000000000000000 =        1.000000
Output divisions in Period      9.000000000000000 =        1.000000
Output divisions in Period     10.000000000000000 =        1.000000
Output divisions in Period     11.000000000000000 =        1.000000
Output divisions in Period     12.000000000000000 =        1.000000
Output divisions in Period     13.000000000000000 =        1.000000
Output divisions in Period     14.000000000000000 =        1.000000


Flow out @    0.000000E+00 min =     2480.000000 cfm &      155.300000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      100.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      180.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      240.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      220.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      280.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      340.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      420.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      500.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m


**** OUTPUT @       20.000000000000000 minutes ****
```

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.54E+00	1.59E-03	1.04E+00	8.54E-03	5.54E+00
1.50	2.25E+01	7.88E-03	5.18E+00	3.13E-01	2.77E+01
2.50	2.30E+01	8.07E-03	5.35E+00	8.57E-01	2.89E+01
3.50	4.30E+01	1.51E-02	1.01E+01	3.11E+00	5.57E+01
4.50	6.40E+01	2.25E-02	1.53E+01	7.67E+00	8.62E+01
5.50	6.48E+01	2.28E-02	1.57E+01	1.17E+01	9.14E+01
6.50	4.67E+01	1.65E-02	1.15E+01	1.19E+01	6.96E+01
7.50	3.54E+01	1.25E-02	8.94E+00	1.22E+01	5.60E+01

8.50	2.99E+01	1.06E-02	7.76E+00	1.36E+01	5.08E+01
9.50	2.22E+01	7.90E-03	5.92E+00	1.28E+01	4.06E+01
15.00	1.85E+02	6.72E-02	5.83E+01	3.06E+02	5.44E+02
25.00	7.72E+01	3.04E-02	3.19E+01	4.29E+02	5.33E+02
35.00	3.67E+01	1.61E-02	1.82E+01	4.30E+02	4.80E+02
45.00	2.44E+01	1.22E-02	1.42E+01	4.82E+02	5.16E+02
55.00	1.71E+00	9.60E-04	1.13E+00	4.78E+01	5.02E+01
65.00	3.44E+00	2.16E-03	2.56E+00	1.28E+02	1.32E+02
75.00	1.95E+00	1.38E-03	1.64E+00	9.24E+01	9.51E+01
85.00	1.09E+00	8.61E-04	1.03E+00	6.37E+01	6.53E+01
95.00	1.19E+00	1.05E-03	1.25E+00	8.36E+01	8.53E+01
125.00	6.10E-01	6.92E-04	8.28E-01	6.38E+01	6.46E+01

689.159526467323300 total grams airborne in tank
2.583713602507487E-001 total g/s out riser
217.726280152797700 total grams lost out riser
2199.114286343567000 total grams settled on floor
3078.356624126434000 total grams made airborne
27.643400277942420 total grams bypassed

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.49E+00	6.18E-07	1.05E+00	5.62E-02	5.54E+00
1.50	2.08E+01	2.86E-06	5.19E+00	2.00E+00	2.77E+01
2.50	1.87E+01	2.57E-06	5.36E+00	5.16E+00	2.89E+01
3.50	2.89E+01	3.97E-06	1.01E+01	1.72E+01	5.57E+01
4.50	3.34E+01	4.60E-06	1.53E+01	3.83E+01	8.62E+01
5.50	2.47E+01	3.40E-06	1.57E+01	5.19E+01	9.14E+01
6.50	1.22E+01	1.68E-06	1.16E+01	4.64E+01	6.96E+01
7.50	5.95E+00	8.20E-07	8.95E+00	4.16E+01	5.60E+01
8.50	3.06E+00	4.21E-07	7.77E+00	4.04E+01	5.08E+01
9.50	1.29E+00	1.78E-07	5.92E+00	3.38E+01	4.06E+01
15.00	1.62E-01	2.23E-08	5.83E+01	4.90E+02	5.44E+02
25.00	2.71E-07	3.74E-14	3.19E+01	5.06E+02	5.33E+02
35.00	1.07E-15	1.47E-22	1.82E+01	4.66E+02	4.80E+02
45.00	2.41E-26	3.32E-33	1.42E+01	5.06E+02	5.16E+02
55.00	3.91E-38	5.61E-45	1.13E+00	4.95E+01	5.02E+01
65.00	0.00E+00	0.00E+00	2.56E+00	1.31E+02	1.32E+02
75.00	0.00E+00	0.00E+00	1.64E+00	9.43E+01	9.51E+01
85.00	0.00E+00	0.00E+00	1.03E+00	6.48E+01	6.53E+01
95.00	0.00E+00	0.00E+00	1.25E+00	8.48E+01	8.53E+01
125.00	0.00E+00	0.00E+00	8.28E-01	6.44E+01	6.46E+01

153.494337710968700 total grams airborne in tank
2.113527063059451E-005 total g/s out riser
217.857107698917400 total grams lost out riser
2734.648646723479000 total grams settled on floor
3078.356624126434000 total grams made airborne
27.643400277942420 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g

.50	7.51E+00	2.61E-03	3.60E+00	7.77E-02	1.11E+01
1.50	3.59E+01	1.25E-02	1.73E+01	2.75E+00	5.54E+01
2.50	3.46E+01	1.20E-02	1.68E+01	7.04E+00	5.79E+01
3.50	5.98E+01	2.08E-02	2.94E+01	2.33E+01	1.11E+02
4.50	8.19E+01	2.86E-02	4.07E+01	5.14E+01	1.72E+02
5.50	7.67E+01	2.69E-02	3.86E+01	6.92E+01	1.83E+02
6.50	5.19E+01	1.82E-02	2.65E+01	6.20E+01	1.39E+02
7.50	3.75E+01	1.32E-02	1.94E+01	5.61E+01	1.12E+02
8.50	3.09E+01	1.09E-02	1.63E+01	5.54E+01	1.02E+02
9.50	2.26E+01	8.01E-03	1.21E+01	4.73E+01	8.13E+01
15.00	1.85E+02	6.72E-02	1.17E+02	7.96E+02	1.09E+03
25.00	7.72E+01	3.04E-02	6.37E+01	9.35E+02	1.07E+03
35.00	3.67E+01	1.61E-02	3.64E+01	8.96E+02	9.60E+02
45.00	2.44E+01	1.22E-02	2.83E+01	9.88E+02	1.03E+03
55.00	1.71E+00	9.60E-04	2.26E+00	9.73E+01	1.00E+02
65.00	3.44E+00	2.16E-03	5.12E+00	2.59E+02	2.65E+02
75.00	1.95E+00	1.38E-03	3.28E+00	1.87E+02	1.90E+02
85.00	1.09E+00	8.61E-04	2.05E+00	1.29E+02	1.31E+02
95.00	1.19E+00	1.05E-03	2.50E+00	1.68E+02	1.71E+02
125.00	6.10E-01	6.92E-04	1.66E+00	1.28E+02	1.29E+02

772.252063870430000 total grams airborne in tank
2.867459172848612E-001 total g/s out riser
482.472560524940500 total grams lost out riser
4957.275503784418000 total grams settled on floor
6156.713248252869000 total grams made airborne
55.286800555884840 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	7.43E+00	1.02E-06	3.60E+00	1.57E-01	1.11E+01
1.50	3.32E+01	4.57E-06	1.73E+01	5.44E+00	5.54E+01
2.50	2.81E+01	3.87E-06	1.68E+01	1.35E+01	5.79E+01
3.50	4.01E+01	5.52E-06	2.94E+01	4.29E+01	1.11E+02
4.50	4.27E+01	5.87E-06	4.07E+01	9.05E+01	1.72E+02
5.50	2.92E+01	4.02E-06	3.86E+01	1.17E+02	1.83E+02
6.50	1.35E+01	1.87E-06	2.65E+01	1.00E+02	1.39E+02
7.50	6.32E+00	8.70E-07	1.94E+01	8.73E+01	1.12E+02
8.50	3.15E+00	4.34E-07	1.63E+01	8.31E+01	1.02E+02
9.50	1.31E+00	1.81E-07	1.21E+01	6.85E+01	8.13E+01
15.00	1.62E-01	2.23E-08	1.17E+02	9.81E+02	1.09E+03
25.00	2.71E-07	3.74E-14	6.37E+01	1.01E+03	1.07E+03
35.00	1.07E-15	1.47E-22	3.64E+01	9.33E+02	9.60E+02
45.00	2.41E-26	3.32E-33	2.83E+01	1.01E+03	1.03E+03
55.00	3.91E-38	5.61E-45	2.26E+00	9.90E+01	1.00E+02
65.00	0.00E+00	0.00E+00	5.12E+00	2.62E+02	2.65E+02
75.00	0.00E+00	0.00E+00	3.28E+00	1.89E+02	1.90E+02
85.00	0.00E+00	0.00E+00	2.05E+00	1.30E+02	1.31E+02
95.00	0.00E+00	0.00E+00	2.50E+00	1.70E+02	1.71E+02
125.00	0.00E+00	0.00E+00	1.66E+00	1.29E+02	1.29E+02

205.150522667400100 total grams airborne in tank
2.824802524699521E-005 total g/s out riser
482.635720133781400 total grams lost out riser
5524.213901370764000 total grams settled on floor
6156.713248252869000 total grams made airborne

55.286800555884840 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	9.45E+00	3.27E-03	7.14E+00	1.86E-01	1.66E+01
1.50	4.39E+01	1.52E-02	3.35E+01	6.45E+00	8.31E+01
2.50	4.04E+01	1.40E-02	3.13E+01	1.59E+01	8.68E+01
3.50	6.63E+01	2.31E-02	5.22E+01	5.02E+01	1.67E+02
4.50	8.68E+01	3.03E-02	6.90E+01	1.05E+02	2.59E+02
5.50	7.89E+01	2.76E-02	6.28E+01	1.35E+02	2.74E+02
6.50	5.25E+01	1.84E-02	4.18E+01	1.16E+02	2.09E+02
7.50	3.77E+01	1.33E-02	3.00E+01	1.02E+02	1.68E+02
8.50	3.09E+01	1.09E-02	2.48E+01	9.80E+01	1.52E+02
9.50	2.26E+01	8.01E-03	1.84E+01	8.21E+01	1.22E+02
15.00	1.85E+02	6.72E-02	1.75E+02	1.29E+03	1.63E+03
25.00	7.72E+01	3.04E-02	9.56E+01	1.44E+03	1.60E+03
35.00	3.67E+01	1.61E-02	5.46E+01	1.36E+03	1.44E+03
45.00	2.44E+01	1.22E-02	4.25E+01	1.49E+03	1.55E+03
55.00	1.71E+00	9.60E-04	3.39E+00	1.47E+02	1.51E+02
65.00	3.44E+00	2.16E-03	7.68E+00	3.90E+02	3.97E+02
75.00	1.95E+00	1.38E-03	4.92E+00	2.81E+02	2.85E+02
85.00	1.09E+00	8.61E-04	3.08E+00	1.93E+02	1.96E+02
95.00	1.19E+00	1.05E-03	3.74E+00	2.53E+02	2.56E+02
125.00	6.10E-01	6.92E-04	2.48E+00	1.93E+02	1.94E+02

802.474219441413900 total grams airborne in tank
2.970662210136652E-001 total g/s out riser
763.619236469268800 total grams lost out riser
7751.906832695007000 total grams settled on floor
9235.069894790649000 total grams made airborne
82.930201590061190 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	9.35E+00	1.29E-06	7.14E+00	2.86E-01	1.66E+01
1.50	4.06E+01	5.59E-06	3.35E+01	9.74E+00	8.31E+01
2.50	3.28E+01	4.52E-06	3.13E+01	2.35E+01	8.68E+01
3.50	4.45E+01	6.13E-06	5.22E+01	7.19E+01	1.67E+02
4.50	4.53E+01	6.23E-06	6.90E+01	1.47E+02	2.59E+02
5.50	3.00E+01	4.13E-06	6.29E+01	1.84E+02	2.74E+02
6.50	1.37E+01	1.89E-06	4.18E+01	1.55E+02	2.09E+02
7.50	6.34E+00	8.74E-07	3.00E+01	1.33E+02	1.68E+02
8.50	3.16E+00	4.35E-07	2.48E+01	1.26E+02	1.52E+02
9.50	1.31E+00	1.81E-07	1.84E+01	1.03E+02	1.22E+02
15.00	1.62E-01	2.23E-08	1.75E+02	1.47E+03	1.63E+03
25.00	2.71E-07	3.74E-14	9.56E+01	1.52E+03	1.60E+03
35.00	1.07E-15	1.47E-22	5.46E+01	1.40E+03	1.44E+03
45.00	2.41E-26	3.32E-33	4.25E+01	1.52E+03	1.55E+03
55.00	3.91E-38	5.61E-45	3.39E+00	1.48E+02	1.51E+02
65.00	0.00E+00	0.00E+00	7.68E+00	3.93E+02	3.97E+02
75.00	0.00E+00	0.00E+00	4.92E+00	2.83E+02	2.85E+02
85.00	0.00E+00	0.00E+00	3.08E+00	1.94E+02	1.96E+02

95.00	0.00E+00	0.00E+00	3.74E+00	2.54E+02	2.56E+02
125.00	0.00E+00	0.00E+00	2.48E+00	1.93E+02	1.94E+02

227.211141187183100 total grams airborne in tank
3.128564230976849E-005 total g/s out riser
763.795139789581300 total grams lost out riser
8326.994010776281000 total grams settled on floor
9235.069894790649000 total grams made airborne
82.930201590061190 total grams bypassed

**** OUTPUT @ 300.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	9.24E+00	1.27E-06	7.14E+00	3.84E-01	1.66E+01
1.50	3.75E+01	5.17E-06	3.35E+01	1.28E+01	8.31E+01
2.50	2.67E+01	3.67E-06	3.13E+01	2.96E+01	8.68E+01
3.50	2.99E+01	4.11E-06	5.22E+01	8.66E+01	1.67E+02
4.50	2.36E+01	3.25E-06	6.90E+01	1.68E+02	2.59E+02
5.50	1.14E+01	1.57E-06	6.29E+01	2.02E+02	2.74E+02
6.50	3.57E+00	4.92E-07	4.18E+01	1.65E+02	2.09E+02
7.50	1.07E+00	1.47E-07	3.00E+01	1.38E+02	1.68E+02
8.50	3.22E-01	4.44E-08	2.48E+01	1.29E+02	1.52E+02
9.50	7.64E-02	1.05E-08	1.84E+01	1.05E+02	1.22E+02
15.00	1.41E-04	1.95E-11	1.75E+02	1.47E+03	1.63E+03
25.00	9.54E-16	1.31E-22	9.56E+01	1.52E+03	1.60E+03
35.00	3.11E-32	4.28E-39	5.46E+01	1.40E+03	1.44E+03
45.00	0.00E+00	0.00E+00	4.25E+01	1.52E+03	1.55E+03
55.00	0.00E+00	0.00E+00	3.39E+00	1.48E+02	1.51E+02
65.00	0.00E+00	0.00E+00	7.68E+00	3.93E+02	3.97E+02
75.00	0.00E+00	0.00E+00	4.92E+00	2.83E+02	2.85E+02
85.00	0.00E+00	0.00E+00	3.08E+00	1.94E+02	1.96E+02
95.00	0.00E+00	0.00E+00	3.74E+00	2.54E+02	2.56E+02
125.00	0.00E+00	0.00E+00	2.48E+00	1.93E+02	1.94E+02

143.365157657986900 total grams airborne in tank
1.974054225549644E-005 total g/s out riser
763.884050369262700 total grams lost out riser
8410.751053541899000 total grams settled on floor
9235.069894790649000 total grams made airborne
82.930201590061190 total grams bypassed

**** OUTPUT @ 360.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.35E+01	4.66E-03	2.08E+01	5.00E-01	3.32E+01
1.50	6.26E+01	2.16E-02	9.46E+01	1.66E+01	1.66E+02
2.50	5.79E+01	2.00E-02	8.44E+01	3.84E+01	1.74E+02
3.50	9.68E+01	3.35E-02	1.36E+02	1.13E+02	3.34E+02
4.50	1.30E+02	4.50E-02	1.77E+02	2.24E+02	5.17E+02
5.50	1.20E+02	4.15E-02	1.62E+02	2.79E+02	5.49E+02
6.50	7.88E+01	2.74E-02	1.09E+02	2.37E+02	4.17E+02
7.50	5.49E+01	1.92E-02	7.89E+01	2.07E+02	3.36E+02
8.50	4.30E+01	1.51E-02	6.49E+01	2.00E+02	3.05E+02
9.50	2.98E+01	1.05E-02	4.74E+01	1.69E+02	2.44E+02

15.00	1.97E+02	7.14E-02	4.03E+02	2.69E+03	3.26E+03
25.00	7.73E+01	3.04E-02	2.00E+02	2.95E+03	3.20E+03
35.00	3.67E+01	1.61E-02	1.11E+02	2.76E+03	2.88E+03
45.00	2.44E+01	1.22E-02	8.59E+01	3.01E+03	3.09E+03
55.00	1.71E+00	9.60E-04	6.82E+00	2.95E+02	3.01E+02
65.00	3.44E+00	2.16E-03	1.54E+01	7.82E+02	7.94E+02
75.00	1.95E+00	1.38E-03	9.86E+00	5.64E+02	5.71E+02
85.00	1.09E+00	8.61E-04	6.17E+00	3.88E+02	3.92E+02
95.00	1.19E+00	1.05E-03	7.50E+00	5.08E+02	5.12E+02
125.00	6.10E-01	6.92E-04	4.97E+00	3.86E+02	3.88E+02

1032.378825306892000 total grams airborne in tank
3.755743850488216E-001 total g/s out riser
1826.837461948395000 total grams lost out riser
15821.701436698440000 total grams settled on floor
18470.139759063720000 total grams made airborne
165.860403180122400 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.34E+01	1.84E-06	2.08E+01	6.42E-01	3.32E+01
1.50	5.79E+01	7.97E-06	9.46E+01	2.13E+01	1.66E+02
2.50	4.70E+01	6.47E-06	8.44E+01	4.92E+01	1.74E+02
3.50	6.50E+01	8.95E-06	1.36E+02	1.45E+02	3.34E+02
4.50	6.77E+01	9.32E-06	1.77E+02	2.87E+02	5.17E+02
5.50	4.55E+01	6.26E-06	1.62E+02	3.53E+02	5.49E+02
6.50	2.06E+01	2.83E-06	1.09E+02	2.95E+02	4.17E+02
7.50	9.24E+00	1.27E-06	7.89E+01	2.53E+02	3.36E+02
8.50	4.39E+00	6.05E-07	6.49E+01	2.39E+02	3.05E+02
9.50	1.73E+00	2.39E-07	4.74E+01	1.97E+02	2.44E+02
15.00	1.73E-01	2.38E-08	4.03E+02	2.89E+03	3.26E+03
25.00	2.72E-07	3.74E-14	2.00E+02	3.03E+03	3.20E+03
35.00	1.07E-15	1.47E-22	1.11E+02	2.80E+03	2.88E+03
45.00	2.41E-26	3.32E-33	8.59E+01	3.04E+03	3.09E+03
55.00	3.91E-38	5.61E-45	6.82E+00	2.97E+02	3.01E+02
65.00	0.00E+00	0.00E+00	1.54E+01	7.86E+02	7.94E+02
75.00	0.00E+00	0.00E+00	9.86E+00	5.66E+02	5.71E+02
85.00	0.00E+00	0.00E+00	6.17E+00	3.89E+02	3.92E+02
95.00	0.00E+00	0.00E+00	7.50E+00	5.09E+02	5.12E+02
125.00	0.00E+00	0.00E+00	4.97E+00	3.86E+02	3.88E+02

332.534273523597100 total grams airborne in tank
4.578802028387454E-005 total g/s out riser
1827.088810920715000 total grams lost out riser
16521.295189738270000 total grams settled on floor
18470.139759063720000 total grams made airborne
165.860403180122400 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.32E+01	1.82E-06	2.09E+01	7.82E-01	3.32E+01
1.50	5.35E+01	7.37E-06	9.46E+01	2.56E+01	1.66E+02

2.50	3.82E+01	5.26E-06	8.44E+01	5.80E+01	1.74E+02
3.50	4.36E+01	6.01E-06	1.36E+02	1.66E+02	3.34E+02
4.50	3.53E+01	4.86E-06	1.77E+02	3.19E+02	5.17E+02
5.50	1.73E+01	2.38E-06	1.62E+02	3.81E+02	5.49E+02
6.50	5.37E+00	7.39E-07	1.09E+02	3.10E+02	4.17E+02
7.50	1.56E+00	2.14E-07	7.89E+01	2.60E+02	3.36E+02
8.50	4.48E-01	6.17E-08	6.49E+01	2.43E+02	3.05E+02
9.50	1.01E-01	1.39E-08	4.74E+01	1.99E+02	2.44E+02
15.00	1.51E-04	2.08E-11	4.03E+02	2.89E+03	3.26E+03
25.00	9.55E-16	1.32E-22	2.00E+02	3.03E+03	3.20E+03
35.00	3.11E-32	4.28E-39	1.11E+02	2.80E+03	2.88E+03
45.00	0.00E+00	0.00E+00	8.59E+01	3.04E+03	3.09E+03
55.00	0.00E+00	0.00E+00	6.82E+00	2.97E+02	3.01E+02
65.00	0.00E+00	0.00E+00	1.54E+01	7.86E+02	7.94E+02
75.00	0.00E+00	0.00E+00	9.86E+00	5.66E+02	5.71E+02
85.00	0.00E+00	0.00E+00	6.17E+00	3.89E+02	3.92E+02
95.00	0.00E+00	0.00E+00	7.50E+00	5.09E+02	5.12E+02
125.00	0.00E+00	0.00E+00	4.97E+00	3.86E+02	3.88E+02

208.613894795664200 total grams airborne in tank
2.872490995136506E-005 total g/s out riser
1827.218602180481000 total grams lost out riser
16645.085903167720000 total grams settled on floor
18470.139759063720000 total grams made airborne
165.860403180122400 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.33E+01	4.58E-03	2.63E+01	8.29E-01	3.88E+01
1.50	5.71E+01	1.97E-02	1.18E+02	2.71E+01	1.94E+02
2.50	4.67E+01	1.61E-02	1.02E+02	6.10E+01	2.03E+02
3.50	6.84E+01	2.38E-02	1.60E+02	1.74E+02	3.90E+02
4.50	8.29E+01	2.89E-02	2.03E+02	3.32E+02	6.03E+02
5.50	7.32E+01	2.57E-02	1.83E+02	3.97E+02	6.40E+02
6.50	4.90E+01	1.73E-02	1.22E+02	3.24E+02	4.87E+02
7.50	3.59E+01	1.27E-02	8.83E+01	2.73E+02	3.92E+02
8.50	3.01E+01	1.07E-02	7.28E+01	2.57E+02	3.56E+02
9.50	2.23E+01	7.90E-03	5.33E+01	2.12E+02	2.84E+02
15.00	1.85E+02	6.72E-02	4.61E+02	3.20E+03	3.81E+03
25.00	7.72E+01	3.04E-02	2.32E+02	3.46E+03	3.73E+03
35.00	3.67E+01	1.61E-02	1.30E+02	3.23E+03	3.36E+03
45.00	2.44E+01	1.22E-02	1.00E+02	3.52E+03	3.61E+03
55.00	1.71E+00	9.60E-04	7.95E+00	3.45E+02	3.51E+02
65.00	3.44E+00	2.16E-03	1.80E+01	9.13E+02	9.27E+02
75.00	1.95E+00	1.38E-03	1.15E+01	6.58E+02	6.66E+02
85.00	1.09E+00	8.61E-04	7.20E+00	4.53E+02	4.57E+02
95.00	1.19E+00	1.05E-03	8.75E+00	5.92E+02	5.97E+02
125.00	6.10E-01	6.92E-04	5.80E+00	4.50E+02	4.53E+02

811.725267529487600 total grams airborne in tank
3.002252837177366E-001 total g/s out riser
2111.173192024231000 total grams lost out riser
18864.019839406010000 total grams settled on floor
21548.496307373050000 total grams made airborne
193.503804951906200 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	1.31E+01	1.81E-06	2.63E+01	9.69E-01	3.88E+01
1.50	5.28E+01	7.27E-06	1.18E+02	3.14E+01	1.94E+02
2.50	3.79E+01	5.22E-06	1.02E+02	6.97E+01	2.03E+02
3.50	4.59E+01	6.32E-06	1.60E+02	1.96E+02	3.90E+02
4.50	4.32E+01	5.95E-06	2.03E+02	3.72E+02	6.03E+02
5.50	2.78E+01	3.83E-06	1.83E+02	4.42E+02	6.40E+02
6.50	1.28E+01	1.76E-06	1.22E+02	3.60E+02	4.87E+02
7.50	6.05E+00	8.33E-07	8.83E+01	3.03E+02	3.92E+02
8.50	3.07E+00	4.23E-07	7.28E+01	2.84E+02	3.56E+02
9.50	1.29E+00	1.78E-07	5.33E+01	2.33E+02	2.84E+02
15.00	1.62E-01	2.23E-08	4.61E+02	3.38E+03	3.81E+03
25.00	2.71E-07	3.74E-14	2.32E+02	3.53E+03	3.73E+03
35.00	1.07E-15	1.47E-22	1.30E+02	3.26E+03	3.36E+03
45.00	2.41E-26	3.32E-33	1.00E+02	3.54E+03	3.61E+03
55.00	3.91E-38	5.61E-45	7.95E+00	3.46E+02	3.51E+02
65.00	0.00E+00	0.00E+00	1.80E+01	9.17E+02	9.27E+02
75.00	0.00E+00	0.00E+00	1.15E+01	6.60E+02	6.66E+02
85.00	0.00E+00	0.00E+00	7.20E+00	4.54E+02	4.57E+02
95.00	0.00E+00	0.00E+00	8.75E+00	5.94E+02	5.97E+02
125.00	0.00E+00	0.00E+00	5.80E+00	4.51E+02	4.53E+02

244.089009094468800 total grams airborne in tank
3.360962580607918E-005 total g/s out riser
2111.356040477753000 total grams lost out riser
19431.473335981370000 total grams settled on floor
21548.496307373050000 total grams made airborne
193.503804951906200 total grams bypassed

Table 4. Comparison of Aerosols With and Without Bypass Fraction
(IL=2100 cfm, PR=1 in./min. for all cases)

WH (in.)	Distance to Riser (m)	Bypass Fraction	Aerosol w/Bypass (g)	Aerosol No Bypass (g)	Percent Increase w/Bypass
500,000 gallon tank					
19.0	5.0874	0.0119	249.4	215.5	13.5926
76.0	3.6397	0.0166	943.7	802.3	14.9836
140.0	2.0142	0.0301	2301.9	1794.9	22.0253
171.0	1.2268	0.0494	4210.2	2976.3	29.3074
181.8	0.9525	0.0636	4882.6	3213.0	34.1949
750,000 gallon tank					
19.0	7.3974	0.0082	211.5	187.5	11.3475
95.0	5.4671	0.0111	1450.5	1292.4	10.8997
171.0	3.5368	0.0171	3049.8	2616.5	14.2075
266.0	1.1239	0.0539	6693.7	4597.7	31.3130
272.7	0.9538	0.0635	7263.8	4808.0	33.8088
1,000,000 gallon tank					
19.0	9.7074	0.0062	183.0	164.7	10.0000
133.0	6.8120	0.0089	2111.3	1935.0	8.3503
247.0	3.9165	0.0155	4259.3	3690.7	13.3496
361.0	1.0210	0.0594	9448.1	6318.0	33.1294
363.6	0.9550	0.0635	9917.4	6556.8	33.8859

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

179B

ADDITIONAL PARAMETERS:

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particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     2280.890000000000000
bypass fraction =   1.550000000000000E-002

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000
Output divisions in Period        3.000000000000000 =        1.000000
Output divisions in Period        4.000000000000000 =        1.000000
Output divisions in Period        5.000000000000000 =        1.000000
Output divisions in Period        6.000000000000000 =        1.000000
Output divisions in Period        7.000000000000000 =        1.000000
Output divisions in Period        8.000000000000000 =        1.000000
Output divisions in Period        9.000000000000000 =        1.000000
Output divisions in Period       10.000000000000000 =        1.000000
Output divisions in Period       11.000000000000000 =        1.000000
Output divisions in Period       12.000000000000000 =        1.000000
Output divisions in Period       13.000000000000000 =        1.000000
Output divisions in Period       14.000000000000000 =        1.000000
Output divisions in Period       15.000000000000000 =        1.000000
Output divisions in Period       16.000000000000000 =        1.000000
Output divisions in Period       17.000000000000000 =        1.000000
Output divisions in Period       18.000000000000000 =        1.000000
Output divisions in Period       19.000000000000000 =        1.000000
Output divisions in Period       20.000000000000000 =        1.000000
Output divisions in Period       21.000000000000000 =        1.000000
Output divisions in Period       22.000000000000000 =        1.000000
Output divisions in Period       23.000000000000000 =        1.000000
Output divisions in Period       24.000000000000000 =        1.000000
Output divisions in Period       25.000000000000000 =        1.000000
Output divisions in Period       26.000000000000000 =        1.000000


Flow out @    0.000000E+00 min =     2480.000000 cfm &      155.300000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      100.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      180.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      240.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      260.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      320.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      340.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      420.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      500.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      580.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      640.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      660.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =     2480.000000 cfm &      155.300000g/m
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Flow out @      740.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      800.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      820.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      880.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      900.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      960.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      980.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1040.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m
```

**** OUTPUT @ 20.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.10E+00	2.18E-03	1.48E+00	1.20E-02	5.50E+00
1.50	2.02E+01	1.07E-02	7.32E+00	4.37E-01	2.75E+01
2.50	2.05E+01	1.09E-02	7.51E+00	1.19E+00	2.87E+01
3.50	3.78E+01	2.01E-02	1.41E+01	4.28E+00	5.53E+01
4.50	5.55E+01	2.96E-02	2.11E+01	1.04E+01	8.56E+01
5.50	5.51E+01	2.95E-02	2.14E+01	1.57E+01	9.08E+01
6.50	3.89E+01	2.08E-02	1.55E+01	1.58E+01	6.91E+01
7.50	2.87E+01	1.55E-02	1.19E+01	1.59E+01	5.57E+01
8.50	2.37E+01	1.28E-02	1.01E+01	1.74E+01	5.05E+01
9.50	1.72E+01	9.36E-03	7.62E+00	1.62E+01	4.04E+01
15.00	1.28E+02	7.30E-02	6.97E+01	3.51E+02	5.40E+02
25.00	5.11E+01	3.32E-02	3.68E+01	4.50E+02	5.30E+02
35.00	2.42E+01	1.87E-02	2.17E+01	4.39E+02	4.77E+02
45.00	1.61E+01	1.50E-02	1.77E+01	4.86E+02	5.12E+02
55.00	1.13E+00	1.23E-03	1.47E+00	4.80E+01	4.98E+01
65.00	2.27E+00	2.89E-03	3.45E+00	1.28E+02	1.31E+02
75.00	1.29E+00	1.90E-03	2.27E+00	9.24E+01	9.45E+01
85.00	7.22E-01	1.22E-03	1.46E+00	6.37E+01	6.48E+01
95.00	7.89E-01	1.52E-03	1.81E+00	8.34E+01	8.47E+01
125.00	4.03E-01	1.05E-03	1.26E+00	6.36E+01	6.42E+01

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   528.141540646553000 total grams airborne in tank
3.111324524506927E-001 total g/s out riser
   275.671673774719200 total grams lost out riser
  2302.186867292970000 total grams settled on floor
  3057.857078075409000 total grams made airborne
    48.143001727759840 total grams bypassed
```

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	4.03E+00	8.34E-07	1.48E+00	7.65E-02	5.50E+00
1.50	1.79E+01	3.71E-06	7.34E+00	2.67E+00	2.75E+01
2.50	1.50E+01	3.10E-06	7.53E+00	6.67E+00	2.87E+01
3.50	2.08E+01	4.30E-06	1.41E+01	2.13E+01	5.53E+01
4.50	2.08E+01	4.31E-06	2.11E+01	4.50E+01	8.56E+01
5.50	1.29E+01	2.67E-06	2.15E+01	5.79E+01	9.08E+01
6.50	5.16E+00	1.07E-06	1.56E+01	4.95E+01	6.91E+01
7.50	1.98E+00	4.09E-07	1.19E+01	4.27E+01	5.57E+01
8.50	7.70E-01	1.59E-07	1.02E+01	4.03E+01	5.05E+01
9.50	2.40E-01	4.96E-08	7.63E+00	3.31E+01	4.04E+01

15.00	3.26E-03	6.74E-10	6.98E+01	4.79E+02	5.40E+02
25.00	1.01E-11	2.09E-18	3.68E+01	5.01E+02	5.30E+02
35.00	3.43E-24	7.11E-31	2.17E+01	4.63E+02	4.77E+02
45.00	4.23E-40	0.00E+00	1.77E+01	5.03E+02	5.12E+02
55.00	0.00E+00	0.00E+00	1.47E+00	4.92E+01	4.98E+01
65.00	0.00E+00	0.00E+00	3.45E+00	1.30E+02	1.31E+02
75.00	0.00E+00	0.00E+00	2.27E+00	9.37E+01	9.45E+01
85.00	0.00E+00	0.00E+00	1.46E+00	6.44E+01	6.48E+01
95.00	0.00E+00	0.00E+00	1.81E+00	8.42E+01	8.47E+01
125.00	0.00E+00	0.00E+00	1.26E+00	6.40E+01	6.42E+01

99.637761424305710 total grams airborne in tank
2.061638609057934E-005 total g/s out riser
275.809823393821700 total grams lost out riser
2730.552490197122000 total grams settled on floor
3057.857078075409000 total grams made airborne
48.143001727759840 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	6.27E+00	3.29E-03	4.81E+00	1.04E-01	1.10E+01
1.50	2.95E+01	1.55E-02	2.28E+01	3.62E+00	5.50E+01
2.50	2.78E+01	1.46E-02	2.16E+01	8.97E+00	5.75E+01
3.50	4.70E+01	2.49E-02	3.70E+01	2.84E+01	1.11E+02
4.50	6.36E+01	3.37E-02	5.05E+01	5.99E+01	1.71E+02
5.50	5.94E+01	3.17E-02	4.77E+01	7.74E+01	1.82E+02
6.50	4.03E+01	2.16E-02	3.29E+01	6.72E+01	1.38E+02
7.50	2.92E+01	1.57E-02	2.44E+01	5.95E+01	1.11E+02
8.50	2.39E+01	1.29E-02	2.05E+01	5.81E+01	1.01E+02
9.50	1.72E+01	9.38E-03	1.53E+01	4.94E+01	8.07E+01
15.00	1.28E+02	7.30E-02	1.39E+02	8.30E+02	1.08E+03
25.00	5.11E+01	3.32E-02	7.35E+01	9.51E+02	1.06E+03
35.00	2.42E+01	1.87E-02	4.33E+01	9.01E+02	9.54E+02
45.00	1.61E+01	1.50E-02	3.54E+01	9.89E+02	1.02E+03
55.00	1.13E+00	1.23E-03	2.93E+00	9.72E+01	9.97E+01
65.00	2.27E+00	2.89E-03	6.89E+00	2.58E+02	2.63E+02
75.00	1.29E+00	1.90E-03	4.54E+00	1.86E+02	1.89E+02
85.00	7.22E-01	1.22E-03	2.92E+00	1.28E+02	1.30E+02
95.00	7.89E-01	1.52E-03	3.63E+00	1.68E+02	1.69E+02
125.00	4.03E-01	1.05E-03	2.52E+00	1.28E+02	1.28E+02

570.573822140693700 total grams airborne in tank
3.329063788987696E-001 total g/s out riser
592.602855443954500 total grams lost out riser
5048.823390409350000 total grams settled on floor
6115.714156150818000 total grams made airborne
96.286003455519680 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	6.16E+00	1.28E-06	4.81E+00	2.03E-01	1.10E+01
1.50	2.62E+01	5.43E-06	2.28E+01	6.88E+00	5.50E+01

2.50	2.03E+01	4.21E-06	2.16E+01	1.64E+01	5.75E+01
3.50	2.58E+01	5.35E-06	3.70E+01	4.96E+01	1.11E+02
4.50	2.39E+01	4.94E-06	5.05E+01	9.96E+01	1.71E+02
5.50	1.39E+01	2.88E-06	4.77E+01	1.23E+02	1.82E+02
6.50	5.35E+00	1.11E-06	3.29E+01	1.02E+02	1.38E+02
7.50	2.01E+00	4.15E-07	2.44E+01	8.67E+01	1.11E+02
8.50	7.74E-01	1.60E-07	2.05E+01	8.12E+01	1.01E+02
9.50	2.40E-01	4.97E-08	1.53E+01	6.64E+01	8.07E+01
15.00	3.26E-03	6.74E-10	1.40E+02	9.58E+02	1.08E+03
25.00	1.01E-11	2.09E-18	7.35E+01	1.00E+03	1.06E+03
35.00	3.43E-24	7.11E-31	4.33E+01	9.26E+02	9.54E+02
45.00	4.23E-40	0.00E+00	3.54E+01	1.01E+03	1.02E+03
55.00	0.00E+00	0.00E+00	2.93E+00	9.83E+01	9.97E+01
65.00	0.00E+00	0.00E+00	6.89E+00	2.60E+02	2.63E+02
75.00	0.00E+00	0.00E+00	4.54E+00	1.87E+02	1.89E+02
85.00	0.00E+00	0.00E+00	2.92E+00	1.29E+02	1.30E+02
95.00	0.00E+00	0.00E+00	3.63E+00	1.68E+02	1.69E+02
125.00	0.00E+00	0.00E+00	2.52E+00	1.28E+02	1.28E+02

124.733984079687700 total grams airborne in tank
2.580913078198619E-005 total g/s out riser
592.765136003494300 total grams lost out riser
5494.500986427069000 total grams settled on floor
6115.714156150818000 total grams made airborne
96.286003455519680 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	7.41E+00	3.88E-03	9.12E+00	2.39E-01	1.65E+01
1.50	3.38E+01	1.77E-02	4.20E+01	8.07E+00	8.26E+01
2.50	3.04E+01	1.60E-02	3.81E+01	1.91E+01	8.62E+01
3.50	4.93E+01	2.60E-02	6.19E+01	5.74E+01	1.66E+02
4.50	6.48E+01	3.44E-02	8.11E+01	1.15E+02	2.57E+02
5.50	5.97E+01	3.18E-02	7.44E+01	1.43E+02	2.72E+02
6.50	4.03E+01	2.16E-02	5.03E+01	1.20E+02	2.07E+02
7.50	2.92E+01	1.57E-02	3.69E+01	1.04E+02	1.67E+02
8.50	2.39E+01	1.29E-02	3.09E+01	9.90E+01	1.51E+02
9.50	1.72E+01	9.38E-03	2.30E+01	8.28E+01	1.21E+02
15.00	1.28E+02	7.30E-02	2.09E+02	1.31E+03	1.62E+03
25.00	5.11E+01	3.32E-02	1.10E+02	1.45E+03	1.59E+03
35.00	2.42E+01	1.87E-02	6.50E+01	1.36E+03	1.43E+03
45.00	1.61E+01	1.50E-02	5.30E+01	1.49E+03	1.54E+03
55.00	1.13E+00	1.23E-03	4.40E+00	1.46E+02	1.50E+02
65.00	2.27E+00	2.89E-03	1.03E+01	3.88E+02	3.94E+02
75.00	1.29E+00	1.90E-03	6.82E+00	2.80E+02	2.83E+02
85.00	7.22E-01	1.22E-03	4.38E+00	1.92E+02	1.94E+02
95.00	7.89E-01	1.52E-03	5.44E+00	2.52E+02	2.54E+02
125.00	4.03E-01	1.05E-03	3.77E+00	1.92E+02	1.93E+02

582.447493672370900 total grams airborne in tank
3.389992937445641E-001 total g/s out riser
920.423084974288900 total grams lost out riser
7815.129604339600000 total grams settled on floor
9173.571195602417000 total grams made airborne
144.429006069898600 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	7.29E+00	1.51E-06	9.13E+00	3.56E-01	1.65E+01
1.50	3.01E+01	6.22E-06	4.20E+01	1.18E+01	8.26E+01
2.50	2.23E+01	4.60E-06	3.81E+01	2.72E+01	8.62E+01
3.50	2.71E+01	5.60E-06	6.20E+01	7.96E+01	1.66E+02
4.50	2.43E+01	5.03E-06	8.11E+01	1.55E+02	2.57E+02
5.50	1.40E+01	2.89E-06	7.44E+01	1.88E+02	2.72E+02
6.50	5.36E+00	1.11E-06	5.03E+01	1.55E+02	2.07E+02
7.50	2.01E+00	4.15E-07	3.69E+01	1.31E+02	1.67E+02
8.50	7.74E-01	1.60E-07	3.09E+01	1.22E+02	1.51E+02
9.50	2.40E-01	4.97E-08	2.30E+01	9.98E+01	1.21E+02
15.00	3.26E-03	6.74E-10	2.09E+02	1.44E+03	1.62E+03
25.00	1.01E-11	2.09E-18	1.10E+02	1.50E+03	1.59E+03
35.00	3.43E-24	7.11E-31	6.50E+01	1.39E+03	1.43E+03
45.00	4.23E-40	0.00E+00	5.30E+01	1.51E+03	1.54E+03
55.00	0.00E+00	0.00E+00	4.40E+00	1.47E+02	1.50E+02
65.00	0.00E+00	0.00E+00	1.03E+01	3.90E+02	3.94E+02
75.00	0.00E+00	0.00E+00	6.82E+00	2.81E+02	2.83E+02
85.00	0.00E+00	0.00E+00	4.38E+00	1.93E+02	1.94E+02
95.00	0.00E+00	0.00E+00	5.44E+00	2.53E+02	2.54E+02
125.00	0.00E+00	0.00E+00	3.77E+00	1.92E+02	1.93E+02

133.353599887817000 total grams airborne in tank
2.759264434282414E-005 total g/s out riser
920.592854976654100 total grams lost out riser
8264.053789407015000 total grams settled on floor
9173.571195602417000 total grams made airborne
144.429006069898600 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.02E+00	4.19E-03	1.39E+01	3.96E-01	2.20E+01
1.50	3.58E+01	1.87E-02	6.29E+01	1.31E+01	1.10E+02
2.50	3.13E+01	1.65E-02	5.54E+01	3.01E+01	1.15E+02
3.50	4.98E+01	2.63E-02	8.75E+01	8.76E+01	2.21E+02
4.50	6.49E+01	3.44E-02	1.12E+02	1.71E+02	3.42E+02
5.50	5.97E+01	3.18E-02	1.01E+02	2.08E+02	3.63E+02
6.50	4.03E+01	2.16E-02	6.77E+01	1.73E+02	2.76E+02
7.50	2.92E+01	1.57E-02	4.94E+01	1.48E+02	2.23E+02
8.50	2.39E+01	1.29E-02	4.13E+01	1.40E+02	2.02E+02
9.50	1.72E+01	9.38E-03	3.07E+01	1.16E+02	1.61E+02
15.00	1.28E+02	7.30E-02	2.79E+02	1.79E+03	2.16E+03
25.00	5.11E+01	3.32E-02	1.47E+02	1.95E+03	2.12E+03
35.00	2.42E+01	1.87E-02	8.67E+01	1.83E+03	1.91E+03
45.00	1.61E+01	1.50E-02	7.07E+01	1.99E+03	2.05E+03
55.00	1.13E+00	1.23E-03	5.86E+00	1.96E+02	1.99E+02
65.00	2.27E+00	2.89E-03	1.38E+01	5.18E+02	5.26E+02
75.00	1.29E+00	1.90E-03	9.09E+00	3.74E+02	3.78E+02
85.00	7.22E-01	1.22E-03	5.84E+00	2.57E+02	2.59E+02
95.00	7.89E-01	1.52E-03	7.26E+00	3.36E+02	3.39E+02
125.00	4.03E-01	1.05E-03	5.03E+00	2.55E+02	2.57E+02

586.714846730232200 total grams airborne in tank
3.411890678107738E-001 total g/s out riser
1252.060338020325000 total grams lost out riser
10585.225147455930000 total grams settled on floor
12231.428312301640000 total grams made airborne
192.572006911039400 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	7.89E+00	1.63E-06	1.40E+01	5.23E-01	2.20E+01
1.50	3.18E+01	6.59E-06	6.29E+01	1.71E+01	1.10E+02
2.50	2.29E+01	4.74E-06	5.54E+01	3.84E+01	1.15E+02
3.50	2.74E+01	5.66E-06	8.75E+01	1.10E+02	2.21E+02
4.50	2.44E+01	5.05E-06	1.12E+02	2.12E+02	3.42E+02
5.50	1.40E+01	2.89E-06	1.01E+02	2.54E+02	3.63E+02
6.50	5.36E+00	1.11E-06	6.77E+01	2.08E+02	2.76E+02
7.50	2.01E+00	4.15E-07	4.94E+01	1.75E+02	2.23E+02
8.50	7.74E-01	1.60E-07	4.13E+01	1.63E+02	2.02E+02
9.50	2.40E-01	4.97E-08	3.07E+01	1.33E+02	1.61E+02
15.00	3.26E-03	6.74E-10	2.79E+02	1.92E+03	2.16E+03
25.00	1.01E-11	2.09E-18	1.47E+02	2.00E+03	2.12E+03
35.00	3.43E-24	7.11E-31	8.67E+01	1.85E+03	1.91E+03
45.00	4.23E-40	0.00E+00	7.07E+01	2.01E+03	2.05E+03
55.00	0.00E+00	0.00E+00	5.86E+00	1.97E+02	1.99E+02
65.00	0.00E+00	0.00E+00	1.38E+01	5.20E+02	5.26E+02
75.00	0.00E+00	0.00E+00	9.09E+00	3.75E+02	3.78E+02
85.00	0.00E+00	0.00E+00	5.84E+00	2.58E+02	2.59E+02
95.00	0.00E+00	0.00E+00	7.26E+00	3.37E+02	3.39E+02
125.00	0.00E+00	0.00E+00	5.03E+00	2.56E+02	2.57E+02

136.765820246665600 total grams airborne in tank
2.829867814491336E-005 total g/s out riser
1252.232970714569000 total grams lost out riser
11035.001555562020000 total grams settled on floor
12231.428312301640000 total grams made airborne
192.572006911039400 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.34E+00	4.35E-03	1.91E+01	5.66E-01	2.75E+01
1.50	3.67E+01	1.92E-02	8.46E+01	1.84E+01	1.38E+02
2.50	3.17E+01	1.66E-02	7.30E+01	4.13E+01	1.44E+02
3.50	5.00E+01	2.64E-02	1.13E+02	1.18E+02	2.77E+02
4.50	6.50E+01	3.45E-02	1.43E+02	2.27E+02	4.28E+02
5.50	5.97E+01	3.18E-02	1.28E+02	2.74E+02	4.54E+02
6.50	4.03E+01	2.16E-02	8.51E+01	2.25E+02	3.46E+02
7.50	2.92E+01	1.57E-02	6.19E+01	1.92E+02	2.78E+02
8.50	2.39E+01	1.29E-02	5.16E+01	1.81E+02	2.52E+02
9.50	1.72E+01	9.38E-03	3.84E+01	1.49E+02	2.02E+02
15.00	1.28E+02	7.30E-02	3.49E+02	2.27E+03	2.70E+03
25.00	5.11E+01	3.32E-02	1.84E+02	2.45E+03	2.65E+03

35.00	2.42E+01	1.87E-02	1.08E+02	2.29E+03	2.39E+03
45.00	1.61E+01	1.50E-02	8.84E+01	2.50E+03	2.56E+03
55.00	1.13E+00	1.23E-03	7.33E+00	2.45E+02	2.49E+02
65.00	2.27E+00	2.89E-03	1.72E+01	6.48E+02	6.57E+02
75.00	1.29E+00	1.90E-03	1.14E+01	4.67E+02	4.72E+02
85.00	7.22E-01	1.22E-03	7.30E+00	3.21E+02	3.24E+02
95.00	7.89E-01	1.52E-03	9.07E+00	4.20E+02	4.24E+02
125.00	4.03E-01	1.05E-03	6.29E+00	3.19E+02	3.21E+02

588.443472981452900 total grams airborne in tank
3.420761045999825E-001 total g/s out riser
1585.224410533905000 total grams lost out riser
13356.332444608210000 total grams settled on floor
15289.285314559940000 total grams made airborne
240.715005964040800 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.20E+00	1.70E-06	1.91E+01	6.97E-01	2.75E+01
1.50	3.26E+01	6.76E-06	8.47E+01	2.25E+01	1.38E+02
2.50	2.32E+01	4.79E-06	7.30E+01	4.98E+01	1.44E+02
3.50	2.74E+01	5.68E-06	1.13E+02	1.41E+02	2.77E+02
4.50	2.44E+01	5.05E-06	1.43E+02	2.68E+02	4.28E+02
5.50	1.40E+01	2.89E-06	1.28E+02	3.20E+02	4.54E+02
6.50	5.36E+00	1.11E-06	8.52E+01	2.60E+02	3.46E+02
7.50	2.01E+00	4.15E-07	6.19E+01	2.19E+02	2.78E+02
8.50	7.74E-01	1.60E-07	5.17E+01	2.04E+02	2.52E+02
9.50	2.40E-01	4.97E-08	3.84E+01	1.66E+02	2.02E+02
15.00	3.26E-03	6.74E-10	3.49E+02	2.40E+03	2.70E+03
25.00	1.01E-11	2.09E-18	1.84E+02	2.51E+03	2.65E+03
35.00	3.43E-24	7.11E-31	1.08E+02	2.31E+03	2.39E+03
45.00	4.23E-40	0.00E+00	8.84E+01	2.51E+03	2.56E+03
55.00	0.00E+00	0.00E+00	7.33E+00	2.46E+02	2.49E+02
65.00	0.00E+00	0.00E+00	1.72E+01	6.51E+02	6.57E+02
75.00	0.00E+00	0.00E+00	1.14E+01	4.69E+02	4.72E+02
85.00	0.00E+00	0.00E+00	7.30E+00	3.22E+02	3.24E+02
95.00	0.00E+00	0.00E+00	9.07E+00	4.21E+02	4.24E+02
125.00	0.00E+00	0.00E+00	6.29E+00	3.20E+02	3.21E+02

138.221360665290500 total grams airborne in tank
2.859984904468802E-005 total g/s out riser
1585.398246765137000 total grams lost out riser
13806.380687773230000 total grams settled on floor
15289.285314559940000 total grams made airborne
240.715005964040800 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.51E+00	4.44E-03	2.43E+01	7.41E-01	3.30E+01
1.50	3.72E+01	1.94E-02	1.07E+02	2.38E+01	1.65E+02
2.50	3.18E+01	1.67E-02	9.07E+01	5.27E+01	1.72E+02
3.50	5.00E+01	2.64E-02	1.39E+02	1.49E+02	3.32E+02

4.50	6.50E+01	3.45E-02	1.74E+02	2.83E+02	5.14E+02
5.50	5.97E+01	3.18E-02	1.54E+02	3.39E+02	5.45E+02
6.50	4.03E+01	2.16E-02	1.03E+02	2.78E+02	4.15E+02
7.50	2.92E+01	1.57E-02	7.44E+01	2.36E+02	3.34E+02
8.50	2.39E+01	1.29E-02	6.20E+01	2.22E+02	3.03E+02
9.50	1.72E+01	9.38E-03	4.61E+01	1.83E+02	2.42E+02
15.00	1.28E+02	7.30E-02	4.19E+02	2.75E+03	3.24E+03
25.00	5.11E+01	3.32E-02	2.21E+02	2.96E+03	3.18E+03
35.00	2.42E+01	1.87E-02	1.30E+02	2.75E+03	2.86E+03
45.00	1.61E+01	1.50E-02	1.06E+02	3.00E+03	3.07E+03
55.00	1.13E+00	1.23E-03	8.80E+00	2.94E+02	2.99E+02
65.00	2.27E+00	2.89E-03	2.07E+01	7.78E+02	7.89E+02
75.00	1.29E+00	1.90E-03	1.36E+01	5.61E+02	5.67E+02
85.00	7.22E-01	1.22E-03	8.76E+00	3.86E+02	3.89E+02
95.00	7.89E-01	1.52E-03	1.09E+01	5.05E+02	5.08E+02
125.00	4.03E-01	1.05E-03	7.55E+00	3.83E+02	3.85E+02

589.190491795539900 total grams airborne in tank
3.424594355747104E-001 total g/s out riser
1919.043685913086000 total grams lost out riser
16127.766111552720000 total grams settled on floor
18347.142375946040000 total grams made airborne
288.858005225658400 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.37E+00	1.73E-06	2.43E+01	8.75E-01	3.30E+01
1.50	3.30E+01	6.83E-06	1.07E+02	2.79E+01	1.65E+02
2.50	2.33E+01	4.81E-06	9.07E+01	6.12E+01	1.72E+02
3.50	2.75E+01	5.68E-06	1.39E+02	1.71E+02	3.32E+02
4.50	2.44E+01	5.05E-06	1.74E+02	3.24E+02	5.14E+02
5.50	1.40E+01	2.89E-06	1.54E+02	3.85E+02	5.45E+02
6.50	5.36E+00	1.11E-06	1.03E+02	3.13E+02	4.15E+02
7.50	2.01E+00	4.15E-07	7.44E+01	2.63E+02	3.34E+02
8.50	7.74E-01	1.60E-07	6.20E+01	2.45E+02	3.03E+02
9.50	2.40E-01	4.97E-08	4.61E+01	2.00E+02	2.42E+02
15.00	3.26E-03	6.74E-10	4.19E+02	2.87E+03	3.24E+03
25.00	1.01E-11	2.09E-18	2.21E+02	3.01E+03	3.18E+03
35.00	3.43E-24	7.11E-31	1.30E+02	2.78E+03	2.86E+03
45.00	4.23E-40	0.00E+00	1.06E+02	3.02E+03	3.07E+03
55.00	0.00E+00	0.00E+00	8.80E+00	2.95E+02	2.99E+02
65.00	0.00E+00	0.00E+00	2.07E+01	7.81E+02	7.89E+02
75.00	0.00E+00	0.00E+00	1.36E+01	5.62E+02	5.67E+02
85.00	0.00E+00	0.00E+00	8.76E+00	3.86E+02	3.89E+02
95.00	0.00E+00	0.00E+00	1.09E+01	5.05E+02	5.08E+02
125.00	0.00E+00	0.00E+00	7.55E+00	3.84E+02	3.85E+02

138.869933110206200 total grams airborne in tank
2.873404714798453E-005 total g/s out riser
1919.217970371246000 total grams lost out riser
16577.912304520610000 total grams settled on floor
18347.142375946040000 total grams made airborne
288.858005225658400 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.60E+00	4.48E-03	2.96E+01	9.20E-01	3.85E+01
1.50	3.74E+01	1.95E-02	1.29E+02	2.93E+01	1.93E+02
2.50	3.18E+01	1.67E-02	1.08E+02	6.41E+01	2.01E+02
3.50	5.00E+01	2.64E-02	1.64E+02	1.79E+02	3.87E+02
4.50	6.50E+01	3.45E-02	2.04E+02	3.39E+02	5.99E+02
5.50	5.97E+01	3.18E-02	1.81E+02	4.05E+02	6.36E+02
6.50	4.03E+01	2.16E-02	1.20E+02	3.31E+02	4.84E+02
7.50	2.92E+01	1.57E-02	8.69E+01	2.80E+02	3.90E+02
8.50	2.39E+01	1.29E-02	7.24E+01	2.62E+02	3.53E+02
9.50	1.72E+01	9.38E-03	5.38E+01	2.16E+02	2.83E+02
15.00	1.28E+02	7.30E-02	4.88E+02	3.23E+03	3.78E+03
25.00	5.11E+01	3.32E-02	2.57E+02	3.46E+03	3.71E+03
35.00	2.42E+01	1.87E-02	1.52E+02	3.22E+03	3.34E+03
45.00	1.61E+01	1.50E-02	1.24E+02	3.50E+03	3.59E+03
55.00	1.13E+00	1.23E-03	1.03E+01	3.43E+02	3.49E+02
65.00	2.27E+00	2.89E-03	2.41E+01	9.09E+02	9.20E+02
75.00	1.29E+00	1.90E-03	1.59E+01	6.55E+02	6.61E+02
85.00	7.22E-01	1.22E-03	1.02E+01	4.50E+02	4.54E+02
95.00	7.89E-01	1.52E-03	1.27E+01	5.89E+02	5.93E+02
125.00	4.03E-01	1.05E-03	8.80E+00	4.47E+02	4.50E+02

589.526064038276700 total grams airborne in tank
3.426316305994987E-001 total g/s out riser
2253.155803680420000 total grams lost out riser
18899.318591833110000 total grams settled on floor
21404.999454498290000 total grams made airborne
337.001004278659800 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.45E+00	1.75E-06	2.96E+01	1.06E+00	3.85E+01
1.50	3.32E+01	6.87E-06	1.29E+02	3.34E+01	1.93E+02
2.50	2.33E+01	4.82E-06	1.08E+02	7.26E+01	2.01E+02
3.50	2.75E+01	5.68E-06	1.64E+02	2.02E+02	3.87E+02
4.50	2.44E+01	5.05E-06	2.04E+02	3.80E+02	5.99E+02
5.50	1.40E+01	2.89E-06	1.81E+02	4.51E+02	6.36E+02
6.50	5.36E+00	1.11E-06	1.20E+02	3.66E+02	4.84E+02
7.50	2.01E+00	4.15E-07	8.69E+01	3.07E+02	3.90E+02
8.50	7.74E-01	1.60E-07	7.24E+01	2.86E+02	3.53E+02
9.50	2.40E-01	4.97E-08	5.38E+01	2.33E+02	2.83E+02
15.00	3.26E-03	6.74E-10	4.88E+02	3.35E+03	3.78E+03
25.00	1.01E-11	2.09E-18	2.57E+02	3.51E+03	3.71E+03
35.00	3.43E-24	7.11E-31	1.52E+02	3.24E+03	3.34E+03
45.00	4.23E-40	0.00E+00	1.24E+02	3.52E+03	3.59E+03
55.00	0.00E+00	0.00E+00	1.03E+01	3.44E+02	3.49E+02
65.00	0.00E+00	0.00E+00	2.41E+01	9.11E+02	9.20E+02
75.00	0.00E+00	0.00E+00	1.59E+01	6.56E+02	6.61E+02
85.00	0.00E+00	0.00E+00	1.02E+01	4.51E+02	4.54E+02
95.00	0.00E+00	0.00E+00	1.27E+01	5.90E+02	5.93E+02
125.00	0.00E+00	0.00E+00	8.80E+00	4.48E+02	4.50E+02

139.167126637427900 total grams airborne in tank

2.879554081325551E-005 total g/s out riser
2253.330384254456000 total grams lost out riser
19349.502592802050000 total grams settled on floor
21404.999454498290000 total grams made airborne
337.001004278659800 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.64E+00	4.51E-03	3.50E+01	1.10E+00	4.40E+01
1.50	3.74E+01	1.96E-02	1.51E+02	3.48E+01	2.20E+02
2.50	3.18E+01	1.67E-02	1.26E+02	7.55E+01	2.30E+02
3.50	5.00E+01	2.64E-02	1.90E+02	2.10E+02	4.43E+02
4.50	6.50E+01	3.45E-02	2.35E+02	3.96E+02	6.85E+02
5.50	5.97E+01	3.18E-02	2.08E+02	4.70E+02	7.27E+02
6.50	4.03E+01	2.16E-02	1.37E+02	3.84E+02	5.53E+02
7.50	2.92E+01	1.57E-02	9.94E+01	3.24E+02	4.45E+02
8.50	2.39E+01	1.29E-02	8.28E+01	3.03E+02	4.04E+02
9.50	1.72E+01	9.38E-03	6.14E+01	2.49E+02	3.23E+02
15.00	1.28E+02	7.30E-02	5.58E+02	3.70E+03	4.32E+03
25.00	5.11E+01	3.32E-02	2.94E+02	3.96E+03	4.24E+03
35.00	2.42E+01	1.87E-02	1.73E+02	3.68E+03	3.82E+03
45.00	1.61E+01	1.50E-02	1.41E+02	4.00E+03	4.10E+03
55.00	1.13E+00	1.23E-03	1.17E+01	3.92E+02	3.99E+02
65.00	2.27E+00	2.89E-03	2.76E+01	1.04E+03	1.05E+03
75.00	1.29E+00	1.90E-03	1.82E+01	7.48E+02	7.56E+02
85.00	7.22E-01	1.22E-03	1.17E+01	5.14E+02	5.19E+02
95.00	7.89E-01	1.52E-03	1.45E+01	6.73E+02	6.78E+02
125.00	4.03E-01	1.05E-03	1.01E+01	5.11E+02	5.14E+02

589.680675625801100 total grams airborne in tank
3.427109741605818E-001 total g/s out riser
2587.402640342712000 total grams lost out riser
21670.916872978210000 total grams settled on floor
24462.856029510500000 total grams made airborne
385.144002616405500 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.50E+00	1.76E-06	3.50E+01	1.24E+00	4.40E+01
1.50	3.33E+01	6.89E-06	1.51E+02	3.90E+01	2.20E+02
2.50	2.33E+01	4.82E-06	1.26E+02	8.40E+01	2.30E+02
3.50	2.75E+01	5.68E-06	1.90E+02	2.32E+02	4.43E+02
4.50	2.44E+01	5.05E-06	2.35E+02	4.36E+02	6.85E+02
5.50	1.40E+01	2.89E-06	2.08E+02	5.16E+02	7.27E+02
6.50	5.36E+00	1.11E-06	1.37E+02	4.19E+02	5.53E+02
7.50	2.01E+00	4.15E-07	9.95E+01	3.51E+02	4.45E+02
8.50	7.74E-01	1.60E-07	8.28E+01	3.26E+02	4.04E+02
9.50	2.40E-01	4.97E-08	6.15E+01	2.66E+02	3.23E+02
15.00	3.26E-03	6.74E-10	5.58E+02	3.83E+03	4.32E+03
25.00	1.01E-11	2.09E-18	2.94E+02	4.01E+03	4.24E+03
35.00	3.43E-24	7.11E-31	1.73E+02	3.70E+03	3.82E+03
45.00	4.23E-40	0.00E+00	1.41E+02	4.02E+03	4.10E+03

55.00	0.00E+00	0.00E+00	1.17E+01	3.93E+02	3.99E+02
65.00	0.00E+00	0.00E+00	2.76E+01	1.04E+03	1.05E+03
75.00	0.00E+00	0.00E+00	1.82E+01	7.50E+02	7.56E+02
85.00	0.00E+00	0.00E+00	1.17E+01	5.15E+02	5.19E+02
95.00	0.00E+00	0.00E+00	1.45E+01	6.74E+02	6.78E+02
125.00	0.00E+00	0.00E+00	1.01E+01	5.12E+02	5.14E+02

139.305991154639800 total grams airborne in tank
2.882427334250024E-005 total g/s out riser
2587.577243804932000 total grams lost out riser
22121.116811156270000 total grams settled on floor
24462.856029510500000 total grams made airborne
385.144002616405500 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.67E+00	4.52E-03	4.04E+01	1.28E+00	4.95E+01
1.50	3.75E+01	1.96E-02	1.74E+02	4.04E+01	2.48E+02
2.50	3.18E+01	1.67E-02	1.44E+02	8.70E+01	2.59E+02
3.50	5.00E+01	2.64E-02	2.16E+02	2.40E+02	4.98E+02
4.50	6.50E+01	3.45E-02	2.66E+02	4.52E+02	7.71E+02
5.50	5.97E+01	3.18E-02	2.34E+02	5.36E+02	8.17E+02
6.50	4.03E+01	2.16E-02	1.55E+02	4.37E+02	6.22E+02
7.50	2.92E+01	1.57E-02	1.12E+02	3.68E+02	5.01E+02
8.50	2.39E+01	1.29E-02	9.31E+01	3.44E+02	4.54E+02
9.50	1.72E+01	9.38E-03	6.91E+01	2.83E+02	3.63E+02
15.00	1.28E+02	7.30E-02	6.28E+02	4.18E+03	4.86E+03
25.00	5.11E+01	3.32E-02	3.31E+02	4.46E+03	4.77E+03
35.00	2.42E+01	1.87E-02	1.95E+02	4.14E+03	4.29E+03
45.00	1.61E+01	1.50E-02	1.59E+02	4.51E+03	4.61E+03
55.00	1.13E+00	1.23E-03	1.32E+01	4.41E+02	4.49E+02
65.00	2.27E+00	2.89E-03	3.10E+01	1.17E+03	1.18E+03
75.00	1.29E+00	1.90E-03	2.04E+01	8.42E+02	8.50E+02
85.00	7.22E-01	1.22E-03	1.31E+01	5.79E+02	5.83E+02
95.00	7.89E-01	1.52E-03	1.63E+01	7.57E+02	7.62E+02
125.00	4.03E-01	1.05E-03	1.13E+01	5.75E+02	5.78E+02

589.753208279609700 total grams airborne in tank
3.427481893450022E-001 total g/s out riser
2921.712335586548000 total grams lost out riser
24442.534428954120000 total grams settled on floor
27520.712451934810000 total grams made airborne
433.286996901035300 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.53E+00	1.76E-06	4.04E+01	1.42E+00	4.95E+01
1.50	3.33E+01	6.89E-06	1.74E+02	4.45E+01	2.48E+02
2.50	2.33E+01	4.82E-06	1.44E+02	9.55E+01	2.59E+02
3.50	2.75E+01	5.68E-06	2.16E+02	2.63E+02	4.98E+02
4.50	2.44E+01	5.05E-06	2.66E+02	4.92E+02	7.71E+02
5.50	1.40E+01	2.89E-06	2.34E+02	5.82E+02	8.17E+02

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6.50	5.36E+00	1.11E-06	1.55E+02	4.72E+02	6.22E+02
7.50	2.01E+00	4.15E-07	1.12E+02	3.95E+02	5.01E+02
8.50	7.74E-01	1.60E-07	9.32E+01	3.67E+02	4.54E+02
9.50	2.40E-01	4.97E-08	6.91E+01	3.00E+02	3.63E+02
15.00	3.26E-03	6.74E-10	6.28E+02	4.31E+03	4.86E+03
25.00	1.01E-11	2.09E-18	3.31E+02	4.51E+03	4.77E+03
35.00	3.43E-24	7.11E-31	1.95E+02	4.17E+03	4.29E+03
45.00	4.23E-40	0.00E+00	1.59E+02	4.52E+03	4.61E+03
55.00	0.00E+00	0.00E+00	1.32E+01	4.42E+02	4.49E+02
65.00	0.00E+00	0.00E+00	3.10E+01	1.17E+03	1.18E+03
75.00	0.00E+00	0.00E+00	2.04E+01	8.43E+02	8.50E+02
85.00	0.00E+00	0.00E+00	1.31E+01	5.79E+02	5.83E+02
95.00	0.00E+00	0.00E+00	1.63E+01	7.58E+02	7.62E+02
125.00	0.00E+00	0.00E+00	1.13E+01	5.76E+02	5.78E+02

139.371823292701400 total grams airborne in tank
2.883789518570921E-005 total g/s out riser
2921.887057304382000 total grams lost out riser
24892.740729689600000 total grams settled on floor
27520.712451934810000 total grams made airborne
433.286996901035300 total grams bypassed

**** OUTPUT @ 740.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.68E+00	4.53E-03	4.58E+01	1.46E+00	5.50E+01
1.50	3.75E+01	1.96E-02	1.96E+02	4.59E+01	2.75E+02
2.50	3.18E+01	1.67E-02	1.62E+02	9.84E+01	2.87E+02
3.50	5.00E+01	2.64E-02	2.41E+02	2.71E+02	5.53E+02
4.50	6.50E+01	3.45E-02	2.97E+02	5.08E+02	8.56E+02
5.50	5.97E+01	3.18E-02	2.61E+02	6.02E+02	9.08E+02
6.50	4.03E+01	2.16E-02	1.72E+02	4.89E+02	6.91E+02
7.50	2.92E+01	1.57E-02	1.24E+02	4.12E+02	5.57E+02
8.50	2.39E+01	1.29E-02	1.04E+02	3.85E+02	5.05E+02
9.50	1.72E+01	9.38E-03	7.68E+01	3.16E+02	4.04E+02
15.00	1.28E+02	7.30E-02	6.98E+02	4.66E+03	5.40E+03
25.00	5.11E+01	3.32E-02	3.68E+02	4.96E+03	5.30E+03
35.00	2.42E+01	1.87E-02	2.17E+02	4.60E+03	4.77E+03
45.00	1.61E+01	1.50E-02	1.77E+02	5.01E+03	5.12E+03
55.00	1.13E+00	1.23E-03	1.47E+01	4.90E+02	4.98E+02
65.00	2.27E+00	2.89E-03	3.45E+01	1.30E+03	1.31E+03
75.00	1.29E+00	1.90E-03	2.27E+01	9.36E+02	9.45E+02
85.00	7.22E-01	1.22E-03	1.46E+01	6.43E+02	6.48E+02
95.00	7.89E-01	1.52E-03	1.81E+01	8.41E+02	8.47E+02
125.00	4.03E-01	1.05E-03	1.26E+01	6.39E+02	6.42E+02

589.787700772285500 total grams airborne in tank
3.427658909931779E-001 total g/s out riser
3256.051990509033000 total grams lost out riser
27214.159867286680000 total grams settled on floor
30578.569133758540000 total grams made airborne
481.429987609386400 total grams bypassed

**** OUTPUT @ 800.000000000000000 minutes ****

diam	airborne	outflow	totalout	totalflr	source

mcrn	g	g/s	g	g	g
.50	8.54E+00	1.77E-06	4.58E+01	1.60E+00	5.50E+01
1.50	3.33E+01	6.90E-06	1.96E+02	5.00E+01	2.75E+02
2.50	2.33E+01	4.82E-06	1.62E+02	1.07E+02	2.87E+02
3.50	2.75E+01	5.68E-06	2.42E+02	2.93E+02	5.53E+02
4.50	2.44E+01	5.05E-06	2.97E+02	5.48E+02	8.56E+02
5.50	1.40E+01	2.89E-06	2.61E+02	6.47E+02	9.08E+02
6.50	5.36E+00	1.11E-06	1.72E+02	5.24E+02	6.91E+02
7.50	2.01E+00	4.15E-07	1.24E+02	4.39E+02	5.57E+02
8.50	7.74E-01	1.60E-07	1.04E+02	4.08E+02	5.05E+02
9.50	2.40E-01	4.97E-08	7.68E+01	3.33E+02	4.04E+02
15.00	3.26E-03	6.74E-10	6.98E+02	4.79E+03	5.40E+03
25.00	1.01E-11	2.09E-18	3.68E+02	5.01E+03	5.30E+03
35.00	3.43E-24	7.11E-31	2.17E+02	4.63E+03	4.77E+03
45.00	4.23E-40	0.00E+00	1.77E+02	5.03E+03	5.12E+03
55.00	0.00E+00	0.00E+00	1.47E+01	4.92E+02	4.98E+02
65.00	0.00E+00	0.00E+00	3.45E+01	1.30E+03	1.31E+03
75.00	0.00E+00	0.00E+00	2.27E+01	9.37E+02	9.45E+02
85.00	0.00E+00	0.00E+00	1.46E+01	6.44E+02	6.48E+02
95.00	0.00E+00	0.00E+00	1.81E+01	8.42E+02	8.47E+02
125.00	0.00E+00	0.00E+00	1.26E+01	6.40E+02	6.42E+02

139.403395634620300 total grams airborne in tank
2.884442797246521E-005 total g/s out riser
3256.226721763611000 total grams lost out riser
27664.369591593740000 total grams settled on floor
30578.569133758540000 total grams made airborne
481.429987609386400 total grams bypassed

**** OUTPUT @ 820.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.69E+00	4.53E-03	5.12E+01	1.65E+00	6.05E+01
1.50	3.75E+01	1.96E-02	2.19E+02	5.14E+01	3.03E+02
2.50	3.18E+01	1.67E-02	1.79E+02	1.10E+02	3.16E+02
3.50	5.00E+01	2.64E-02	2.67E+02	3.01E+02	6.09E+02
4.50	6.50E+01	3.45E-02	3.28E+02	5.64E+02	9.42E+02
5.50	5.97E+01	3.18E-02	2.88E+02	6.67E+02	9.99E+02
6.50	4.03E+01	2.16E-02	1.90E+02	5.42E+02	7.60E+02
7.50	2.92E+01	1.57E-02	1.37E+02	4.56E+02	6.12E+02
8.50	2.39E+01	1.29E-02	1.14E+02	4.26E+02	5.55E+02
9.50	1.72E+01	9.38E-03	8.45E+01	3.49E+02	4.44E+02
15.00	1.28E+02	7.30E-02	7.67E+02	5.14E+03	5.94E+03
25.00	5.11E+01	3.32E-02	4.04E+02	5.46E+03	5.83E+03
35.00	2.42E+01	1.87E-02	2.38E+02	5.07E+03	5.25E+03
45.00	1.61E+01	1.50E-02	1.94E+02	5.51E+03	5.63E+03
55.00	1.13E+00	1.23E-03	1.61E+01	5.40E+02	5.48E+02
65.00	2.27E+00	2.89E-03	3.79E+01	1.43E+03	1.45E+03
75.00	1.29E+00	1.90E-03	2.50E+01	1.03E+03	1.04E+03
85.00	7.22E-01	1.22E-03	1.61E+01	7.08E+02	7.13E+02
95.00	7.89E-01	1.52E-03	2.00E+01	9.26E+02	9.32E+02
125.00	4.03E-01	1.05E-03	1.38E+01	7.03E+02	7.06E+02

589.804286122322100 total grams airborne in tank
3.427744032815099E-001 total g/s out riser
3590.405979156494000 total grams lost out riser

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29985.789272308350000 total grams settled on floor
33636.425754547120000 total grams made airborne
529.572978079319000 total grams bypassed

**** OUTPUT @ 880.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.55E+00	1.77E-06	5.12E+01	1.78E+00	6.05E+01
1.50	3.33E+01	6.90E-06	2.19E+02	5.56E+01	3.03E+02
2.50	2.33E+01	4.82E-06	1.80E+02	1.18E+02	3.16E+02
3.50	2.75E+01	5.68E-06	2.67E+02	3.24E+02	6.09E+02
4.50	2.44E+01	5.05E-06	3.28E+02	6.05E+02	9.42E+02
5.50	1.40E+01	2.89E-06	2.88E+02	7.13E+02	9.99E+02
6.50	5.36E+00	1.11E-06	1.90E+02	5.77E+02	7.60E+02
7.50	2.01E+00	4.15E-07	1.37E+02	4.83E+02	6.12E+02
8.50	7.74E-01	1.60E-07	1.14E+02	4.49E+02	5.55E+02
9.50	2.40E-01	4.97E-08	8.45E+01	3.66E+02	4.44E+02
15.00	3.26E-03	6.74E-10	7.67E+02	5.27E+03	5.94E+03
25.00	1.01E-11	2.09E-18	4.04E+02	5.51E+03	5.83E+03
35.00	3.43E-24	7.11E-31	2.38E+02	5.09E+03	5.25E+03
45.00	4.23E-40	0.00E+00	1.94E+02	5.53E+03	5.63E+03
55.00	0.00E+00	0.00E+00	1.61E+01	5.41E+02	5.48E+02
65.00	0.00E+00	0.00E+00	3.79E+01	1.43E+03	1.45E+03
75.00	0.00E+00	0.00E+00	2.50E+01	1.03E+03	1.04E+03
85.00	0.00E+00	0.00E+00	1.61E+01	7.08E+02	7.13E+02
95.00	0.00E+00	0.00E+00	2.00E+01	9.26E+02	9.32E+02
125.00	0.00E+00	0.00E+00	1.38E+01	7.04E+02	7.06E+02

139.418683033912300 total grams airborne in tank
2.884759051291695E-005 total g/s out riser
3590.580754280090000 total grams lost out riser
30436.000418543820000 total grams settled on floor
33636.425754547120000 total grams made airborne
529.572978079319000 total grams bypassed

**** OUTPUT @ 900.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.69E+00	4.53E-03	5.66E+01	1.83E+00	6.60E+01
1.50	3.75E+01	1.96E-02	2.41E+02	5.70E+01	3.30E+02
2.50	3.18E+01	1.67E-02	1.97E+02	1.21E+02	3.45E+02
3.50	5.00E+01	2.64E-02	2.93E+02	3.32E+02	6.64E+02
4.50	6.50E+01	3.45E-02	3.58E+02	6.20E+02	1.03E+03
5.50	5.97E+01	3.18E-02	3.15E+02	7.33E+02	1.09E+03
6.50	4.03E+01	2.16E-02	2.07E+02	5.95E+02	8.29E+02
7.50	2.92E+01	1.57E-02	1.50E+02	5.00E+02	6.68E+02
8.50	2.39E+01	1.29E-02	1.24E+02	4.67E+02	6.05E+02
9.50	1.72E+01	9.38E-03	9.22E+01	3.83E+02	4.84E+02
15.00	1.28E+02	7.30E-02	8.37E+02	5.62E+03	6.48E+03
25.00	5.11E+01	3.32E-02	4.41E+02	5.96E+03	6.36E+03
35.00	2.42E+01	1.87E-02	2.60E+02	5.53E+03	5.72E+03
45.00	1.61E+01	1.50E-02	2.12E+02	6.01E+03	6.15E+03
55.00	1.13E+00	1.23E-03	1.76E+01	5.89E+02	5.98E+02
65.00	2.27E+00	2.89E-03	4.13E+01	1.56E+03	1.58E+03

75.00	1.29E+00	1.90E-03	2.73E+01	1.12E+03	1.13E+03
85.00	7.22E-01	1.22E-03	1.75E+01	7.72E+02	7.78E+02
95.00	7.89E-01	1.52E-03	2.18E+01	1.01E+03	1.02E+03
125.00	4.03E-01	1.05E-03	1.51E+01	7.67E+02	7.71E+02

589.812331318855300 total grams airborne in tank
3.427785313688219E-001 total g/s out riser
3924.766946792603000 total grams lost out riser
32757.420610785480000 total grams settled on floor
36694.282493591310000 total grams made airborne
577.715969443321200 total grams bypassed

**** OUTPUT @ 960.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.55E+00	1.77E-06	5.66E+01	1.97E+00	6.60E+01
1.50	3.33E+01	6.90E-06	2.41E+02	6.11E+01	3.30E+02
2.50	2.33E+01	4.82E-06	1.97E+02	1.30E+02	3.45E+02
3.50	2.75E+01	5.68E-06	2.93E+02	3.54E+02	6.64E+02
4.50	2.44E+01	5.05E-06	3.59E+02	6.61E+02	1.03E+03
5.50	1.40E+01	2.89E-06	3.15E+02	7.78E+02	1.09E+03
6.50	5.36E+00	1.11E-06	2.07E+02	6.30E+02	8.29E+02
7.50	2.01E+00	4.15E-07	1.50E+02	5.27E+02	6.68E+02
8.50	7.74E-01	1.60E-07	1.24E+02	4.90E+02	6.05E+02
9.50	2.40E-01	4.97E-08	9.22E+01	4.00E+02	4.84E+02
15.00	3.26E-03	6.74E-10	8.37E+02	5.75E+03	6.48E+03
25.00	1.01E-11	2.09E-18	4.41E+02	6.01E+03	6.36E+03
35.00	3.43E-24	7.11E-31	2.60E+02	5.55E+03	5.72E+03
45.00	4.23E-40	0.00E+00	2.12E+02	6.03E+03	6.15E+03
55.00	0.00E+00	0.00E+00	1.76E+01	5.90E+02	5.98E+02
65.00	0.00E+00	0.00E+00	4.13E+01	1.56E+03	1.58E+03
75.00	0.00E+00	0.00E+00	2.73E+01	1.12E+03	1.13E+03
85.00	0.00E+00	0.00E+00	1.75E+01	7.73E+02	7.78E+02
95.00	0.00E+00	0.00E+00	2.18E+01	1.01E+03	1.02E+03
125.00	0.00E+00	0.00E+00	1.51E+01	7.68E+02	7.71E+02

139.426144581763900 total grams airborne in tank
2.884913438017321E-005 total g/s out riser
3924.941729545593000 total grams lost out riser
33207.632051587100000 total grams settled on floor
36694.282493591310000 total grams made airborne
577.715969443321200 total grams bypassed

**** OUTPUT @ 980.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.69E+00	4.53E-03	6.20E+01	2.01E+00	7.16E+01
1.50	3.75E+01	1.96E-02	2.63E+02	6.25E+01	3.58E+02
2.50	3.18E+01	1.67E-02	2.15E+02	1.33E+02	3.74E+02
3.50	5.00E+01	2.64E-02	3.19E+02	3.62E+02	7.20E+02
4.50	6.50E+01	3.45E-02	3.89E+02	6.76E+02	1.11E+03
5.50	5.97E+01	3.18E-02	3.41E+02	7.98E+02	1.18E+03
6.50	4.03E+01	2.16E-02	2.24E+02	6.48E+02	8.98E+02
7.50	2.92E+01	1.57E-02	1.62E+02	5.44E+02	7.23E+02

8.50	2.39E+01	1.29E-02	1.35E+02	5.08E+02	6.56E+02
9.50	1.72E+01	9.38E-03	9.99E+01	4.16E+02	5.25E+02
15.00	1.28E+02	7.30E-02	9.07E+02	6.10E+03	7.02E+03
25.00	5.11E+01	3.32E-02	4.78E+02	6.46E+03	6.89E+03
35.00	2.42E+01	1.87E-02	2.82E+02	5.99E+03	6.20E+03
45.00	1.61E+01	1.50E-02	2.30E+02	6.52E+03	6.66E+03
55.00	1.13E+00	1.23E-03	1.91E+01	6.38E+02	6.48E+02
65.00	2.27E+00	2.89E-03	4.48E+01	1.69E+03	1.71E+03
75.00	1.29E+00	1.90E-03	2.95E+01	1.22E+03	1.23E+03
85.00	7.22E-01	1.22E-03	1.90E+01	8.36E+02	8.43E+02
95.00	7.89E-01	1.52E-03	2.36E+01	1.09E+03	1.10E+03
125.00	4.03E-01	1.05E-03	1.63E+01	8.31E+02	8.35E+02

589.816267132759100 total grams airborne in tank
3.427805518731475E-001 total g/s out riser
4259.131282806396000 total grams lost out riser
35529.052448749540000 total grams settled on floor
39752.139205932620000 total grams made airborne
625.858961343765300 total grams bypassed

**** OUTPUT @ 1040.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	8.55E+00	1.77E-06	6.20E+01	2.15E+00	7.16E+01
1.50	3.33E+01	6.90E-06	2.63E+02	6.66E+01	3.58E+02
2.50	2.33E+01	4.82E-06	2.15E+02	1.41E+02	3.74E+02
3.50	2.75E+01	5.68E-06	3.19E+02	3.85E+02	7.20E+02
4.50	2.44E+01	5.05E-06	3.89E+02	7.17E+02	1.11E+03
5.50	1.40E+01	2.89E-06	3.41E+02	8.44E+02	1.18E+03
6.50	5.36E+00	1.11E-06	2.25E+02	6.83E+02	8.98E+02
7.50	2.01E+00	4.15E-07	1.62E+02	5.71E+02	7.23E+02
8.50	7.74E-01	1.60E-07	1.35E+02	5.31E+02	6.56E+02
9.50	2.40E-01	4.97E-08	9.99E+01	4.33E+02	5.25E+02
15.00	3.26E-03	6.74E-10	9.07E+02	6.23E+03	7.02E+03
25.00	1.01E-11	2.09E-18	4.78E+02	6.52E+03	6.89E+03
35.00	3.43E-24	7.11E-31	2.82E+02	6.02E+03	6.20E+03
45.00	4.23E-40	0.00E+00	2.30E+02	6.53E+03	6.66E+03
55.00	0.00E+00	0.00E+00	1.91E+01	6.39E+02	6.48E+02
65.00	0.00E+00	0.00E+00	4.48E+01	1.69E+03	1.71E+03
75.00	0.00E+00	0.00E+00	2.95E+01	1.22E+03	1.23E+03
85.00	0.00E+00	0.00E+00	1.90E+01	8.37E+02	8.43E+02
95.00	0.00E+00	0.00E+00	2.36E+01	1.09E+03	1.10E+03
125.00	0.00E+00	0.00E+00	1.63E+01	8.32E+02	8.35E+02

139.429808598487500 total grams airborne in tank
2.884989323981500E-005 total g/s out riser
4259.306051254272000 total grams lost out riser
35979.264156818390000 total grams settled on floor
39752.139205932620000 total grams made airborne
625.858961343765300 total grams bypassed

Table 4. Comparison of Aerosols With and Without Bypass Fraction
(IL=2100 cfm, PR=1 in./min. for all cases)

WH (in.)	Distance to Riser (m)	Bypass Fraction	Aerosol w/Bypass (g)	Aerosol No Bypass (g)	Percent Increase w/Bypass
500,000 gallon tank					
19.0	5.0874	0.0119	249.4	215.5	13.5926
76.0	3.6397	0.0166	943.7	802.3	14.9836
140.0	2.0142	0.0301	2301.9	1794.9	22.0253
171.0	1.2268	0.0494	4210.2	2976.3	29.3074
181.8	0.9525	0.0636	4882.6	3213.0	34.1949
750,000 gallon tank					
19.0	7.3974	0.0082	211.5	187.5	11.3475
95.0	5.4671	0.0111	1450.5	1292.4	10.8997
171.0	3.5368	0.0171	3049.8	2616.5	14.2075
266.0	1.1239	0.0539	6693.7	4597.7	31.3130
272.7	0.9538	0.0635	7263.8	4808.0	33.8088
1,000,000 gallon tank					
19.0	9.7074	0.0062	183.0	164.7	10.0000
133.0	6.8120	0.0089	2111.3	1935.0	8.3503
247.0	3.9165	0.0155	4259.3	3690.7	13.3496
361.0	1.0210	0.0594	9448.1	6318.0	33.1294
363.6	0.9550	0.0635	9917.4	6556.8	33.8859

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

180B

ADDITIONAL PARAMETERS:

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particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     1061.310000000000000
bypass fraction =   5.940000000000000E-002

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000
Output divisions in Period        3.000000000000000 =        1.000000
Output divisions in Period        4.000000000000000 =        1.000000
Output divisions in Period        5.000000000000000 =        1.000000
Output divisions in Period        6.000000000000000 =        1.000000
Output divisions in Period        7.000000000000000 =        1.000000
Output divisions in Period        8.000000000000000 =        1.000000
Output divisions in Period        9.000000000000000 =        1.000000
Output divisions in Period       10.000000000000000 =        1.000000
Output divisions in Period       11.000000000000000 =        1.000000
Output divisions in Period       12.000000000000000 =        1.000000
Output divisions in Period       13.000000000000000 =        1.000000
Output divisions in Period       14.000000000000000 =        1.000000
Output divisions in Period       15.000000000000000 =        1.000000
Output divisions in Period       16.000000000000000 =        1.000000
Output divisions in Period       17.000000000000000 =        1.000000
Output divisions in Period       18.000000000000000 =        1.000000
Output divisions in Period       19.000000000000000 =        1.000000
Output divisions in Period       20.000000000000000 =        1.000000
Output divisions in Period       21.000000000000000 =        1.000000
Output divisions in Period       22.000000000000000 =        1.000000
Output divisions in Period       23.000000000000000 =        1.000000
Output divisions in Period       24.000000000000000 =        1.000000
Output divisions in Period       25.000000000000000 =        1.000000
Output divisions in Period       26.000000000000000 =        1.000000
Output divisions in Period       27.000000000000000 =        1.000000
Output divisions in Period       28.000000000000000 =        1.000000
Output divisions in Period       29.000000000000000 =        1.000000
Output divisions in Period       30.000000000000000 =        1.000000
Output divisions in Period       31.000000000000000 =        1.000000
Output divisions in Period       32.000000000000000 =        1.000000
Output divisions in Period       33.000000000000000 =        1.000000
Output divisions in Period       34.000000000000000 =        1.000000
Output divisions in Period       35.000000000000000 =        1.000000
Output divisions in Period       36.000000000000000 =        1.000000
Output divisions in Period       37.000000000000000 =        1.000000
Output divisions in Period       38.000000000000000 =        1.000000

Flow out @    0.000000E+00 min =     2480.000000 cfm &      155.300000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      100.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      180.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      240.000000 min =     2480.000000 cfm &      155.300000g/m
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Flow out @	260.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	320.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	340.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	400.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	420.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	480.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	500.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	560.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	580.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	640.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	660.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	720.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	740.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	800.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	820.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	880.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	900.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	960.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	980.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	1040.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	1060.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	1120.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	1140.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	1200.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	1220.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	1280.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	1300.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	1360.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	1380.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	1440.000000	min =	2480.000000	cfm &	155.300000g/m
Flow out @	1460.000000	min =	1.000000	cfm &	0.000000E+00g/m
Flow out @	1520.000000	min =	0.000000E+00	cfm &	0.000000E+00g/m

**** OUTPUT @ 20.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	2.90E+00	3.48E-03	2.67E+00	2.01E-02	5.26E+00
1.50	1.41E+01	1.69E-02	1.31E+01	7.26E-01	2.63E+01
2.50	1.40E+01	1.69E-02	1.33E+01	1.95E+00	2.75E+01
3.50	2.49E+01	3.03E-02	2.44E+01	6.84E+00	5.29E+01
4.50	3.51E+01	4.30E-02	3.57E+01	1.62E+01	8.18E+01
5.50	3.33E+01	4.12E-02	3.54E+01	2.35E+01	8.68E+01
6.50	2.24E+01	2.81E-02	2.50E+01	2.28E+01	6.60E+01
7.50	1.58E+01	2.02E-02	1.86E+01	2.21E+01	5.32E+01
8.50	1.25E+01	1.63E-02	1.56E+01	2.32E+01	4.82E+01
9.50	8.69E+00	1.16E-02	1.15E+01	2.09E+01	3.86E+01
15.00	5.80E+01	9.11E-02	1.01E+02	3.90E+02	5.16E+02
25.00	2.27E+01	5.17E-02	6.07E+01	4.55E+02	5.06E+02
35.00	1.08E+01	3.59E-02	4.27E+01	4.31E+02	4.56E+02
45.00	7.17E+00	3.37E-02	4.03E+01	4.73E+02	4.89E+02
55.00	5.03E-01	3.06E-03	3.67E+00	4.65E+01	4.76E+01
65.00	1.01E+00	7.73E-03	9.26E+00	1.23E+02	1.26E+02
75.00	5.74E-01	5.38E-03	6.46E+00	8.89E+01	9.03E+01
85.00	3.21E-01	3.61E-03	4.33E+00	6.12E+01	6.19E+01
95.00	3.51E-01	4.65E-03	5.57E+00	8.01E+01	8.09E+01
125.00	1.79E-01	3.43E-03	4.11E+00	6.09E+01	6.14E+01

285.099227175116500 total grams airborne in tank
4.681584595236927E-001 total g/s out riser
473.076158523559600 total grams lost out riser
2347.824654972181000 total grams settled on floor
2921.503611564636000 total grams made airborne
184.496401935815800 total grams bypassed

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	2.80E+00	1.25E-06	2.67E+00	1.17E-01	5.26E+00
1.50	1.10E+01	4.87E-06	1.31E+01	3.86E+00	2.63E+01
2.50	7.15E+00	3.18E-06	1.33E+01	8.76E+00	2.75E+01
3.50	6.88E+00	3.06E-06	2.45E+01	2.49E+01	5.29E+01
4.50	4.27E+00	1.90E-06	3.57E+01	4.70E+01	8.18E+01
5.50	1.47E+00	6.52E-07	3.55E+01	5.53E+01	8.68E+01
6.50	2.92E-01	1.30E-07	2.51E+01	4.49E+01	6.60E+01
7.50	5.00E-02	2.22E-08	1.86E+01	3.78E+01	5.32E+01
8.50	7.85E-03	3.49E-09	1.56E+01	3.57E+01	4.82E+01
9.50	8.91E-04	3.96E-10	1.15E+01	2.95E+01	3.86E+01
15.00	7.71E-09	3.43E-15	1.01E+02	4.48E+02	5.16E+02
25.00	1.13E-26	5.04E-33	6.07E+01	4.77E+02	5.06E+02
35.00	0.00E+00	0.00E+00	4.27E+01	4.42E+02	4.56E+02
45.00	0.00E+00	0.00E+00	4.03E+01	4.80E+02	4.89E+02
55.00	0.00E+00	0.00E+00	3.67E+00	4.70E+01	4.76E+01
65.00	0.00E+00	0.00E+00	9.26E+00	1.24E+02	1.26E+02
75.00	0.00E+00	0.00E+00	6.46E+00	8.95E+01	9.03E+01
85.00	0.00E+00	0.00E+00	4.33E+00	6.15E+01	6.19E+01
95.00	0.00E+00	0.00E+00	5.57E+00	8.05E+01	8.09E+01
125.00	0.00E+00	0.00E+00	4.11E+00	6.11E+01	6.14E+01

33.875007855967180 total grams airborne in tank
1.506364499927344E-005 total g/s out riser
473.200767755508400 total grams lost out riser
2598.924252361059000 total grams settled on floor
2921.503611564636000 total grams made airborne
184.496401935815800 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.64E+00	4.29E-03	7.39E+00	1.55E-01	1.05E+01
1.50	1.68E+01	1.99E-02	3.40E+01	5.08E+00	5.26E+01
2.50	1.55E+01	1.85E-02	3.14E+01	1.15E+01	5.49E+01
3.50	2.61E+01	3.16E-02	5.32E+01	3.31E+01	1.06E+02
4.50	3.56E+01	4.36E-02	7.39E+01	6.44E+01	1.64E+02
5.50	3.34E+01	4.14E-02	7.16E+01	7.95E+01	1.74E+02
6.50	2.24E+01	2.81E-02	5.02E+01	6.78E+01	1.32E+02
7.50	1.58E+01	2.02E-02	3.73E+01	6.00E+01	1.06E+02
8.50	1.25E+01	1.63E-02	3.11E+01	5.89E+01	9.64E+01
9.50	8.69E+00	1.16E-02	2.29E+01	5.04E+01	7.71E+01
15.00	5.80E+01	9.11E-02	2.01E+02	8.38E+02	1.03E+03
25.00	2.27E+01	5.17E-02	1.21E+02	9.32E+02	1.01E+03

4.50	3.56E+01	4.36E-02	1.12E+02	1.13E+02	2.45E+02
5.50	3.34E+01	4.14E-02	1.08E+02	1.35E+02	2.60E+02
6.50	2.24E+01	2.81E-02	7.54E+01	1.13E+02	1.98E+02
7.50	1.58E+01	2.02E-02	5.59E+01	9.79E+01	1.60E+02
8.50	1.25E+01	1.63E-02	4.67E+01	9.46E+01	1.45E+02
9.50	8.69E+00	1.16E-02	3.44E+01	7.99E+01	1.16E+02
15.00	5.80E+01	9.11E-02	3.02E+02	1.29E+03	1.55E+03
25.00	2.27E+01	5.17E-02	1.82E+02	1.41E+03	1.52E+03
35.00	1.08E+01	3.59E-02	1.28E+02	1.31E+03	1.37E+03
45.00	7.17E+00	3.37E-02	1.21E+02	1.43E+03	1.47E+03
55.00	5.03E-01	3.06E-03	1.10E+01	1.40E+02	1.43E+02
65.00	1.01E+00	7.73E-03	2.78E+01	3.72E+02	3.77E+02
75.00	5.74E-01	5.38E-03	1.94E+01	2.68E+02	2.71E+02
85.00	3.21E-01	3.61E-03	1.30E+01	1.84E+02	1.86E+02
95.00	3.51E-01	4.65E-03	1.67E+01	2.41E+02	2.43E+02
125.00	1.79E-01	3.43E-03	1.23E+01	1.83E+02	1.84E+02

292.886242851615000 total grams airborne in tank
4.767460911534727E-001 total g/s out riser
1466.770663261414000 total grams lost out riser
7558.343173176050000 total grams settled on floor
8764.510722160339000 total grams made airborne
553.489206194877600 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.69E+00	1.64E-06	1.26E+01	4.47E-01	1.58E+01
1.50	1.34E+01	5.97E-06	5.65E+01	1.40E+01	7.89E+01
2.50	8.01E+00	3.56E-06	5.00E+01	2.95E+01	8.24E+01
3.50	7.23E+00	3.21E-06	8.22E+01	7.93E+01	1.59E+02
4.50	4.34E+00	1.93E-06	1.12E+02	1.44E+02	2.45E+02
5.50	1.47E+00	6.55E-07	1.08E+02	1.67E+02	2.60E+02
6.50	2.92E-01	1.30E-07	7.54E+01	1.35E+02	1.98E+02
7.50	5.00E-02	2.22E-08	5.60E+01	1.14E+02	1.60E+02
8.50	7.85E-03	3.49E-09	4.67E+01	1.07E+02	1.45E+02
9.50	8.91E-04	3.96E-10	3.44E+01	8.86E+01	1.16E+02
15.00	7.71E-09	3.43E-15	3.02E+02	1.34E+03	1.55E+03
25.00	1.13E-26	5.04E-33	1.82E+02	1.43E+03	1.52E+03
35.00	0.00E+00	0.00E+00	1.28E+02	1.33E+03	1.37E+03
45.00	0.00E+00	0.00E+00	1.21E+02	1.44E+03	1.47E+03
55.00	0.00E+00	0.00E+00	1.10E+01	1.41E+02	1.43E+02
65.00	0.00E+00	0.00E+00	2.78E+01	3.73E+02	3.77E+02
75.00	0.00E+00	0.00E+00	1.94E+01	2.69E+02	2.71E+02
85.00	0.00E+00	0.00E+00	1.30E+01	1.85E+02	1.86E+02
95.00	0.00E+00	0.00E+00	1.67E+01	2.41E+02	2.43E+02
125.00	0.00E+00	0.00E+00	1.23E+01	1.83E+02	1.84E+02

38.528806702727940 total grams airborne in tank
1.713311044722483E-005 total g/s out riser
1466.904794692993000 total grams lost out riser
7812.566435366869000 total grams settled on floor
8764.510722160339000 total grams made airborne
553.489206194877600 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

35.00	1.08E+01	3.59E-02	8.54E+01	8.73E+02	9.12E+02
45.00	7.17E+00	3.37E-02	8.05E+01	9.53E+02	9.79E+02
55.00	5.03E-01	3.06E-03	7.33E+00	9.34E+01	9.52E+01
65.00	1.01E+00	7.73E-03	1.85E+01	2.48E+02	2.51E+02
75.00	5.74E-01	5.38E-03	1.29E+01	1.78E+02	1.81E+02
85.00	3.21E-01	3.61E-03	8.67E+00	1.23E+02	1.24E+02
95.00	3.51E-01	4.65E-03	1.11E+01	1.61E+02	1.62E+02
125.00	1.79E-01	3.43E-03	8.22E+00	1.22E+02	1.23E+02

291.956791624426800 total grams airborne in tank
4.757210738025606E-001 total g/s out riser
968.534251689910900 total grams lost out riser
4951.509038984776000 total grams settled on floor
5843.007223129272000 total grams made airborne
368.992803871631600 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.51E+00	1.56E-06	7.39E+00	2.77E-01	1.05E+01
1.50	1.30E+01	5.80E-06	3.41E+01	8.82E+00	5.26E+01
2.50	7.93E+00	3.52E-06	3.14E+01	1.91E+01	5.49E+01
3.50	7.21E+00	3.21E-06	5.32E+01	5.20E+01	1.06E+02
4.50	4.34E+00	1.93E-06	7.39E+01	9.57E+01	1.64E+02
5.50	1.47E+00	6.55E-07	7.17E+01	1.11E+02	1.74E+02
6.50	2.92E-01	1.30E-07	5.02E+01	8.99E+01	1.32E+02
7.50	5.00E-02	2.22E-08	3.73E+01	7.57E+01	1.06E+02
8.50	7.85E-03	3.49E-09	3.11E+01	7.14E+01	9.64E+01
9.50	8.91E-04	3.96E-10	2.29E+01	5.91E+01	7.71E+01
15.00	7.71E-09	3.43E-15	2.01E+02	8.96E+02	1.03E+03
25.00	1.13E-26	5.04E-33	1.21E+02	9.55E+02	1.01E+03
35.00	0.00E+00	0.00E+00	8.54E+01	8.84E+02	9.12E+02
45.00	0.00E+00	0.00E+00	8.05E+01	9.60E+02	9.79E+02
55.00	0.00E+00	0.00E+00	7.33E+00	9.39E+01	9.52E+01
65.00	0.00E+00	0.00E+00	1.85E+01	2.49E+02	2.51E+02
75.00	0.00E+00	0.00E+00	1.29E+01	1.79E+02	1.81E+02
85.00	0.00E+00	0.00E+00	8.67E+00	1.23E+02	1.24E+02
95.00	0.00E+00	0.00E+00	1.11E+01	1.61E+02	1.62E+02
125.00	0.00E+00	0.00E+00	8.22E+00	1.22E+02	1.23E+02

37.850842045182850 total grams airborne in tank
1.683163179718046E-005 total g/s out riser
968.667125701904300 total grams lost out riser
5205.482087612152000 total grams settled on floor
5843.007223129272000 total grams made airborne
368.992803871631600 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.83E+00	4.50E-03	1.26E+01	3.19E-01	1.58E+01
1.50	1.73E+01	2.05E-02	5.64E+01	1.01E+01	7.89E+01
2.50	1.57E+01	1.87E-02	5.00E+01	2.19E+01	8.24E+01
3.50	2.62E+01	3.17E-02	8.22E+01	6.03E+01	1.59E+02

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.87E+00	4.55E-03	1.80E+01	4.90E-01	2.10E+01
1.50	1.74E+01	2.06E-02	7.91E+01	1.53E+01	1.05E+02
2.50	1.57E+01	1.87E-02	6.87E+01	3.24E+01	1.10E+02
3.50	2.62E+01	3.17E-02	1.11E+02	8.75E+01	2.12E+02
4.50	3.56E+01	4.36E-02	1.50E+02	1.62E+02	3.27E+02
5.50	3.34E+01	4.14E-02	1.44E+02	1.92E+02	3.47E+02
6.50	2.24E+01	2.81E-02	1.01E+02	1.58E+02	2.64E+02
7.50	1.58E+01	2.02E-02	7.46E+01	1.36E+02	2.13E+02
8.50	1.25E+01	1.63E-02	6.23E+01	1.30E+02	1.93E+02
9.50	8.69E+00	1.16E-02	4.58E+01	1.09E+02	1.54E+02
15.00	5.80E+01	9.11E-02	4.03E+02	1.73E+03	2.06E+03
25.00	2.27E+01	5.17E-02	2.43E+02	1.89E+03	2.02E+03
35.00	1.08E+01	3.59E-02	1.71E+02	1.76E+03	1.82E+03
45.00	7.17E+00	3.37E-02	1.61E+02	1.91E+03	1.96E+03
55.00	5.03E-01	3.06E-03	1.47E+01	1.87E+02	1.90E+02
65.00	1.01E+00	7.73E-03	3.70E+01	4.96E+02	5.02E+02
75.00	5.74E-01	5.38E-03	2.58E+01	3.58E+02	3.61E+02
85.00	3.21E-01	3.61E-03	1.73E+01	2.46E+02	2.48E+02
95.00	3.51E-01	4.65E-03	2.23E+01	3.22E+02	3.24E+02
125.00	1.79E-01	3.43E-03	1.64E+01	2.44E+02	2.45E+02

293.051595911383600 total grams airborne in tank
4.769284417852759E-001 total g/s out riser
1965.488855361938000 total grams lost out riser
10165.459681540730000 total grams settled on floor
11686.014446258540000 total grams made airborne
737.985607743263200 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.74E+00	1.66E-06	1.80E+01	6.20E-01	2.10E+01
1.50	1.35E+01	6.01E-06	7.91E+01	1.92E+01	1.05E+02
2.50	8.02E+00	3.57E-06	6.87E+01	4.00E+01	1.10E+02
3.50	7.23E+00	3.21E-06	1.11E+02	1.06E+02	2.12E+02
4.50	4.34E+00	1.93E-06	1.50E+02	1.93E+02	3.27E+02
5.50	1.47E+00	6.55E-07	1.44E+02	2.23E+02	3.47E+02
6.50	2.92E-01	1.30E-07	1.01E+02	1.80E+02	2.64E+02
7.50	5.00E-02	2.22E-08	7.46E+01	1.51E+02	2.13E+02
8.50	7.85E-03	3.49E-09	6.23E+01	1.43E+02	1.93E+02
9.50	8.91E-04	3.96E-10	4.58E+01	1.18E+02	1.54E+02
15.00	7.71E-09	3.43E-15	4.03E+02	1.79E+03	2.06E+03
25.00	1.13E-26	5.04E-33	2.43E+02	1.91E+03	2.02E+03
35.00	0.00E+00	0.00E+00	1.71E+02	1.77E+03	1.82E+03
45.00	0.00E+00	0.00E+00	1.61E+02	1.92E+03	1.96E+03
55.00	0.00E+00	0.00E+00	1.47E+01	1.88E+02	1.90E+02
65.00	0.00E+00	0.00E+00	3.70E+01	4.97E+02	5.02E+02
75.00	0.00E+00	0.00E+00	2.58E+01	3.58E+02	3.61E+02
85.00	0.00E+00	0.00E+00	1.73E+01	2.46E+02	2.48E+02
95.00	0.00E+00	0.00E+00	2.23E+01	3.22E+02	3.24E+02
125.00	0.00E+00	0.00E+00	1.64E+01	2.44E+02	2.45E+02

38.659889118308690 total grams airborne in tank

1.719140058793907E-005 total g/s out riser
1965.623218536377000 total grams lost out riser
10419.716985940930000 total grams settled on floor
11686.014446258540000 total grams made airborne
737.985607743263200 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.56E-03	2.34E+01	6.64E-01	2.63E+01
1.50	1.74E+01	2.06E-02	1.02E+02	2.05E+01	1.31E+02
2.50	1.57E+01	1.87E-02	8.74E+01	4.29E+01	1.37E+02
3.50	2.62E+01	3.17E-02	1.40E+02	1.15E+02	2.64E+02
4.50	3.56E+01	4.36E-02	1.88E+02	2.11E+02	4.09E+02
5.50	3.34E+01	4.14E-02	1.80E+02	2.48E+02	4.34E+02
6.50	2.24E+01	2.81E-02	1.26E+02	2.03E+02	3.30E+02
7.50	1.58E+01	2.02E-02	9.33E+01	1.74E+02	2.66E+02
8.50	1.25E+01	1.63E-02	7.78E+01	1.66E+02	2.41E+02
9.50	8.69E+00	1.16E-02	5.73E+01	1.39E+02	1.93E+02
15.00	5.80E+01	9.11E-02	5.04E+02	2.18E+03	2.58E+03
25.00	2.27E+01	5.17E-02	3.03E+02	2.36E+03	2.53E+03
35.00	1.08E+01	3.59E-02	2.13E+02	2.20E+03	2.28E+03
45.00	7.17E+00	3.37E-02	2.01E+02	2.39E+03	2.45E+03
55.00	5.03E-01	3.06E-03	1.83E+01	2.34E+02	2.38E+02
65.00	1.01E+00	7.73E-03	4.63E+01	6.20E+02	6.28E+02
75.00	5.74E-01	5.38E-03	3.23E+01	4.47E+02	4.51E+02
85.00	3.21E-01	3.61E-03	2.17E+01	3.07E+02	3.10E+02
95.00	3.51E-01	4.65E-03	2.79E+01	4.02E+02	4.05E+02
125.00	1.79E-01	3.43E-03	2.06E+01	3.05E+02	3.07E+02

293.084180101752300 total grams airborne in tank
4.769643754698336E-001 total g/s out riser
2464.300909042358000 total grams lost out riser
12772.615161538120000 total grams settled on floor
14607.518215179440000 total grams made airborne
922.482014060020400 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	2.34E+01	7.94E-01	2.63E+01
1.50	1.35E+01	6.01E-06	1.02E+02	2.44E+01	1.31E+02
2.50	8.02E+00	3.57E-06	8.74E+01	5.05E+01	1.37E+02
3.50	7.23E+00	3.21E-06	1.40E+02	1.34E+02	2.64E+02
4.50	4.34E+00	1.93E-06	1.89E+02	2.42E+02	4.09E+02
5.50	1.47E+00	6.55E-07	1.80E+02	2.79E+02	4.34E+02
6.50	2.92E-01	1.30E-07	1.26E+02	2.25E+02	3.30E+02
7.50	5.00E-02	2.22E-08	9.33E+01	1.89E+02	2.66E+02
8.50	7.85E-03	3.49E-09	7.78E+01	1.78E+02	2.41E+02
9.50	8.91E-04	3.96E-10	5.73E+01	1.48E+02	1.93E+02
15.00	7.71E-09	3.43E-15	5.04E+02	2.24E+03	2.58E+03
25.00	1.13E-26	5.04E-33	3.03E+02	2.39E+03	2.53E+03
35.00	0.00E+00	0.00E+00	2.13E+02	2.21E+03	2.28E+03
45.00	0.00E+00	0.00E+00	2.01E+02	2.40E+03	2.45E+03

55.00	0.00E+00	0.00E+00	1.83E+01	2.35E+02	2.38E+02
65.00	0.00E+00	0.00E+00	4.63E+01	6.21E+02	6.28E+02
75.00	0.00E+00	0.00E+00	3.23E+01	4.48E+02	4.51E+02
85.00	0.00E+00	0.00E+00	2.17E+01	3.08E+02	3.10E+02
95.00	0.00E+00	0.00E+00	2.79E+01	4.02E+02	4.05E+02
125.00	0.00E+00	0.00E+00	2.06E+01	3.06E+02	3.07E+02

38.686875002021460 total grams airborne in tank
1.720340137052896E-005 total g/s out riser
2464.435291290283000 total grams lost out riser
13026.878025174140000 total grams settled on floor
14607.518215179440000 total grams made airborne
922.482014060020400 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	2.88E+01	8.38E-01	3.16E+01
1.50	1.74E+01	2.06E-02	1.25E+02	2.57E+01	1.58E+02
2.50	1.57E+01	1.87E-02	1.06E+02	5.34E+01	1.65E+02
3.50	2.62E+01	3.17E-02	1.69E+02	1.42E+02	3.17E+02
4.50	3.56E+01	4.36E-02	2.27E+02	2.59E+02	4.91E+02
5.50	3.34E+01	4.14E-02	2.16E+02	3.04E+02	5.21E+02
6.50	2.24E+01	2.81E-02	1.51E+02	2.48E+02	3.96E+02
7.50	1.58E+01	2.02E-02	1.12E+02	2.11E+02	3.19E+02
8.50	1.25E+01	1.63E-02	9.34E+01	2.02E+02	2.89E+02
9.50	8.69E+00	1.16E-02	6.87E+01	1.69E+02	2.31E+02
15.00	5.80E+01	9.11E-02	6.04E+02	2.63E+03	3.10E+03
25.00	2.27E+01	5.17E-02	3.64E+02	2.84E+03	3.04E+03
35.00	1.08E+01	3.59E-02	2.56E+02	2.64E+03	2.73E+03
45.00	7.17E+00	3.37E-02	2.42E+02	2.87E+03	2.94E+03
55.00	5.03E-01	3.06E-03	2.20E+01	2.81E+02	2.86E+02
65.00	1.01E+00	7.73E-03	5.56E+01	7.45E+02	7.54E+02
75.00	5.74E-01	5.38E-03	3.87E+01	5.37E+02	5.42E+02
85.00	3.21E-01	3.61E-03	2.60E+01	3.69E+02	3.72E+02
95.00	3.51E-01	4.65E-03	3.34E+01	4.82E+02	4.86E+02
125.00	1.79E-01	3.43E-03	2.47E+01	3.67E+02	3.68E+02

293.090967163443600 total grams airborne in tank
4.769718614406884E-001 total g/s out riser
2963.132335662842000 total grams lost out riser
15379.776920676230000 total grams settled on floor
17529.021945953370000 total grams made airborne
1106.978404641151000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	2.88E+01	9.68E-01	3.16E+01
1.50	1.35E+01	6.01E-06	1.25E+02	2.96E+01	1.58E+02
2.50	8.02E+00	3.57E-06	1.06E+02	6.10E+01	1.65E+02
3.50	7.23E+00	3.21E-06	1.69E+02	1.61E+02	3.17E+02
4.50	4.34E+00	1.93E-06	2.27E+02	2.91E+02	4.91E+02
5.50	1.47E+00	6.55E-07	2.16E+02	3.36E+02	5.21E+02

6.50	2.92E-01	1.30E-07	1.51E+02	2.70E+02	3.96E+02
7.50	5.00E-02	2.22E-08	1.12E+02	2.27E+02	3.19E+02
8.50	7.85E-03	3.49E-09	9.34E+01	2.14E+02	2.89E+02
9.50	8.91E-04	3.96E-10	6.87E+01	1.77E+02	2.31E+02
15.00	7.71E-09	3.43E-15	6.04E+02	2.69E+03	3.10E+03
25.00	1.13E-26	5.04E-33	3.64E+02	2.86E+03	3.04E+03
35.00	0.00E+00	0.00E+00	2.56E+02	2.65E+03	2.73E+03
45.00	0.00E+00	0.00E+00	2.42E+02	2.88E+03	2.94E+03
55.00	0.00E+00	0.00E+00	2.20E+01	2.82E+02	2.86E+02
65.00	0.00E+00	0.00E+00	5.56E+01	7.46E+02	7.54E+02
75.00	0.00E+00	0.00E+00	3.87E+01	5.37E+02	5.42E+02
85.00	0.00E+00	0.00E+00	2.60E+01	3.69E+02	3.72E+02
95.00	0.00E+00	0.00E+00	3.34E+01	4.83E+02	4.86E+02
125.00	0.00E+00	0.00E+00	2.47E+01	3.67E+02	3.68E+02

38.692662613029150 total grams airborne in tank
1.720597501316130E-005 total g/s out riser
2963.266721725464000 total grams lost out riser
15634.040907502170000 total grams settled on floor
17529.021945953370000 total grams made airborne
1106.978404641151000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	3.42E+01	1.01E+00	3.68E+01
1.50	1.74E+01	2.06E-02	1.47E+02	3.09E+01	1.84E+02
2.50	1.57E+01	1.87E-02	1.25E+02	6.39E+01	1.92E+02
3.50	2.62E+01	3.17E-02	1.98E+02	1.69E+02	3.70E+02
4.50	3.56E+01	4.36E-02	2.65E+02	3.08E+02	5.73E+02
5.50	3.34E+01	4.14E-02	2.53E+02	3.60E+02	6.07E+02
6.50	2.24E+01	2.81E-02	1.76E+02	2.93E+02	4.62E+02
7.50	1.58E+01	2.02E-02	1.31E+02	2.49E+02	3.72E+02
8.50	1.25E+01	1.63E-02	1.09E+02	2.37E+02	3.37E+02
9.50	8.69E+00	1.16E-02	8.02E+01	1.98E+02	2.70E+02
15.00	5.80E+01	9.11E-02	7.05E+02	3.08E+03	3.61E+03
25.00	2.27E+01	5.17E-02	4.25E+02	3.32E+03	3.54E+03
35.00	1.08E+01	3.59E-02	2.99E+02	3.08E+03	3.19E+03
45.00	7.17E+00	3.37E-02	2.82E+02	3.35E+03	3.43E+03
55.00	5.03E-01	3.06E-03	2.57E+01	3.28E+02	3.33E+02
65.00	1.01E+00	7.73E-03	6.48E+01	8.69E+02	8.79E+02
75.00	5.74E-01	5.38E-03	4.52E+01	6.26E+02	6.32E+02
85.00	3.21E-01	3.61E-03	3.03E+01	4.30E+02	4.34E+02
95.00	3.51E-01	4.65E-03	3.90E+01	5.63E+02	5.66E+02
125.00	1.79E-01	3.43E-03	2.88E+01	4.28E+02	4.29E+02

293.092436060309400 total grams airborne in tank
4.769734810106456E-001 total g/s out riser
3461.967933654785000 total grams lost out riser
17986.939918756480000 total grams settled on floor
20450.525646209720000 total grams made airborne
1291.474800109863000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam	airborne	outflow	totalout	totalflr	source

mcrn	g	g/s	g	g	g
.50	3.75E+00	1.67E-06	3.42E+01	1.14E+00	3.68E+01
1.50	1.35E+01	6.01E-06	1.47E+02	3.48E+01	1.84E+02
2.50	8.02E+00	3.57E-06	1.25E+02	7.16E+01	1.92E+02
3.50	7.23E+00	3.21E-06	1.98E+02	1.88E+02	3.70E+02
4.50	4.34E+00	1.93E-06	2.65E+02	3.40E+02	5.73E+02
5.50	1.47E+00	6.55E-07	2.53E+02	3.92E+02	6.07E+02
6.50	2.92E-01	1.30E-07	1.76E+02	3.15E+02	4.62E+02
7.50	5.00E-02	2.22E-08	1.31E+02	2.65E+02	3.72E+02
8.50	7.85E-03	3.49E-09	1.09E+02	2.50E+02	3.37E+02
9.50	8.91E-04	3.96E-10	8.02E+01	2.07E+02	2.70E+02
15.00	7.71E-09	3.43E-15	7.05E+02	3.14E+03	3.61E+03
25.00	1.13E-26	5.04E-33	4.25E+02	3.34E+03	3.54E+03
35.00	0.00E+00	0.00E+00	2.99E+02	3.09E+03	3.19E+03
45.00	0.00E+00	0.00E+00	2.82E+02	3.36E+03	3.43E+03
55.00	0.00E+00	0.00E+00	2.57E+01	3.29E+02	3.33E+02
65.00	0.00E+00	0.00E+00	6.48E+01	8.70E+02	8.79E+02
75.00	0.00E+00	0.00E+00	4.52E+01	6.27E+02	6.32E+02
85.00	0.00E+00	0.00E+00	3.03E+01	4.31E+02	4.34E+02
95.00	0.00E+00	0.00E+00	3.90E+01	5.63E+02	5.66E+02
125.00	0.00E+00	0.00E+00	2.88E+01	4.28E+02	4.29E+02

38.693941967124610 total grams airborne in tank
1.720654390209726E-005 total g/s out riser
3462.102378845215000 total grams lost out riser
18241.204200744630000 total grams settled on floor
20450.525646209720000 total grams made airborne
1291.474800109863000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	3.96E+01	1.19E+00	4.21E+01
1.50	1.74E+01	2.06E-02	1.70E+02	3.61E+01	2.10E+02
2.50	1.57E+01	1.87E-02	1.43E+02	7.44E+01	2.20E+02
3.50	2.62E+01	3.17E-02	2.27E+02	1.97E+02	4.23E+02
4.50	3.56E+01	4.36E-02	3.03E+02	3.57E+02	6.54E+02
5.50	3.34E+01	4.14E-02	2.89E+02	4.16E+02	6.94E+02
6.50	2.24E+01	2.81E-02	2.01E+02	3.38E+02	5.28E+02
7.50	1.58E+01	2.02E-02	1.49E+02	2.87E+02	4.25E+02
8.50	1.25E+01	1.63E-02	1.25E+02	2.73E+02	3.86E+02
9.50	8.69E+00	1.16E-02	9.16E+01	2.28E+02	3.09E+02
15.00	5.80E+01	9.11E-02	8.06E+02	3.53E+03	4.13E+03
25.00	2.27E+01	5.17E-02	4.85E+02	3.80E+03	4.05E+03
35.00	1.08E+01	3.59E-02	3.42E+02	3.52E+03	3.65E+03
45.00	7.17E+00	3.37E-02	3.22E+02	3.83E+03	3.91E+03
55.00	5.03E-01	3.06E-03	2.93E+01	3.75E+02	3.81E+02
65.00	1.01E+00	7.73E-03	7.41E+01	9.93E+02	1.00E+03
75.00	5.74E-01	5.38E-03	5.16E+01	7.16E+02	7.22E+02
85.00	3.21E-01	3.61E-03	3.47E+01	4.92E+02	4.95E+02
95.00	3.51E-01	4.65E-03	4.46E+01	6.43E+02	6.47E+02
125.00	1.79E-01	3.43E-03	3.29E+01	4.89E+02	4.91E+02

293.092761740088500 total grams airborne in tank
4.769738386385143E-001 total g/s out riser
3960.804491043091000 total grams lost out riser

20594.103258728980000 total grams settled on floor
23372.029117584230000 total grams made airborne
1475.971211671829000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	3.97E+01	1.32E+00	4.21E+01
1.50	1.35E+01	6.01E-06	1.70E+02	4.00E+01	2.10E+02
2.50	8.02E+00	3.57E-06	1.43E+02	8.21E+01	2.20E+02
3.50	7.23E+00	3.21E-06	2.27E+02	2.15E+02	4.23E+02
4.50	4.34E+00	1.93E-06	3.03E+02	3.88E+02	6.54E+02
5.50	1.47E+00	6.55E-07	2.89E+02	4.48E+02	6.94E+02
6.50	2.92E-01	1.30E-07	2.01E+02	3.60E+02	5.28E+02
7.50	5.00E-02	2.22E-08	1.49E+02	3.03E+02	4.25E+02
8.50	7.85E-03	3.49E-09	1.25E+02	2.85E+02	3.86E+02
9.50	8.91E-04	3.96E-10	9.16E+01	2.36E+02	3.09E+02
15.00	7.71E-09	3.43E-15	8.06E+02	3.58E+03	4.13E+03
25.00	1.13E-26	5.04E-33	4.85E+02	3.82E+03	4.05E+03
35.00	0.00E+00	0.00E+00	3.42E+02	3.53E+03	3.65E+03
45.00	0.00E+00	0.00E+00	3.22E+02	3.84E+03	3.91E+03
55.00	0.00E+00	0.00E+00	2.93E+01	3.76E+02	3.81E+02
65.00	0.00E+00	0.00E+00	7.41E+01	9.94E+02	1.00E+03
75.00	0.00E+00	0.00E+00	5.16E+01	7.16E+02	7.22E+02
85.00	0.00E+00	0.00E+00	3.47E+01	4.92E+02	4.95E+02
95.00	0.00E+00	0.00E+00	4.46E+01	6.44E+02	6.47E+02
125.00	0.00E+00	0.00E+00	3.29E+01	4.89E+02	4.91E+02

38.694233076209690 total grams airborne in tank
1.720667282297124E-005 total g/s out riser
3960.938833236694000 total grams lost out riser
20848.367507100110000 total grams settled on floor
23372.029117584230000 total grams made airborne
1475.971211671829000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	4.51E+01	1.36E+00	4.73E+01
1.50	1.74E+01	2.06E-02	1.93E+02	4.13E+01	2.37E+02
2.50	1.57E+01	1.87E-02	1.62E+02	8.49E+01	2.47E+02
3.50	2.62E+01	3.17E-02	2.56E+02	2.24E+02	4.76E+02
4.50	3.56E+01	4.36E-02	3.41E+02	4.06E+02	7.36E+02
5.50	3.34E+01	4.14E-02	3.25E+02	4.72E+02	7.81E+02
6.50	2.24E+01	2.81E-02	2.27E+02	3.83E+02	5.94E+02
7.50	1.58E+01	2.02E-02	1.68E+02	3.25E+02	4.79E+02
8.50	1.25E+01	1.63E-02	1.40E+02	3.09E+02	4.34E+02
9.50	8.69E+00	1.16E-02	1.03E+02	2.57E+02	3.47E+02
15.00	5.80E+01	9.11E-02	9.06E+02	3.98E+03	4.65E+03
25.00	2.27E+01	5.17E-02	5.46E+02	4.27E+03	4.55E+03
35.00	1.08E+01	3.59E-02	3.84E+02	3.97E+03	4.10E+03
45.00	7.17E+00	3.37E-02	3.62E+02	4.31E+03	4.40E+03
55.00	5.03E-01	3.06E-03	3.30E+01	4.22E+02	4.29E+02
65.00	1.01E+00	7.73E-03	8.33E+01	1.12E+03	1.13E+03

75.00	5.74E-01	5.38E-03	5.81E+01	8.05E+02	8.12E+02
85.00	3.21E-01	3.61E-03	3.90E+01	5.53E+02	5.57E+02
95.00	3.51E-01	4.65E-03	5.02E+01	7.24E+02	7.28E+02
125.00	1.79E-01	3.43E-03	3.70E+01	5.50E+02	5.52E+02

293.092837795615200 total grams airborne in tank
4.769739238545299E-001 total g/s out riser
4459.641193389893000 total grams lost out riser
23201.266490101810000 total grams settled on floor
26293.532588958740000 total grams made airborne
1660.467640399933000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	4.51E+01	1.49E+00	4.73E+01
1.50	1.35E+01	6.01E-06	1.93E+02	4.52E+01	2.37E+02
2.50	8.02E+00	3.57E-06	1.62E+02	9.26E+01	2.47E+02
3.50	7.23E+00	3.21E-06	2.56E+02	2.43E+02	4.76E+02
4.50	4.34E+00	1.93E-06	3.41E+02	4.37E+02	7.36E+02
5.50	1.47E+00	6.55E-07	3.25E+02	5.04E+02	7.81E+02
6.50	2.92E-01	1.30E-07	2.27E+02	4.05E+02	5.94E+02
7.50	5.00E-02	2.22E-08	1.68E+02	3.41E+02	4.79E+02
8.50	7.85E-03	3.49E-09	1.40E+02	3.21E+02	4.34E+02
9.50	8.91E-04	3.96E-10	1.03E+02	2.66E+02	3.47E+02
15.00	7.71E-09	3.43E-15	9.06E+02	4.03E+03	4.65E+03
25.00	1.13E-26	5.04E-33	5.46E+02	4.30E+03	4.55E+03
35.00	0.00E+00	0.00E+00	3.84E+02	3.98E+03	4.10E+03
45.00	0.00E+00	0.00E+00	3.62E+02	4.32E+03	4.40E+03
55.00	0.00E+00	0.00E+00	3.30E+01	4.23E+02	4.29E+02
65.00	0.00E+00	0.00E+00	8.33E+01	1.12E+03	1.13E+03
75.00	0.00E+00	0.00E+00	5.81E+01	8.06E+02	8.12E+02
85.00	0.00E+00	0.00E+00	3.90E+01	5.54E+02	5.57E+02
95.00	0.00E+00	0.00E+00	5.02E+01	7.24E+02	7.28E+02
125.00	0.00E+00	0.00E+00	3.70E+01	5.50E+02	5.52E+02

38.694300787086160 total grams airborne in tank
1.720670283629640E-005 total g/s out riser
4459.775585174561000 total grams lost out riser
23455.530404448510000 total grams settled on floor
26293.532588958740000 total grams made airborne
1660.467640399933000 total grams bypassed

**** OUTPUT @ 740.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	5.05E+01	1.53E+00	5.26E+01
1.50	1.74E+01	2.06E-02	2.16E+02	4.65E+01	2.63E+02
2.50	1.57E+01	1.87E-02	1.81E+02	9.54E+01	2.75E+02
3.50	2.62E+01	3.17E-02	2.85E+02	2.51E+02	5.29E+02
4.50	3.56E+01	4.36E-02	3.80E+02	4.55E+02	8.18E+02
5.50	3.34E+01	4.14E-02	3.61E+02	5.28E+02	8.68E+02
6.50	2.24E+01	2.81E-02	2.52E+02	4.28E+02	6.60E+02
7.50	1.58E+01	2.02E-02	1.87E+02	3.63E+02	5.32E+02

8.50	1.25E+01	1.63E-02	1.56E+02	3.44E+02	4.82E+02
9.50	8.69E+00	1.16E-02	1.15E+02	2.87E+02	3.86E+02
15.00	5.80E+01	9.11E-02	1.01E+03	4.42E+03	5.16E+03
25.00	2.27E+01	5.17E-02	6.07E+02	4.75E+03	5.06E+03
35.00	1.08E+01	3.59E-02	4.27E+02	4.41E+03	4.56E+03
45.00	7.17E+00	3.37E-02	4.03E+02	4.79E+03	4.89E+03
55.00	5.03E-01	3.06E-03	3.67E+01	4.69E+02	4.76E+02
65.00	1.01E+00	7.73E-03	9.26E+01	1.24E+03	1.26E+03
75.00	5.74E-01	5.38E-03	6.46E+01	8.95E+02	9.03E+02
85.00	3.21E-01	3.61E-03	4.33E+01	6.15E+02	6.19E+02
95.00	3.51E-01	4.65E-03	5.57E+01	8.04E+02	8.09E+02
125.00	1.79E-01	3.43E-03	4.11E+01	6.11E+02	6.14E+02

293.092854246497200 total grams airborne in tank
4.769739438779652E-001 total g/s out riser
4958.477981567383000 total grams lost out riser
25808.429017782210000 total grams settled on floor
29215.036060333250000 total grams made airborne
1844.964031934738000 total grams bypassed

**** OUTPUT @ 800.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	5.05E+01	1.66E+00	5.26E+01
1.50	1.35E+01	6.01E-06	2.16E+02	5.04E+01	2.63E+02
2.50	8.02E+00	3.57E-06	1.81E+02	1.03E+02	2.75E+02
3.50	7.23E+00	3.21E-06	2.85E+02	2.70E+02	5.29E+02
4.50	4.34E+00	1.93E-06	3.80E+02	4.86E+02	8.18E+02
5.50	1.47E+00	6.55E-07	3.61E+02	5.60E+02	8.68E+02
6.50	2.92E-01	1.30E-07	2.52E+02	4.50E+02	6.60E+02
7.50	5.00E-02	2.22E-08	1.87E+02	3.79E+02	5.32E+02
8.50	7.85E-03	3.49E-09	1.56E+02	3.57E+02	4.82E+02
9.50	8.91E-04	3.96E-10	1.15E+02	2.95E+02	3.86E+02
15.00	7.71E-09	3.43E-15	1.01E+03	4.48E+03	5.16E+03
25.00	1.13E-26	5.04E-33	6.07E+02	4.77E+03	5.06E+03
35.00	0.00E+00	0.00E+00	4.27E+02	4.42E+03	4.56E+03
45.00	0.00E+00	0.00E+00	4.03E+02	4.80E+03	4.89E+03
55.00	0.00E+00	0.00E+00	3.67E+01	4.70E+02	4.76E+02
65.00	0.00E+00	0.00E+00	9.26E+01	1.24E+03	1.26E+03
75.00	0.00E+00	0.00E+00	6.46E+01	8.95E+02	9.03E+02
85.00	0.00E+00	0.00E+00	4.33E+01	6.15E+02	6.19E+02
95.00	0.00E+00	0.00E+00	5.57E+01	8.05E+02	8.09E+02
125.00	0.00E+00	0.00E+00	4.11E+01	6.11E+02	6.14E+02

38.694316045875220 total grams airborne in tank
1.720671011225401E-005 total g/s out riser
4958.612403869629000 total grams lost out riser
26062.693348288540000 total grams settled on floor
29215.036060333250000 total grams made airborne
1844.964031934738000 total grams bypassed

**** OUTPUT @ 820.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g

.50	3.89E+00	4.57E-03	5.59E+01	1.71E+00	5.78E+01
1.50	1.74E+01	2.06E-02	2.38E+02	5.18E+01	2.89E+02
2.50	1.57E+01	1.87E-02	2.00E+02	1.06E+02	3.02E+02
3.50	2.62E+01	3.17E-02	3.14E+02	2.78E+02	5.82E+02
4.50	3.56E+01	4.36E-02	4.18E+02	5.03E+02	9.00E+02
5.50	3.34E+01	4.14E-02	3.98E+02	5.84E+02	9.54E+02
6.50	2.24E+01	2.81E-02	2.77E+02	4.73E+02	7.26E+02
7.50	1.58E+01	2.02E-02	2.05E+02	4.01E+02	5.85E+02
8.50	1.25E+01	1.63E-02	1.71E+02	3.80E+02	5.30E+02
9.50	8.69E+00	1.16E-02	1.26E+02	3.16E+02	4.24E+02
15.00	5.80E+01	9.11E-02	1.11E+03	4.87E+03	5.68E+03
25.00	2.27E+01	5.17E-02	6.67E+02	5.23E+03	5.57E+03
35.00	1.08E+01	3.59E-02	4.70E+02	4.85E+03	5.01E+03
45.00	7.17E+00	3.37E-02	4.43E+02	5.27E+03	5.38E+03
55.00	5.03E-01	3.06E-03	4.03E+01	5.16E+02	5.24E+02
65.00	1.01E+00	7.73E-03	1.02E+02	1.37E+03	1.38E+03
75.00	5.74E-01	5.38E-03	7.10E+01	9.84E+02	9.93E+02
85.00	3.21E-01	3.61E-03	4.77E+01	6.76E+02	6.81E+02
95.00	3.51E-01	4.65E-03	6.13E+01	8.85E+02	8.90E+02
125.00	1.79E-01	3.43E-03	4.52E+01	6.72E+02	6.75E+02

293.092857584357300 total grams airborne in tank
4.769739471375942E-001 total g/s out riser
5457.314788818359000 total grams lost out riser
28415.591835737230000 total grams settled on floor
32136.539516448970000 total grams made airborne
2029.460422515869000 total grams bypassed

**** OUTPUT @ 880.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	5.59E+01	1.84E+00	5.78E+01
1.50	1.35E+01	6.01E-06	2.38E+02	5.56E+01	2.89E+02
2.50	8.02E+00	3.57E-06	2.00E+02	1.14E+02	3.02E+02
3.50	7.23E+00	3.21E-06	3.14E+02	2.97E+02	5.82E+02
4.50	4.34E+00	1.93E-06	4.18E+02	5.35E+02	9.00E+02
5.50	1.47E+00	6.55E-07	3.98E+02	6.16E+02	9.54E+02
6.50	2.92E-01	1.30E-07	2.77E+02	4.95E+02	7.26E+02
7.50	5.00E-02	2.22E-08	2.05E+02	4.17E+02	5.85E+02
8.50	7.85E-03	3.49E-09	1.71E+02	3.93E+02	5.30E+02
9.50	8.91E-04	3.96E-10	1.26E+02	3.25E+02	4.24E+02
15.00	7.71E-09	3.43E-15	1.11E+03	4.93E+03	5.68E+03
25.00	1.13E-26	5.04E-33	6.67E+02	5.25E+03	5.57E+03
35.00	0.00E+00	0.00E+00	4.70E+02	4.86E+03	5.01E+03
45.00	0.00E+00	0.00E+00	4.43E+02	5.28E+03	5.38E+03
55.00	0.00E+00	0.00E+00	4.03E+01	5.17E+02	5.24E+02
65.00	0.00E+00	0.00E+00	1.02E+02	1.37E+03	1.38E+03
75.00	0.00E+00	0.00E+00	7.10E+01	9.85E+02	9.93E+02
85.00	0.00E+00	0.00E+00	4.77E+01	6.77E+02	6.81E+02
95.00	0.00E+00	0.00E+00	6.13E+01	8.85E+02	8.90E+02
125.00	0.00E+00	0.00E+00	4.52E+01	6.72E+02	6.75E+02

38.694320098991060 total grams airborne in tank
1.720671204493025E-005 total g/s out riser
5457.449203491211000 total grams lost out riser
28669.856113076210000 total grams settled on floor
32136.539516448970000 total grams made airborne

2029.460422515869000 total grams bypassed

**** OUTPUT @ 900.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	6.13E+01	1.88E+00	6.31E+01
1.50	1.74E+01	2.06E-02	2.61E+02	5.70E+01	3.16E+02
2.50	1.57E+01	1.87E-02	2.18E+02	1.16E+02	3.30E+02
3.50	2.62E+01	3.17E-02	3.43E+02	3.06E+02	6.35E+02
4.50	3.56E+01	4.36E-02	4.56E+02	5.52E+02	9.82E+02
5.50	3.34E+01	4.14E-02	4.34E+02	6.40E+02	1.04E+03
6.50	2.24E+01	2.81E-02	3.02E+02	5.18E+02	7.92E+02
7.50	1.58E+01	2.02E-02	2.24E+02	4.39E+02	6.38E+02
8.50	1.25E+01	1.63E-02	1.87E+02	4.16E+02	5.78E+02
9.50	8.69E+00	1.16E-02	1.37E+02	3.46E+02	4.63E+02
15.00	5.80E+01	9.11E-02	1.21E+03	5.32E+03	6.19E+03
25.00	2.27E+01	5.17E-02	7.28E+02	5.70E+03	6.07E+03
35.00	1.08E+01	3.59E-02	5.12E+02	5.29E+03	5.47E+03
45.00	7.17E+00	3.37E-02	4.83E+02	5.75E+03	5.87E+03
55.00	5.03E-01	3.06E-03	4.40E+01	5.63E+02	5.71E+02
65.00	1.01E+00	7.73E-03	1.11E+02	1.49E+03	1.51E+03
75.00	5.74E-01	5.38E-03	7.75E+01	1.07E+03	1.08E+03
85.00	3.21E-01	3.61E-03	5.20E+01	7.38E+02	7.43E+02
95.00	3.51E-01	4.65E-03	6.69E+01	9.65E+02	9.71E+02
125.00	1.79E-01	3.43E-03	4.93E+01	7.33E+02	7.36E+02

293.092858538031600 total grams airborne in tank
4.769739480689168E-001 total g/s out riser
5956.151634216309000 total grams lost out riser
31022.754592895510000 total grams settled on floor
35058.042819976810000 total grams made airborne
2213.956807374954000 total grams bypassed

**** OUTPUT @ 960.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	6.13E+01	2.01E+00	6.31E+01
1.50	1.35E+01	6.01E-06	2.61E+02	6.08E+01	3.16E+02
2.50	8.02E+00	3.57E-06	2.18E+02	1.24E+02	3.30E+02
3.50	7.23E+00	3.21E-06	3.43E+02	3.24E+02	6.35E+02
4.50	4.34E+00	1.93E-06	4.56E+02	5.83E+02	9.82E+02
5.50	1.47E+00	6.55E-07	4.34E+02	6.72E+02	1.04E+03
6.50	2.92E-01	1.30E-07	3.02E+02	5.40E+02	7.92E+02
7.50	5.00E-02	2.22E-08	2.24E+02	4.54E+02	6.38E+02
8.50	7.85E-03	3.49E-09	1.87E+02	4.28E+02	5.78E+02
9.50	8.91E-04	3.96E-10	1.37E+02	3.55E+02	4.63E+02
15.00	7.71E-09	3.43E-15	1.21E+03	5.38E+03	6.19E+03
25.00	1.13E-26	5.04E-33	7.28E+02	5.73E+03	6.07E+03
35.00	0.00E+00	0.00E+00	5.12E+02	5.30E+03	5.47E+03
45.00	0.00E+00	0.00E+00	4.83E+02	5.76E+03	5.87E+03
55.00	0.00E+00	0.00E+00	4.40E+01	5.64E+02	5.71E+02
65.00	0.00E+00	0.00E+00	1.11E+02	1.49E+03	1.51E+03
75.00	0.00E+00	0.00E+00	7.75E+01	1.07E+03	1.08E+03
85.00	0.00E+00	0.00E+00	5.20E+01	7.38E+02	7.43E+02

95.00	0.00E+00	0.00E+00	6.69E+01	9.66E+02	9.71E+02
125.00	0.00E+00	0.00E+00	4.93E+01	7.33E+02	7.36E+02

38.694320814246800 total grams airborne in tank
1.720671238599076E-005 total g/s out riser
5956.285995483398000 total grams lost out riser
31277.018904447560000 total grams settled on floor
35058.042819976810000 total grams made airborne
2213.956807374954000 total grams bypassed

**** OUTPUT @ 980.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	6.67E+01	2.06E+00	6.84E+01
1.50	1.74E+01	2.06E-02	2.84E+02	6.22E+01	3.42E+02
2.50	1.57E+01	1.87E-02	2.37E+02	1.27E+02	3.57E+02
3.50	2.62E+01	3.17E-02	3.72E+02	3.33E+02	6.87E+02
4.50	3.56E+01	4.36E-02	4.94E+02	6.01E+02	1.06E+03
5.50	3.34E+01	4.14E-02	4.70E+02	6.96E+02	1.13E+03
6.50	2.24E+01	2.81E-02	3.27E+02	5.63E+02	8.58E+02
7.50	1.58E+01	2.02E-02	2.43E+02	4.77E+02	6.91E+02
8.50	1.25E+01	1.63E-02	2.02E+02	4.51E+02	6.27E+02
9.50	8.69E+00	1.16E-02	1.49E+02	3.75E+02	5.01E+02
15.00	5.80E+01	9.11E-02	1.31E+03	5.77E+03	6.71E+03
25.00	2.27E+01	5.17E-02	7.89E+02	6.18E+03	6.58E+03
35.00	1.08E+01	3.59E-02	5.55E+02	5.73E+03	5.92E+03
45.00	7.17E+00	3.37E-02	5.23E+02	6.23E+03	6.36E+03
55.00	5.03E-01	3.06E-03	4.77E+01	6.10E+02	6.19E+02
65.00	1.01E+00	7.73E-03	1.20E+02	1.61E+03	1.63E+03
75.00	5.74E-01	5.38E-03	8.39E+01	1.16E+03	1.17E+03
85.00	3.21E-01	3.61E-03	5.63E+01	7.99E+02	8.05E+02
95.00	3.51E-01	4.65E-03	7.24E+01	1.05E+03	1.05E+03
125.00	1.79E-01	3.43E-03	5.34E+01	7.94E+02	7.98E+02

293.092858538031600 total grams airborne in tank
4.769739485345781E-001 total g/s out riser
6454.988471984863000 total grams lost out riser
33629.917418718340000 total grams settled on floor
37979.546066284180000 total grams made airborne
2398.453196048737000 total grams bypassed

**** OUTPUT @ 1040.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	6.67E+01	2.19E+00	6.84E+01
1.50	1.35E+01	6.01E-06	2.84E+02	6.60E+01	3.42E+02
2.50	8.02E+00	3.57E-06	2.37E+02	1.35E+02	3.57E+02
3.50	7.23E+00	3.21E-06	3.72E+02	3.52E+02	6.87E+02
4.50	4.34E+00	1.93E-06	4.94E+02	6.32E+02	1.06E+03
5.50	1.47E+00	6.55E-07	4.70E+02	7.28E+02	1.13E+03
6.50	2.92E-01	1.30E-07	3.27E+02	5.85E+02	8.58E+02
7.50	5.00E-02	2.22E-08	2.43E+02	4.92E+02	6.91E+02
8.50	7.85E-03	3.49E-09	2.02E+02	4.64E+02	6.27E+02
9.50	8.91E-04	3.96E-10	1.49E+02	3.84E+02	5.01E+02

15.00	7.71E-09	3.43E-15	1.31E+03	5.83E+03	6.71E+03
25.00	1.13E-26	5.04E-33	7.89E+02	6.20E+03	6.58E+03
35.00	0.00E+00	0.00E+00	5.55E+02	5.74E+03	5.92E+03
45.00	0.00E+00	0.00E+00	5.23E+02	6.24E+03	6.36E+03
55.00	0.00E+00	0.00E+00	4.77E+01	6.11E+02	6.19E+02
65.00	0.00E+00	0.00E+00	1.20E+02	1.62E+03	1.63E+03
75.00	0.00E+00	0.00E+00	8.39E+01	1.16E+03	1.17E+03
85.00	0.00E+00	0.00E+00	5.63E+01	8.00E+02	8.05E+02
95.00	0.00E+00	0.00E+00	7.24E+01	1.05E+03	1.05E+03
125.00	0.00E+00	0.00E+00	5.34E+01	7.94E+02	7.98E+02

38.694321052665380 total grams airborne in tank
1.720671238599076E-005 total g/s out riser
6455.122840881348000 total grams lost out riser
33884.181688308720000 total grams settled on floor
37979.546066284180000 total grams made airborne
2398.453196048737000 total grams bypassed

**** OUTPUT @ 1060.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	7.22E+01	2.23E+00	7.36E+01
1.50	1.74E+01	2.06E-02	3.07E+02	6.74E+01	3.68E+02
2.50	1.57E+01	1.87E-02	2.56E+02	1.37E+02	3.84E+02
3.50	2.62E+01	3.17E-02	4.01E+02	3.60E+02	7.40E+02
4.50	3.56E+01	4.36E-02	5.32E+02	6.50E+02	1.15E+03
5.50	3.34E+01	4.14E-02	5.06E+02	7.52E+02	1.21E+03
6.50	2.24E+01	2.81E-02	3.52E+02	6.08E+02	9.24E+02
7.50	1.58E+01	2.02E-02	2.61E+02	5.14E+02	7.44E+02
8.50	1.25E+01	1.63E-02	2.18E+02	4.87E+02	6.75E+02
9.50	8.69E+00	1.16E-02	1.60E+02	4.05E+02	5.40E+02
15.00	5.80E+01	9.11E-02	1.41E+03	6.22E+03	7.23E+03
25.00	2.27E+01	5.17E-02	8.49E+02	6.66E+03	7.08E+03
35.00	1.08E+01	3.59E-02	5.98E+02	6.17E+03	6.38E+03
45.00	7.17E+00	3.37E-02	5.64E+02	6.71E+03	6.85E+03
55.00	5.03E-01	3.06E-03	5.13E+01	6.57E+02	6.67E+02
65.00	1.01E+00	7.73E-03	1.30E+02	1.74E+03	1.76E+03
75.00	5.74E-01	5.38E-03	9.04E+01	1.25E+03	1.26E+03
85.00	3.21E-01	3.61E-03	6.07E+01	8.61E+02	8.67E+02
95.00	3.51E-01	4.65E-03	7.80E+01	1.13E+03	1.13E+03
125.00	1.79E-01	3.43E-03	5.76E+01	8.55E+02	8.59E+02

293.092858776450200 total grams airborne in tank
4.769739485345781E-001 total g/s out riser
6953.825191497803000 total grams lost out riser
36237.080168008800000 total grams settled on floor
40901.049461364750000 total grams made airborne
2582.949586868286000 total grams bypassed

**** OUTPUT @ 1120.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	7.22E+01	2.36E+00	7.36E+01
1.50	1.35E+01	6.01E-06	3.07E+02	7.12E+01	3.68E+02

2.50	8.02E+00	3.57E-06	2.56E+02	1.45E+02	3.84E+02
3.50	7.23E+00	3.21E-06	4.01E+02	3.79E+02	7.40E+02
4.50	4.34E+00	1.93E-06	5.32E+02	6.81E+02	1.15E+03
5.50	1.47E+00	6.55E-07	5.06E+02	7.84E+02	1.21E+03
6.50	2.92E-01	1.30E-07	3.52E+02	6.30E+02	9.24E+02
7.50	5.00E-02	2.22E-08	2.61E+02	5.30E+02	7.44E+02
8.50	7.85E-03	3.49E-09	2.18E+02	5.00E+02	6.75E+02
9.50	8.91E-04	3.96E-10	1.60E+02	4.14E+02	5.40E+02
15.00	7.71E-09	3.43E-15	1.41E+03	6.27E+03	7.23E+03
25.00	1.13E-26	5.04E-33	8.49E+02	6.68E+03	7.08E+03
35.00	0.00E+00	0.00E+00	5.98E+02	6.19E+03	6.38E+03
45.00	0.00E+00	0.00E+00	5.64E+02	6.72E+03	6.85E+03
55.00	0.00E+00	0.00E+00	5.13E+01	6.57E+02	6.67E+02
65.00	0.00E+00	0.00E+00	1.30E+02	1.74E+03	1.76E+03
75.00	0.00E+00	0.00E+00	9.04E+01	1.25E+03	1.26E+03
85.00	0.00E+00	0.00E+00	6.07E+01	8.61E+02	8.67E+02
95.00	0.00E+00	0.00E+00	7.80E+01	1.13E+03	1.13E+03
125.00	0.00E+00	0.00E+00	5.76E+01	8.56E+02	8.59E+02

38.694321052665380 total grams airborne in tank
1.720671249967760E-005 total g/s out riser
6953.959644317627000 total grams lost out riser
36491.344441890720000 total grams settled on floor
40901.049461364750000 total grams made airborne
2582.949586868286000 total grams bypassed

**** OUTPUT @ 1140.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	7.76E+01	2.40E+00	7.89E+01
1.50	1.74E+01	2.06E-02	3.29E+02	7.26E+01	3.94E+02
2.50	1.57E+01	1.87E-02	2.74E+02	1.48E+02	4.12E+02
3.50	2.62E+01	3.17E-02	4.30E+02	3.87E+02	7.93E+02
4.50	3.56E+01	4.36E-02	5.71E+02	6.98E+02	1.23E+03
5.50	3.34E+01	4.14E-02	5.42E+02	8.08E+02	1.30E+03
6.50	2.24E+01	2.81E-02	3.78E+02	6.53E+02	9.90E+02
7.50	1.58E+01	2.02E-02	2.80E+02	5.52E+02	7.98E+02
8.50	1.25E+01	1.63E-02	2.33E+02	5.23E+02	7.23E+02
9.50	8.69E+00	1.16E-02	1.72E+02	4.34E+02	5.78E+02
15.00	5.80E+01	9.11E-02	1.51E+03	6.66E+03	7.74E+03
25.00	2.27E+01	5.17E-02	9.10E+02	7.14E+03	7.59E+03
35.00	1.08E+01	3.59E-02	6.40E+02	6.62E+03	6.84E+03
45.00	7.17E+00	3.37E-02	6.04E+02	7.19E+03	7.34E+03
55.00	5.03E-01	3.06E-03	5.50E+01	7.04E+02	7.14E+02
65.00	1.01E+00	7.73E-03	1.39E+02	1.86E+03	1.88E+03
75.00	5.74E-01	5.38E-03	9.68E+01	1.34E+03	1.35E+03
85.00	3.21E-01	3.61E-03	6.50E+01	9.22E+02	9.29E+02
95.00	3.51E-01	4.65E-03	8.36E+01	1.21E+03	1.21E+03
125.00	1.79E-01	3.43E-03	6.17E+01	9.17E+02	9.20E+02

293.092858776450200 total grams airborne in tank
4.769739485345781E-001 total g/s out riser
7452.662071228027000 total grams lost out riser
38844.242929220200000 total grams settled on floor
43822.552825927730000 total grams made airborne
2767.445975780487000 total grams bypassed

**** OUTPUT @ 1200.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	7.76E+01	2.53E+00	7.89E+01
1.50	1.35E+01	6.01E-06	3.29E+02	7.65E+01	3.94E+02
2.50	8.02E+00	3.57E-06	2.74E+02	1.56E+02	4.12E+02
3.50	7.23E+00	3.21E-06	4.30E+02	4.06E+02	7.93E+02
4.50	4.34E+00	1.93E-06	5.71E+02	7.30E+02	1.23E+03
5.50	1.47E+00	6.55E-07	5.42E+02	8.40E+02	1.30E+03
6.50	2.92E-01	1.30E-07	3.78E+02	6.75E+02	9.90E+02
7.50	5.00E-02	2.22E-08	2.80E+02	5.68E+02	7.98E+02
8.50	7.85E-03	3.49E-09	2.33E+02	5.35E+02	7.23E+02
9.50	8.91E-04	3.96E-10	1.72E+02	4.43E+02	5.78E+02
15.00	7.71E-09	3.43E-15	1.51E+03	6.72E+03	7.74E+03
25.00	1.13E-26	5.04E-33	9.10E+02	7.16E+03	7.59E+03
35.00	0.00E+00	0.00E+00	6.40E+02	6.63E+03	6.84E+03
45.00	0.00E+00	0.00E+00	6.04E+02	7.20E+03	7.34E+03
55.00	0.00E+00	0.00E+00	5.50E+01	7.04E+02	7.14E+02
65.00	0.00E+00	0.00E+00	1.39E+02	1.86E+03	1.88E+03
75.00	0.00E+00	0.00E+00	9.68E+01	1.34E+03	1.35E+03
85.00	0.00E+00	0.00E+00	6.50E+01	9.23E+02	9.29E+02
95.00	0.00E+00	0.00E+00	8.36E+01	1.21E+03	1.21E+03
125.00	0.00E+00	0.00E+00	6.17E+01	9.17E+02	9.20E+02

38.694321052665380 total grams airborne in tank
1.720671249967760E-005 total g/s out riser
7452.796401977539000 total grams lost out riser
39098.507263898850000 total grams settled on floor
43822.552825927730000 total grams made airborne
2767.445975780487000 total grams bypassed

**** OUTPUT @ 1220.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	8.30E+01	2.58E+00	8.41E+01
1.50	1.74E+01	2.06E-02	3.52E+02	7.78E+01	4.21E+02
2.50	1.57E+01	1.87E-02	2.93E+02	1.58E+02	4.39E+02
3.50	2.62E+01	3.17E-02	4.59E+02	4.14E+02	8.46E+02
4.50	3.56E+01	4.36E-02	6.09E+02	7.47E+02	1.31E+03
5.50	3.34E+01	4.14E-02	5.79E+02	8.64E+02	1.39E+03
6.50	2.24E+01	2.81E-02	4.03E+02	6.98E+02	1.06E+03
7.50	1.58E+01	2.02E-02	2.98E+02	5.90E+02	8.51E+02
8.50	1.25E+01	1.63E-02	2.49E+02	5.58E+02	7.71E+02
9.50	8.69E+00	1.16E-02	1.83E+02	4.64E+02	6.17E+02
15.00	5.80E+01	9.11E-02	1.61E+03	7.11E+03	8.26E+03
25.00	2.27E+01	5.17E-02	9.71E+02	7.61E+03	8.10E+03
35.00	1.08E+01	3.59E-02	6.83E+02	7.06E+03	7.29E+03
45.00	7.17E+00	3.37E-02	6.44E+02	7.67E+03	7.83E+03
55.00	5.03E-01	3.06E-03	5.87E+01	7.51E+02	7.62E+02
65.00	1.01E+00	7.73E-03	1.48E+02	1.99E+03	2.01E+03
75.00	5.74E-01	5.38E-03	1.03E+02	1.43E+03	1.44E+03
85.00	3.21E-01	3.61E-03	6.93E+01	9.84E+02	9.91E+02
95.00	3.51E-01	4.65E-03	8.92E+01	1.29E+03	1.29E+03
125.00	1.79E-01	3.43E-03	6.58E+01	9.78E+02	9.82E+02

293.092858776450200 total grams airborne in tank
4.769739485345781E-001 total g/s out riser
7951.498802185059000 total grams lost out riser
41451.405873298650000 total grams settled on floor
46744.056617736820000 total grams made airborne
2951.942330360413000 total grams bypassed

**** OUTPUT @ 1280.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	8.30E+01	2.71E+00	8.41E+01
1.50	1.35E+01	6.01E-06	3.52E+02	8.17E+01	4.21E+02
2.50	8.02E+00	3.57E-06	2.93E+02	1.66E+02	4.39E+02
3.50	7.23E+00	3.21E-06	4.59E+02	4.33E+02	8.46E+02
4.50	4.34E+00	1.93E-06	6.09E+02	7.78E+02	1.31E+03
5.50	1.47E+00	6.55E-07	5.79E+02	8.96E+02	1.39E+03
6.50	2.92E-01	1.30E-07	4.03E+02	7.20E+02	1.06E+03
7.50	5.00E-02	2.22E-08	2.98E+02	6.06E+02	8.51E+02
8.50	7.85E-03	3.49E-09	2.49E+02	5.71E+02	7.71E+02
9.50	8.91E-04	3.96E-10	1.83E+02	4.73E+02	6.17E+02
15.00	7.71E-09	3.43E-15	1.61E+03	7.17E+03	8.26E+03
25.00	1.13E-26	5.04E-33	9.71E+02	7.64E+03	8.10E+03
35.00	0.00E+00	0.00E+00	6.83E+02	7.07E+03	7.29E+03
45.00	0.00E+00	0.00E+00	6.44E+02	7.68E+03	7.83E+03
55.00	0.00E+00	0.00E+00	5.87E+01	7.51E+02	7.62E+02
65.00	0.00E+00	0.00E+00	1.48E+02	1.99E+03	2.01E+03
75.00	0.00E+00	0.00E+00	1.03E+02	1.43E+03	1.44E+03
85.00	0.00E+00	0.00E+00	6.93E+01	9.84E+02	9.91E+02
95.00	0.00E+00	0.00E+00	8.92E+01	1.29E+03	1.29E+03
125.00	0.00E+00	0.00E+00	6.58E+01	9.78E+02	9.82E+02

38.694321052665380 total grams airborne in tank
1.720671249967760E-005 total g/s out riser
7951.633193969727000 total grams lost out riser
41705.670101165770000 total grams settled on floor
46744.056617736820000 total grams made airborne
2951.942330360413000 total grams bypassed

**** OUTPUT @ 1300.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	8.84E+01	2.75E+00	8.94E+01
1.50	1.74E+01	2.06E-02	3.75E+02	8.30E+01	4.47E+02
2.50	1.57E+01	1.87E-02	3.12E+02	1.69E+02	4.67E+02
3.50	2.62E+01	3.17E-02	4.88E+02	4.42E+02	8.99E+02
4.50	3.56E+01	4.36E-02	6.47E+02	7.96E+02	1.39E+03
5.50	3.34E+01	4.14E-02	6.15E+02	9.20E+02	1.48E+03
6.50	2.24E+01	2.81E-02	4.28E+02	7.43E+02	1.12E+03
7.50	1.58E+01	2.02E-02	3.17E+02	6.28E+02	9.04E+02
8.50	1.25E+01	1.63E-02	2.65E+02	5.94E+02	8.19E+02
9.50	8.69E+00	1.16E-02	1.95E+02	4.94E+02	6.56E+02
15.00	5.80E+01	9.11E-02	1.71E+03	7.56E+03	8.78E+03
25.00	2.27E+01	5.17E-02	1.03E+03	8.09E+03	8.60E+03

35.00	1.08E+01	3.59E-02	7.26E+02	7.50E+03	7.75E+03
45.00	7.17E+00	3.37E-02	6.84E+02	8.15E+03	8.32E+03
55.00	5.03E-01	3.06E-03	6.23E+01	7.98E+02	8.10E+02
65.00	1.01E+00	7.73E-03	1.57E+02	2.11E+03	2.14E+03
75.00	5.74E-01	5.38E-03	1.10E+02	1.52E+03	1.53E+03
85.00	3.21E-01	3.61E-03	7.37E+01	1.05E+03	1.05E+03
95.00	3.51E-01	4.65E-03	9.47E+01	1.37E+03	1.38E+03
125.00	1.79E-01	3.43E-03	6.99E+01	1.04E+03	1.04E+03

293.092858776450200 total grams airborne in tank
4.769739485345781E-001 total g/s out riser
8450.335731506348000 total grams lost out riser
44058.568703174590000 total grams settled on floor
49665.559127807620000 total grams made airborne
3136.438753604889000 total grams bypassed

**** OUTPUT @ 1360.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	8.84E+01	2.88E+00	8.94E+01
1.50	1.35E+01	6.01E-06	3.75E+02	8.69E+01	4.47E+02
2.50	8.02E+00	3.57E-06	3.12E+02	1.77E+02	4.67E+02
3.50	7.23E+00	3.21E-06	4.88E+02	4.61E+02	8.99E+02
4.50	4.34E+00	1.93E-06	6.47E+02	8.27E+02	1.39E+03
5.50	1.47E+00	6.55E-07	6.15E+02	9.52E+02	1.48E+03
6.50	2.92E-01	1.30E-07	4.28E+02	7.65E+02	1.12E+03
7.50	5.00E-02	2.22E-08	3.17E+02	6.44E+02	9.04E+02
8.50	7.85E-03	3.49E-09	2.65E+02	6.07E+02	8.19E+02
9.50	8.91E-04	3.96E-10	1.95E+02	5.02E+02	6.56E+02
15.00	7.71E-09	3.43E-15	1.71E+03	7.62E+03	8.78E+03
25.00	1.13E-26	5.04E-33	1.03E+03	8.11E+03	8.60E+03
35.00	0.00E+00	0.00E+00	7.26E+02	7.51E+03	7.75E+03
45.00	0.00E+00	0.00E+00	6.84E+02	8.16E+03	8.32E+03
55.00	0.00E+00	0.00E+00	6.23E+01	7.98E+02	8.10E+02
65.00	0.00E+00	0.00E+00	1.57E+02	2.11E+03	2.14E+03
75.00	0.00E+00	0.00E+00	1.10E+02	1.52E+03	1.53E+03
85.00	0.00E+00	0.00E+00	7.37E+01	1.05E+03	1.05E+03
95.00	0.00E+00	0.00E+00	9.47E+01	1.37E+03	1.38E+03
125.00	0.00E+00	0.00E+00	6.99E+01	1.04E+03	1.04E+03

38.694321052665380 total grams airborne in tank
1.720671249967760E-005 total g/s out riser
8450.470077514648000 total grams lost out riser
44312.833052873610000 total grams settled on floor
49665.559127807620000 total grams made airborne
3136.438753604889000 total grams bypassed

**** OUTPUT @ 1380.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	9.38E+01	2.93E+00	9.47E+01
1.50	1.74E+01	2.06E-02	3.98E+02	8.82E+01	4.73E+02
2.50	1.57E+01	1.87E-02	3.30E+02	1.79E+02	4.94E+02
3.50	2.62E+01	3.17E-02	5.17E+02	4.69E+02	9.52E+02

4.50	3.56E+01	4.36E-02	6.85E+02	8.45E+02	1.47E+03
5.50	3.34E+01	4.14E-02	6.51E+02	9.76E+02	1.56E+03
6.50	2.24E+01	2.81E-02	4.53E+02	7.88E+02	1.19E+03
7.50	1.58E+01	2.02E-02	3.36E+02	6.66E+02	9.57E+02
8.50	1.25E+01	1.63E-02	2.80E+02	6.30E+02	8.68E+02
9.50	8.69E+00	1.16E-02	2.06E+02	5.23E+02	6.94E+02
15.00	5.80E+01	9.11E-02	1.81E+03	8.01E+03	9.29E+03
25.00	2.27E+01	5.17E-02	1.09E+03	8.57E+03	9.11E+03
35.00	1.08E+01	3.59E-02	7.69E+02	7.94E+03	8.20E+03
45.00	7.17E+00	3.37E-02	7.25E+02	8.63E+03	8.81E+03
55.00	5.03E-01	3.06E-03	6.60E+01	8.45E+02	8.57E+02
65.00	1.01E+00	7.73E-03	1.67E+02	2.24E+03	2.26E+03
75.00	5.74E-01	5.38E-03	1.16E+02	1.61E+03	1.62E+03
85.00	3.21E-01	3.61E-03	7.80E+01	1.11E+03	1.11E+03
95.00	3.51E-01	4.65E-03	1.00E+02	1.45E+03	1.46E+03
125.00	1.79E-01	3.43E-03	7.40E+01	1.10E+03	1.10E+03

293.092858776450200 total grams airborne in tank
4.769739485345781E-001 total g/s out riser
8949.172523498535000 total grams lost out riser
46665.732226848600000 total grams settled on floor
52587.061698913570000 total grams made airborne
3320.935180664062000 total grams bypassed

**** OUTPUT @ 1440.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	9.38E+01	3.06E+00	9.47E+01
1.50	1.35E+01	6.01E-06	3.98E+02	9.21E+01	4.73E+02
2.50	8.02E+00	3.57E-06	3.30E+02	1.87E+02	4.94E+02
3.50	7.23E+00	3.21E-06	5.17E+02	4.88E+02	9.52E+02
4.50	4.34E+00	1.93E-06	6.85E+02	8.76E+02	1.47E+03
5.50	1.47E+00	6.55E-07	6.51E+02	1.01E+03	1.56E+03
6.50	2.92E-01	1.30E-07	4.53E+02	8.10E+02	1.19E+03
7.50	5.00E-02	2.22E-08	3.36E+02	6.82E+02	9.57E+02
8.50	7.85E-03	3.49E-09	2.80E+02	6.42E+02	8.68E+02
9.50	8.91E-04	3.96E-10	2.06E+02	5.32E+02	6.94E+02
15.00	7.71E-09	3.43E-15	1.81E+03	8.07E+03	9.29E+03
25.00	1.13E-26	5.04E-33	1.09E+03	8.59E+03	9.11E+03
35.00	0.00E+00	0.00E+00	7.69E+02	7.95E+03	8.20E+03
45.00	0.00E+00	0.00E+00	7.25E+02	8.64E+03	8.81E+03
55.00	0.00E+00	0.00E+00	6.60E+01	8.45E+02	8.57E+02
65.00	0.00E+00	0.00E+00	1.67E+02	2.24E+03	2.26E+03
75.00	0.00E+00	0.00E+00	1.16E+02	1.61E+03	1.62E+03
85.00	0.00E+00	0.00E+00	7.80E+01	1.11E+03	1.11E+03
95.00	0.00E+00	0.00E+00	1.00E+02	1.45E+03	1.46E+03
125.00	0.00E+00	0.00E+00	7.40E+01	1.10E+03	1.10E+03

38.694321052665380 total grams airborne in tank
1.720671249967760E-005 total g/s out riser
8949.306777954102000 total grams lost out riser
46919.995958805080000 total grams settled on floor
52587.061698913570000 total grams made airborne
3320.935180664062000 total grams bypassed

**** OUTPUT @ 1460.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.89E+00	4.57E-03	9.92E+01	3.10E+00	9.99E+01
1.50	1.74E+01	2.06E-02	4.20E+02	9.34E+01	5.00E+02
2.50	1.57E+01	1.87E-02	3.49E+02	1.90E+02	5.22E+02
3.50	2.62E+01	3.17E-02	5.46E+02	4.96E+02	1.00E+03
4.50	3.56E+01	4.36E-02	7.23E+02	8.93E+02	1.55E+03
5.50	3.34E+01	4.14E-02	6.87E+02	1.03E+03	1.65E+03
6.50	2.24E+01	2.81E-02	4.78E+02	8.33E+02	1.25E+03
7.50	1.58E+01	2.02E-02	3.54E+02	7.04E+02	1.01E+03
8.50	1.25E+01	1.63E-02	2.96E+02	6.66E+02	9.16E+02
9.50	8.69E+00	1.16E-02	2.18E+02	5.53E+02	7.33E+02
15.00	5.80E+01	9.11E-02	1.91E+03	8.46E+03	9.81E+03
25.00	2.27E+01	5.17E-02	1.15E+03	9.05E+03	9.61E+03
35.00	1.08E+01	3.59E-02	8.11E+02	8.38E+03	8.66E+03
45.00	7.17E+00	3.37E-02	7.65E+02	9.11E+03	9.30E+03
55.00	5.03E-01	3.06E-03	6.97E+01	8.92E+02	9.05E+02
65.00	1.01E+00	7.73E-03	1.76E+02	2.36E+03	2.39E+03
75.00	5.74E-01	5.38E-03	1.23E+02	1.70E+03	1.72E+03
85.00	3.21E-01	3.61E-03	8.23E+01	1.17E+03	1.18E+03
95.00	3.51E-01	4.65E-03	1.06E+02	1.53E+03	1.54E+03
125.00	1.79E-01	3.43E-03	7.81E+01	1.16E+03	1.17E+03

293.092858776450200 total grams airborne in tank
4.769739485345781E-001 total g/s out riser
9448.009284973145000 total grams lost out riser
49272.895598411560000 total grams settled on floor
55508.564758300780000 total grams made airborne
3505.431577205658000 total grams bypassed

**** OUTPUT @ 1520.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.75E+00	1.67E-06	9.92E+01	3.23E+00	9.99E+01
1.50	1.35E+01	6.01E-06	4.20E+02	9.73E+01	5.00E+02
2.50	8.02E+00	3.57E-06	3.49E+02	1.98E+02	5.22E+02
3.50	7.23E+00	3.21E-06	5.46E+02	5.15E+02	1.00E+03
4.50	4.34E+00	1.93E-06	7.23E+02	9.25E+02	1.55E+03
5.50	1.47E+00	6.55E-07	6.87E+02	1.06E+03	1.65E+03
6.50	2.92E-01	1.30E-07	4.78E+02	8.55E+02	1.25E+03
7.50	5.00E-02	2.22E-08	3.54E+02	7.20E+02	1.01E+03
8.50	7.85E-03	3.49E-09	2.96E+02	6.78E+02	9.16E+02
9.50	8.91E-04	3.96E-10	2.18E+02	5.61E+02	7.33E+02
15.00	7.71E-09	3.43E-15	1.91E+03	8.51E+03	9.81E+03
25.00	1.13E-26	5.04E-33	1.15E+03	9.07E+03	9.61E+03
35.00	0.00E+00	0.00E+00	8.11E+02	8.39E+03	8.66E+03
45.00	0.00E+00	0.00E+00	7.65E+02	9.12E+03	9.30E+03
55.00	0.00E+00	0.00E+00	6.97E+01	8.92E+02	9.05E+02
65.00	0.00E+00	0.00E+00	1.76E+02	2.36E+03	2.39E+03
75.00	0.00E+00	0.00E+00	1.23E+02	1.70E+03	1.72E+03
85.00	0.00E+00	0.00E+00	8.23E+01	1.17E+03	1.18E+03
95.00	0.00E+00	0.00E+00	1.06E+02	1.53E+03	1.54E+03
125.00	0.00E+00	0.00E+00	7.81E+01	1.16E+03	1.17E+03

38.694321052665380 total grams airborne in tank

```
1.720671249967760E-005 total g/s out riser
  9448.143585205078000 total grams lost out riser
 49527.159307241440000 total grams settled on floor
 55508.564758300780000 total grams made airborne
  3505.431577205658000 total grams bypassed
```

Table 4. Comparison of Aerosols With and Without Bypass Fraction
(IL=2100 cfm, PR=1 in./min. for all cases)

WH (in.)	Distance to Riser (m)	Bypass Fraction	Aerosol w/Bypass (g)	Aerosol No Bypass (g)	Percent Increase w/Bypass
500,000 gallon tank					
19.0	5.0874	0.0119	249.4	215.5	13.5926
76.0	3.6397	0.0166	943.7	802.3	14.9836
140.0	2.0142	0.0301	2301.9	1794.9	22.0253
171.0	1.2268	0.0494	4210.2	2976.3	29.3074
181.8	0.9525	0.0636	4882.6	3213.0	34.1949
750,000 gallon tank					
19.0	7.3974	0.0082	211.5	187.5	11.3475
95.0	5.4671	0.0111	1450.5	1292.4	10.8997
171.0	3.5368	0.0171	3049.8	2616.5	14.2075
266.0	1.1239	0.0539	6693.7	4597.7	31.3130
272.7	0.9538	0.0635	7263.8	4808.0	33.8088
1,000,000 gallon tank					
19.0	9.7074	0.0062	183.0	164.7	10.0000
133.0	6.8120	0.0089	2111.3	1935.0	8.3503
247.0	3.9165	0.0155	4259.3	3690.7	13.3496
361.0	1.0210	0.0594	9448.1	6318.0	33.1294
363.6	0.9550	0.0635	9917.4	6556.8	33.8859

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

180bx

ADDITIONAL PARAMETERS:

```
particle density, g/cc =        2.400000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =      888.309999999999900
bypass fraction =   6.350000000000000E-002

Output divisions in Period      1.000000000000000 =        1.000000
Output divisions in Period      2.000000000000000 =        1.000000
Output divisions in Period      3.000000000000000 =        1.000000
Output divisions in Period      4.000000000000000 =        1.000000
Output divisions in Period      5.000000000000000 =        1.000000
Output divisions in Period      6.000000000000000 =        1.000000
Output divisions in Period      7.000000000000000 =        1.000000
Output divisions in Period      8.000000000000000 =        1.000000
Output divisions in Period      9.000000000000000 =        1.000000
Output divisions in Period     10.000000000000000 =        1.000000
Output divisions in Period     11.000000000000000 =        1.000000
Output divisions in Period     12.000000000000000 =        1.000000
Output divisions in Period     13.000000000000000 =        1.000000
Output divisions in Period     14.000000000000000 =        1.000000
Output divisions in Period     15.000000000000000 =        1.000000
Output divisions in Period     16.000000000000000 =        1.000000
Output divisions in Period     17.000000000000000 =        1.000000
Output divisions in Period     18.000000000000000 =        1.000000
Output divisions in Period     19.000000000000000 =        1.000000
Output divisions in Period     20.000000000000000 =        1.000000
Output divisions in Period     21.000000000000000 =        1.000000
Output divisions in Period     22.000000000000000 =        1.000000
Output divisions in Period     23.000000000000000 =        1.000000
Output divisions in Period     24.000000000000000 =        1.000000
Output divisions in Period     25.000000000000000 =        1.000000
Output divisions in Period     26.000000000000000 =        1.000000
Output divisions in Period     27.000000000000000 =        1.000000
Output divisions in Period     28.000000000000000 =        1.000000
Output divisions in Period     29.000000000000000 =        1.000000
Output divisions in Period     30.000000000000000 =        1.000000
Output divisions in Period     31.000000000000000 =        1.000000
Output divisions in Period     32.000000000000000 =        1.000000
Output divisions in Period     33.000000000000000 =        1.000000
Output divisions in Period     34.000000000000000 =        1.000000
Output divisions in Period     35.000000000000000 =        1.000000
Output divisions in Period     36.000000000000000 =        1.000000
Output divisions in Period     37.000000000000000 =        1.000000
Output divisions in Period     38.000000000000000 =        1.000000
Output divisions in Period     39.000000000000000 =        1.000000

Flow out @    0.000000E+00 min =     2480.000000 cfm &      155.300000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      100.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      180.000000 min =        1.000000 cfm &    0.000000E+00g/m
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Flow out @      240.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      260.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      320.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      340.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      420.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      500.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      580.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      640.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      660.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      740.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      800.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      820.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      880.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      900.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      960.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @      980.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1040.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1060.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1120.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1140.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1200.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1220.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1280.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1300.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1360.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1380.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1440.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1460.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @     1520.000000 min =     2480.000000 cfm &      155.300000g/m
Flow out @     1523.000000 min =        1.000000 cfm &    0.000000E+00g/m
```

**** OUTPUT @ 20.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	2.62E+00	3.74E-03	2.95E+00	2.23E-02	5.24E+00
1.50	1.27E+01	1.82E-02	1.45E+01	8.05E-01	2.62E+01
2.50	1.25E+01	1.80E-02	1.46E+01	2.15E+00	2.73E+01
3.50	2.21E+01	3.20E-02	2.67E+01	7.49E+00	5.26E+01
4.50	3.07E+01	4.50E-02	3.87E+01	1.76E+01	8.14E+01
5.50	2.88E+01	4.28E-02	3.81E+01	2.54E+01	8.64E+01
6.50	1.91E+01	2.89E-02	2.67E+01	2.43E+01	6.57E+01
7.50	1.34E+01	2.06E-02	1.97E+01	2.34E+01	5.29E+01
8.50	1.05E+01	1.66E-02	1.64E+01	2.44E+01	4.80E+01
9.50	7.29E+00	1.18E-02	1.20E+01	2.17E+01	3.84E+01
15.00	4.83E+01	9.27E-02	1.04E+02	3.96E+02	5.14E+02
25.00	1.89E+01	5.34E-02	6.30E+01	4.56E+02	5.04E+02
35.00	8.98E+00	3.75E-02	4.47E+01	4.31E+02	4.54E+02
45.00	5.97E+00	3.54E-02	4.24E+01	4.72E+02	4.87E+02
55.00	4.19E-01	3.23E-03	3.87E+00	4.63E+01	4.74E+01
65.00	8.42E-01	8.18E-03	9.80E+00	1.23E+02	1.25E+02
75.00	4.79E-01	5.71E-03	6.85E+00	8.86E+01	8.99E+01
85.00	2.67E-01	3.84E-03	4.60E+00	6.10E+01	6.17E+01

95.00	2.92E-01	4.94E-03	5.92E+00	7.98E+01	8.06E+01
125.00	1.49E-01	3.65E-03	4.38E+00	6.07E+01	6.11E+01

244.244032427668600 total grams airborne in tank
4.861724774818867E-001 total g/s out riser
499.864900350570700 total grams lost out riser
2361.891163326800000 total grams settled on floor
2908.769057750702000 total grams made airborne
197.231005579233200 total grams bypassed

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	2.51E+00	1.33E-06	2.96E+00	1.27E-01	5.24E+00
1.50	9.36E+00	4.97E-06	1.45E+01	4.09E+00	2.62E+01
2.50	5.59E+00	2.97E-06	1.46E+01	9.00E+00	2.73E+01
3.50	4.73E+00	2.51E-06	2.67E+01	2.48E+01	5.26E+01
4.50	2.48E+00	1.32E-06	3.87E+01	4.58E+01	8.14E+01
5.50	6.91E-01	3.67E-07	3.81E+01	5.34E+01	8.64E+01
6.50	1.07E-01	5.71E-08	2.67E+01	4.34E+01	6.57E+01
7.50	1.38E-02	7.36E-09	1.97E+01	3.68E+01	5.29E+01
8.50	1.58E-03	8.38E-10	1.64E+01	3.49E+01	4.80E+01
9.50	1.25E-04	6.64E-11	1.20E+01	2.90E+01	3.84E+01
15.00	7.67E-11	4.07E-17	1.04E+02	4.45E+02	5.14E+02
25.00	4.55E-32	2.42E-38	6.30E+01	4.75E+02	5.04E+02
35.00	0.00E+00	0.00E+00	4.47E+01	4.40E+02	4.54E+02
45.00	0.00E+00	0.00E+00	4.24E+01	4.78E+02	4.87E+02
55.00	0.00E+00	0.00E+00	3.87E+00	4.68E+01	4.74E+01
65.00	0.00E+00	0.00E+00	9.80E+00	1.24E+02	1.25E+02
75.00	0.00E+00	0.00E+00	6.85E+00	8.91E+01	8.99E+01
85.00	0.00E+00	0.00E+00	4.60E+00	6.12E+01	6.17E+01
95.00	0.00E+00	0.00E+00	5.92E+00	8.01E+01	8.06E+01
125.00	0.00E+00	0.00E+00	4.38E+00	6.08E+01	6.11E+01

25.494793103895340 total grams airborne in tank
1.354502698487546E-005 total g/s out riser
499.982851982116700 total grams lost out riser
2580.522471785545000 total grams settled on floor
2908.769057750702000 total grams made airborne
197.231005579233200 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.13E+00	4.41E-03	7.89E+00	1.66E-01	1.05E+01
1.50	1.44E+01	2.05E-02	3.61E+01	5.35E+00	5.24E+01
2.50	1.33E+01	1.91E-02	3.32E+01	1.18E+01	5.47E+01
3.50	2.26E+01	3.28E-02	5.65E+01	3.33E+01	1.05E+02
4.50	3.09E+01	4.53E-02	7.89E+01	6.41E+01	1.63E+02
5.50	2.88E+01	4.29E-02	7.66E+01	7.91E+01	1.73E+02
6.50	1.91E+01	2.89E-02	5.35E+01	6.77E+01	1.31E+02
7.50	1.34E+01	2.06E-02	3.95E+01	6.02E+01	1.06E+02
8.50	1.05E+01	1.66E-02	3.28E+01	5.92E+01	9.60E+01
9.50	7.29E+00	1.18E-02	2.40E+01	5.07E+01	7.68E+01

15.00	4.83E+01	9.27E-02	2.08E+02	8.41E+02	1.03E+03
25.00	1.89E+01	5.34E-02	1.26E+02	9.31E+02	1.01E+03
35.00	8.98E+00	3.75E-02	8.94E+01	8.71E+02	9.08E+02
45.00	5.97E+00	3.54E-02	8.47E+01	9.50E+02	9.74E+02
55.00	4.19E-01	3.23E-03	7.74E+00	9.31E+01	9.48E+01
65.00	8.42E-01	8.18E-03	1.96E+01	2.47E+02	2.50E+02
75.00	4.79E-01	5.71E-03	1.37E+01	1.78E+02	1.80E+02
85.00	2.67E-01	3.84E-03	9.20E+00	1.22E+02	1.23E+02
95.00	2.92E-01	4.94E-03	1.18E+01	1.60E+02	1.61E+02
125.00	1.49E-01	3.65E-03	8.75E+00	1.22E+02	1.22E+02

248.227383419871300 total grams airborne in tank
4.914209006819874E-001 total g/s out riser
1018.060737133026000 total grams lost out riser
4945.712124675512000 total grams settled on floor
5817.538115501404000 total grams made airborne
394.462011158466300 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.00E+00	1.59E-06	7.90E+00	2.91E-01	1.05E+01
1.50	1.07E+01	5.66E-06	3.62E+01	9.09E+00	5.24E+01
2.50	5.99E+00	3.18E-06	3.32E+01	1.92E+01	5.47E+01
3.50	4.86E+00	2.58E-06	5.65E+01	5.10E+01	1.05E+02
4.50	2.50E+00	1.33E-06	7.89E+01	9.25E+01	1.63E+02
5.50	6.92E-01	3.68E-07	7.66E+01	1.07E+02	1.73E+02
6.50	1.08E-01	5.71E-08	5.35E+01	8.68E+01	1.31E+02
7.50	1.38E-02	7.36E-09	3.95E+01	7.36E+01	1.06E+02
8.50	1.58E-03	8.38E-10	3.28E+01	6.97E+01	9.60E+01
9.50	1.25E-04	6.64E-11	2.40E+01	5.80E+01	7.68E+01
15.00	7.67E-11	4.07E-17	2.08E+02	8.90E+02	1.03E+03
25.00	4.55E-32	2.42E-38	1.26E+02	9.50E+02	1.01E+03
35.00	0.00E+00	0.00E+00	8.94E+01	8.80E+02	9.08E+02
45.00	0.00E+00	0.00E+00	8.47E+01	9.56E+02	9.74E+02
55.00	0.00E+00	0.00E+00	7.74E+00	9.35E+01	9.48E+01
65.00	0.00E+00	0.00E+00	1.96E+01	2.48E+02	2.50E+02
75.00	0.00E+00	0.00E+00	1.37E+01	1.78E+02	1.80E+02
85.00	0.00E+00	0.00E+00	9.20E+00	1.22E+02	1.23E+02
95.00	0.00E+00	0.00E+00	1.18E+01	1.60E+02	1.61E+02
125.00	0.00E+00	0.00E+00	8.75E+00	1.22E+02	1.22E+02

27.810170729313820 total grams airborne in tank
1.477515453320637E-005 total g/s out riser
1018.184426307678000 total grams lost out riser
5166.005629569292000 total grams settled on floor
5817.538115501404000 total grams made airborne
394.462011158466300 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.22E+00	4.54E-03	1.32E+01	3.33E-01	1.57E+01
1.50	1.47E+01	2.08E-02	5.88E+01	1.04E+01	7.85E+01

2.50	1.34E+01	1.92E-02	5.21E+01	2.20E+01	8.20E+01
3.50	2.26E+01	3.28E-02	8.64E+01	5.96E+01	1.58E+02
4.50	3.09E+01	4.53E-02	1.19E+02	1.11E+02	2.44E+02
5.50	2.88E+01	4.29E-02	1.15E+02	1.33E+02	2.59E+02
6.50	1.91E+01	2.89E-02	8.03E+01	1.11E+02	1.97E+02
7.50	1.34E+01	2.06E-02	5.92E+01	9.70E+01	1.59E+02
8.50	1.05E+01	1.66E-02	4.91E+01	9.41E+01	1.44E+02
9.50	7.29E+00	1.18E-02	3.60E+01	7.97E+01	1.15E+02
15.00	4.83E+01	9.27E-02	3.12E+02	1.29E+03	1.54E+03
25.00	1.89E+01	5.34E-02	1.89E+02	1.41E+03	1.51E+03
35.00	8.98E+00	3.75E-02	1.34E+02	1.31E+03	1.36E+03
45.00	5.97E+00	3.54E-02	1.27E+02	1.43E+03	1.46E+03
55.00	4.19E-01	3.23E-03	1.16E+01	1.40E+02	1.42E+02
65.00	8.42E-01	8.18E-03	2.94E+01	3.70E+02	3.75E+02
75.00	4.79E-01	5.71E-03	2.05E+01	2.67E+02	2.70E+02
85.00	2.67E-01	3.84E-03	1.38E+01	1.83E+02	1.85E+02
95.00	2.92E-01	4.94E-03	1.78E+01	2.40E+02	2.42E+02
125.00	1.49E-01	3.65E-03	1.31E+01	1.82E+02	1.83E+02

248.645538374781600 total grams airborne in tank
4.919718557503074E-001 total g/s out riser
1538.012756347656000 total grams lost out riser
7531.342012107372000 total grams settled on floor
8726.307052612305000 total grams made airborne
591.693013310432400 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.09E+00	1.64E-06	1.32E+01	4.62E-01	1.57E+01
1.50	1.08E+01	5.75E-06	5.88E+01	1.42E+01	7.85E+01
2.50	6.02E+00	3.20E-06	5.22E+01	2.94E+01	8.20E+01
3.50	4.86E+00	2.58E-06	8.65E+01	7.73E+01	1.58E+02
4.50	2.50E+00	1.33E-06	1.19E+02	1.39E+02	2.44E+02
5.50	6.92E-01	3.68E-07	1.15E+02	1.61E+02	2.59E+02
6.50	1.08E-01	5.71E-08	8.03E+01	1.30E+02	1.97E+02
7.50	1.38E-02	7.36E-09	5.92E+01	1.10E+02	1.59E+02
8.50	1.58E-03	8.38E-10	4.91E+01	1.05E+02	1.44E+02
9.50	1.25E-04	6.64E-11	3.60E+01	8.70E+01	1.15E+02
15.00	7.67E-11	4.07E-17	3.12E+02	1.33E+03	1.54E+03
25.00	4.55E-32	2.42E-38	1.89E+02	1.42E+03	1.51E+03
35.00	0.00E+00	0.00E+00	1.34E+02	1.32E+03	1.36E+03
45.00	0.00E+00	0.00E+00	1.27E+02	1.43E+03	1.46E+03
55.00	0.00E+00	0.00E+00	1.16E+01	1.40E+02	1.42E+02
65.00	0.00E+00	0.00E+00	2.94E+01	3.71E+02	3.75E+02
75.00	0.00E+00	0.00E+00	2.05E+01	2.67E+02	2.70E+02
85.00	0.00E+00	0.00E+00	1.38E+01	1.84E+02	1.85E+02
95.00	0.00E+00	0.00E+00	1.78E+01	2.40E+02	2.42E+02
125.00	0.00E+00	0.00E+00	1.31E+01	1.83E+02	1.83E+02

28.113578636799780 total grams airborne in tank
1.493635093343431E-005 total g/s out riser
1538.137089729309000 total grams lost out riser
7751.749639958143000 total grams settled on floor
8726.307052612305000 total grams made airborne
591.693013310432400 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.24E+00	4.57E-03	1.86E+01	5.05E-01	2.09E+01
1.50	1.47E+01	2.08E-02	8.16E+01	1.55E+01	1.05E+02
2.50	1.34E+01	1.92E-02	7.11E+01	3.23E+01	1.09E+02
3.50	2.26E+01	3.28E-02	1.16E+02	8.59E+01	2.11E+02
4.50	3.09E+01	4.53E-02	1.59E+02	1.58E+02	3.26E+02
5.50	2.88E+01	4.29E-02	1.54E+02	1.87E+02	3.46E+02
6.50	1.91E+01	2.89E-02	1.07E+02	1.55E+02	2.63E+02
7.50	1.34E+01	2.06E-02	7.90E+01	1.34E+02	2.12E+02
8.50	1.05E+01	1.66E-02	6.55E+01	1.29E+02	1.92E+02
9.50	7.29E+00	1.18E-02	4.80E+01	1.09E+02	1.54E+02
15.00	4.83E+01	9.27E-02	4.16E+02	1.73E+03	2.06E+03
25.00	1.89E+01	5.34E-02	2.52E+02	1.88E+03	2.02E+03
35.00	8.98E+00	3.75E-02	1.79E+02	1.75E+03	1.82E+03
45.00	5.97E+00	3.54E-02	1.69E+02	1.91E+03	1.95E+03
55.00	4.19E-01	3.23E-03	1.55E+01	1.87E+02	1.90E+02
65.00	8.42E-01	8.18E-03	3.92E+01	4.94E+02	5.00E+02
75.00	4.79E-01	5.71E-03	2.74E+01	3.56E+02	3.60E+02
85.00	2.67E-01	3.84E-03	1.84E+01	2.45E+02	2.47E+02
95.00	2.92E-01	4.94E-03	2.37E+01	3.20E+02	3.22E+02
125.00	1.49E-01	3.65E-03	1.75E+01	2.43E+02	2.44E+02

248.702589079737700 total grams airborne in tank
4.920470223296434E-001 total g/s out riser
2058.198377609253000 total grams lost out riser
10117.099397957320000 total grams settled on floor
11635.076231002810000 total grams made airborne
788.924022316932700 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	1.86E+01	6.35E-01	2.09E+01
1.50	1.09E+01	5.77E-06	8.16E+01	1.94E+01	1.05E+02
2.50	6.02E+00	3.20E-06	7.11E+01	3.97E+01	1.09E+02
3.50	4.86E+00	2.58E-06	1.16E+02	1.04E+02	2.11E+02
4.50	2.50E+00	1.33E-06	1.59E+02	1.86E+02	3.26E+02
5.50	6.92E-01	3.68E-07	1.54E+02	2.15E+02	3.46E+02
6.50	1.08E-01	5.71E-08	1.07E+02	1.74E+02	2.63E+02
7.50	1.38E-02	7.36E-09	7.90E+01	1.47E+02	2.12E+02
8.50	1.58E-03	8.38E-10	6.55E+01	1.39E+02	1.92E+02
9.50	1.25E-04	6.64E-11	4.80E+01	1.16E+02	1.54E+02
15.00	7.67E-11	4.07E-17	4.16E+02	1.78E+03	2.06E+03
25.00	4.55E-32	2.42E-38	2.52E+02	1.90E+03	2.02E+03
35.00	0.00E+00	0.00E+00	1.79E+02	1.76E+03	1.82E+03
45.00	0.00E+00	0.00E+00	1.69E+02	1.91E+03	1.95E+03
55.00	0.00E+00	0.00E+00	1.55E+01	1.87E+02	1.90E+02
65.00	0.00E+00	0.00E+00	3.92E+01	4.95E+02	5.00E+02
75.00	0.00E+00	0.00E+00	2.74E+01	3.57E+02	3.60E+02
85.00	0.00E+00	0.00E+00	1.84E+01	2.45E+02	2.47E+02
95.00	0.00E+00	0.00E+00	2.37E+01	3.20E+02	3.22E+02
125.00	0.00E+00	0.00E+00	1.75E+01	2.43E+02	2.44E+02

28.158455689106910 total grams airborne in tank
1.496019367810180E-005 total g/s out riser
2058.322841644287000 total grams lost out riser
10337.519146203990000 total grams settled on floor
11635.076231002810000 total grams made airborne
788.924022316932700 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	2.40E+01	6.78E-01	2.62E+01
1.50	1.47E+01	2.08E-02	1.04E+02	2.07E+01	1.31E+02
2.50	1.34E+01	1.92E-02	9.00E+01	4.25E+01	1.37E+02
3.50	2.26E+01	3.28E-02	1.46E+02	1.12E+02	2.63E+02
4.50	3.09E+01	4.53E-02	2.00E+02	2.04E+02	4.07E+02
5.50	2.88E+01	4.29E-02	1.92E+02	2.40E+02	4.32E+02
6.50	1.91E+01	2.89E-02	1.34E+02	1.98E+02	3.29E+02
7.50	1.34E+01	2.06E-02	9.87E+01	1.71E+02	2.65E+02
8.50	1.05E+01	1.66E-02	8.19E+01	1.64E+02	2.40E+02
9.50	7.29E+00	1.18E-02	6.00E+01	1.38E+02	1.92E+02
15.00	4.83E+01	9.27E-02	5.20E+02	2.18E+03	2.57E+03
25.00	1.89E+01	5.34E-02	3.15E+02	2.36E+03	2.52E+03
35.00	8.98E+00	3.75E-02	2.23E+02	2.19E+03	2.27E+03
45.00	5.97E+00	3.54E-02	2.12E+02	2.38E+03	2.44E+03
55.00	4.19E-01	3.23E-03	1.94E+01	2.33E+02	2.37E+02
65.00	8.42E-01	8.18E-03	4.90E+01	6.18E+02	6.25E+02
75.00	4.79E-01	5.71E-03	3.42E+01	4.45E+02	4.49E+02
85.00	2.67E-01	3.84E-03	2.30E+01	3.06E+02	3.08E+02
95.00	2.92E-01	4.94E-03	2.96E+01	4.00E+02	4.03E+02
125.00	1.49E-01	3.65E-03	2.19E+01	3.04E+02	3.05E+02

248.711190983653100 total grams airborne in tank
4.920583583880216E-001 total g/s out riser
2578.418882369995000 total grams lost out riser
12702.870484769340000 total grams settled on floor
14543.845409393310000 total grams made airborne
986.155029416084300 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	2.40E+01	8.08E-01	2.62E+01
1.50	1.09E+01	5.77E-06	1.04E+02	2.45E+01	1.31E+02
2.50	6.02E+00	3.20E-06	9.00E+01	4.99E+01	1.37E+02
3.50	4.86E+00	2.58E-06	1.46E+02	1.30E+02	2.63E+02
4.50	2.50E+00	1.33E-06	2.00E+02	2.33E+02	4.07E+02
5.50	6.92E-01	3.68E-07	1.92E+02	2.68E+02	4.32E+02
6.50	1.08E-01	5.71E-08	1.34E+02	2.17E+02	3.29E+02
7.50	1.38E-02	7.36E-09	9.87E+01	1.84E+02	2.65E+02
8.50	1.58E-03	8.38E-10	8.19E+01	1.74E+02	2.40E+02
9.50	1.25E-04	6.64E-11	6.00E+01	1.45E+02	1.92E+02
15.00	7.67E-11	4.07E-17	5.20E+02	2.22E+03	2.57E+03
25.00	4.55E-32	2.42E-38	3.15E+02	2.37E+03	2.52E+03

35.00	0.00E+00	0.00E+00	2.23E+02	2.20E+03	2.27E+03
45.00	0.00E+00	0.00E+00	2.12E+02	2.39E+03	2.44E+03
55.00	0.00E+00	0.00E+00	1.94E+01	2.34E+02	2.37E+02
65.00	0.00E+00	0.00E+00	4.90E+01	6.19E+02	6.25E+02
75.00	0.00E+00	0.00E+00	3.42E+01	4.46E+02	4.49E+02
85.00	0.00E+00	0.00E+00	2.30E+01	3.06E+02	3.08E+02
95.00	0.00E+00	0.00E+00	2.96E+01	4.01E+02	4.03E+02
125.00	0.00E+00	0.00E+00	2.19E+01	3.04E+02	3.05E+02

28.165536959324800 total grams airborne in tank
1.496395580293568E-005 total g/s out riser
2578.543315887451000 total grams lost out riser
12923.291706085210000 total grams settled on floor
14543.845409393310000 total grams made airborne
986.155029416084300 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	2.94E+01	8.51E-01	3.14E+01
1.50	1.47E+01	2.08E-02	1.27E+02	2.58E+01	1.57E+02
2.50	1.34E+01	1.92E-02	1.09E+02	5.28E+01	1.64E+02
3.50	2.26E+01	3.28E-02	1.76E+02	1.38E+02	3.16E+02
4.50	3.09E+01	4.53E-02	2.40E+02	2.51E+02	4.89E+02
5.50	2.88E+01	4.29E-02	2.31E+02	2.94E+02	5.18E+02
6.50	1.91E+01	2.89E-02	1.61E+02	2.41E+02	3.94E+02
7.50	1.34E+01	2.06E-02	1.18E+02	2.07E+02	3.18E+02
8.50	1.05E+01	1.66E-02	9.83E+01	1.99E+02	2.88E+02
9.50	7.29E+00	1.18E-02	7.20E+01	1.67E+02	2.30E+02
15.00	4.83E+01	9.27E-02	6.24E+02	2.62E+03	3.08E+03
25.00	1.89E+01	5.34E-02	3.78E+02	2.83E+03	3.02E+03
35.00	8.98E+00	3.75E-02	2.68E+02	2.63E+03	2.72E+03
45.00	5.97E+00	3.54E-02	2.54E+02	2.86E+03	2.92E+03
55.00	4.19E-01	3.23E-03	2.32E+01	2.80E+02	2.84E+02
65.00	8.42E-01	8.18E-03	5.88E+01	7.42E+02	7.50E+02
75.00	4.79E-01	5.71E-03	4.11E+01	5.34E+02	5.39E+02
85.00	2.67E-01	3.84E-03	2.76E+01	3.67E+02	3.70E+02
95.00	2.92E-01	4.94E-03	3.55E+01	4.80E+02	4.83E+02
125.00	1.49E-01	3.65E-03	2.63E+01	3.65E+02	3.67E+02

248.712566658854500 total grams airborne in tank
4.920601688791066E-001 total g/s out riser
3098.644834518433000 total grams lost out riser
15288.643337965010000 total grams settled on floor
17452.614549636840000 total grams made airborne
1183.386024713516000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	2.95E+01	9.81E-01	3.14E+01
1.50	1.09E+01	5.77E-06	1.27E+02	2.96E+01	1.57E+02
2.50	6.02E+00	3.20E-06	1.09E+02	6.02E+01	1.64E+02
3.50	4.86E+00	2.58E-06	1.76E+02	1.56E+02	3.16E+02

4.50	2.50E+00	1.33E-06	2.40E+02	2.79E+02	4.89E+02
5.50	6.92E-01	3.68E-07	2.31E+02	3.22E+02	5.18E+02
6.50	1.08E-01	5.71E-08	1.61E+02	2.60E+02	3.94E+02
7.50	1.38E-02	7.36E-09	1.18E+02	2.21E+02	3.18E+02
8.50	1.58E-03	8.38E-10	9.83E+01	2.09E+02	2.88E+02
9.50	1.25E-04	6.64E-11	7.20E+01	1.74E+02	2.30E+02
15.00	7.67E-11	4.07E-17	6.24E+02	2.67E+03	3.08E+03
25.00	4.55E-32	2.42E-38	3.78E+02	2.85E+03	3.02E+03
35.00	0.00E+00	0.00E+00	2.68E+02	2.64E+03	2.72E+03
45.00	0.00E+00	0.00E+00	2.54E+02	2.87E+03	2.92E+03
55.00	0.00E+00	0.00E+00	2.32E+01	2.81E+02	2.84E+02
65.00	0.00E+00	0.00E+00	5.88E+01	7.43E+02	7.50E+02
75.00	0.00E+00	0.00E+00	4.11E+01	5.35E+02	5.39E+02
85.00	0.00E+00	0.00E+00	2.76E+01	3.67E+02	3.70E+02
95.00	0.00E+00	0.00E+00	3.55E+01	4.81E+02	4.83E+02
125.00	0.00E+00	0.00E+00	2.63E+01	3.65E+02	3.67E+02

28.166704971943820 total grams airborne in tank
1.496457687413015E-005 total g/s out riser
3098.769294738770000 total grams lost out riser
15509.064697027210000 total grams settled on floor
17452.614549636840000 total grams made airborne
1183.386024713516000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	3.49E+01	1.02E+00	3.67E+01
1.50	1.47E+01	2.08E-02	1.50E+02	3.10E+01	1.83E+02
2.50	1.34E+01	1.92E-02	1.28E+02	6.31E+01	1.91E+02
3.50	2.26E+01	3.28E-02	2.06E+02	1.65E+02	3.69E+02
4.50	3.09E+01	4.53E-02	2.80E+02	2.98E+02	5.70E+02
5.50	2.88E+01	4.29E-02	2.69E+02	3.48E+02	6.05E+02
6.50	1.91E+01	2.89E-02	1.87E+02	2.85E+02	4.60E+02
7.50	1.34E+01	2.06E-02	1.38E+02	2.44E+02	3.71E+02
8.50	1.05E+01	1.66E-02	1.15E+02	2.34E+02	3.36E+02
9.50	7.29E+00	1.18E-02	8.40E+01	1.96E+02	2.69E+02
15.00	4.83E+01	9.27E-02	7.28E+02	3.06E+03	3.60E+03
25.00	1.89E+01	5.34E-02	4.41E+02	3.31E+03	3.53E+03
35.00	8.98E+00	3.75E-02	3.13E+02	3.07E+03	3.18E+03
45.00	5.97E+00	3.54E-02	2.97E+02	3.34E+03	3.41E+03
55.00	4.19E-01	3.23E-03	2.71E+01	3.27E+02	3.32E+02
65.00	8.42E-01	8.18E-03	6.86E+01	8.65E+02	8.76E+02
75.00	4.79E-01	5.71E-03	4.79E+01	6.23E+02	6.29E+02
85.00	2.67E-01	3.84E-03	3.22E+01	4.28E+02	4.32E+02
95.00	2.92E-01	4.94E-03	4.15E+01	5.60E+02	5.64E+02
125.00	1.49E-01	3.65E-03	3.06E+01	4.26E+02	4.28E+02

248.712796255946200 total grams airborne in tank
4.920604710932821E-001 total g/s out riser
3618.871673583984000 total grams lost out riser
17874.416400313380000 total grams settled on floor
20361.383705139160000 total grams made airborne
1380.617021799088000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	3.49E+01	1.15E+00	3.67E+01
1.50	1.09E+01	5.77E-06	1.50E+02	3.48E+01	1.83E+02
2.50	6.02E+00	3.20E-06	1.28E+02	7.04E+01	1.91E+02
3.50	4.86E+00	2.58E-06	2.06E+02	1.83E+02	3.69E+02
4.50	2.50E+00	1.33E-06	2.80E+02	3.26E+02	5.70E+02
5.50	6.92E-01	3.68E-07	2.69E+02	3.76E+02	6.05E+02
6.50	1.08E-01	5.71E-08	1.87E+02	3.04E+02	4.60E+02
7.50	1.38E-02	7.36E-09	1.38E+02	2.57E+02	3.71E+02
8.50	1.58E-03	8.38E-10	1.15E+02	2.44E+02	3.36E+02
9.50	1.25E-04	6.64E-11	8.40E+01	2.03E+02	2.69E+02
15.00	7.67E-11	4.07E-17	7.29E+02	3.11E+03	3.60E+03
25.00	4.55E-32	2.42E-38	4.41E+02	3.32E+03	3.53E+03
35.00	0.00E+00	0.00E+00	3.13E+02	3.08E+03	3.18E+03
45.00	0.00E+00	0.00E+00	2.97E+02	3.35E+03	3.41E+03
55.00	0.00E+00	0.00E+00	2.71E+01	3.27E+02	3.32E+02
65.00	0.00E+00	0.00E+00	6.86E+01	8.66E+02	8.76E+02
75.00	0.00E+00	0.00E+00	4.79E+01	6.24E+02	6.29E+02
85.00	0.00E+00	0.00E+00	3.22E+01	4.29E+02	4.32E+02
95.00	0.00E+00	0.00E+00	4.15E+01	5.61E+02	5.64E+02
125.00	0.00E+00	0.00E+00	3.06E+01	4.26E+02	4.28E+02

28.166905720387430 total grams airborne in tank
1.496468317132342E-005 total g/s out riser
3618.996229171753000 total grams lost out riser
18094.837820410730000 total grams settled on floor
20361.383705139160000 total grams made airborne
1380.617021799088000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	4.03E+01	1.20E+00	4.19E+01
1.50	1.47E+01	2.08E-02	1.73E+02	3.61E+01	2.09E+02
2.50	1.34E+01	1.92E-02	1.47E+02	7.33E+01	2.19E+02
3.50	2.26E+01	3.28E-02	2.36E+02	1.91E+02	4.21E+02
4.50	3.09E+01	4.53E-02	3.20E+02	3.45E+02	6.52E+02
5.50	2.88E+01	4.29E-02	3.08E+02	4.02E+02	6.91E+02
6.50	1.91E+01	2.89E-02	2.14E+02	3.28E+02	5.26E+02
7.50	1.34E+01	2.06E-02	1.58E+02	2.81E+02	4.24E+02
8.50	1.05E+01	1.66E-02	1.31E+02	2.68E+02	3.84E+02
9.50	7.29E+00	1.18E-02	9.59E+01	2.25E+02	3.07E+02
15.00	4.83E+01	9.27E-02	8.33E+02	3.51E+03	4.11E+03
25.00	1.89E+01	5.34E-02	5.04E+02	3.78E+03	4.03E+03
35.00	8.98E+00	3.75E-02	3.57E+02	3.51E+03	3.63E+03
45.00	5.97E+00	3.54E-02	3.39E+02	3.82E+03	3.90E+03
55.00	4.19E-01	3.23E-03	3.10E+01	3.74E+02	3.79E+02
65.00	8.42E-01	8.18E-03	7.84E+01	9.89E+02	1.00E+03
75.00	4.79E-01	5.71E-03	5.48E+01	7.13E+02	7.19E+02
85.00	2.67E-01	3.84E-03	3.68E+01	4.90E+02	4.93E+02
95.00	2.92E-01	4.94E-03	4.74E+01	6.41E+02	6.45E+02
125.00	1.49E-01	3.65E-03	3.50E+01	4.87E+02	4.89E+02

248.712835118174600 total grams airborne in tank

4.920605223160237E-001 total g/s out riser
4139.098779678345000 total grams lost out riser
20460.189576148990000 total grams settled on floor
23270.152797698970000 total grams made airborne
1577.847999811172000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	4.03E+01	1.33E+00	4.19E+01
1.50	1.09E+01	5.77E-06	1.73E+02	3.99E+01	2.09E+02
2.50	6.02E+00	3.20E-06	1.47E+02	8.07E+01	2.19E+02
3.50	4.86E+00	2.58E-06	2.36E+02	2.09E+02	4.21E+02
4.50	2.50E+00	1.33E-06	3.20E+02	3.73E+02	6.52E+02
5.50	6.92E-01	3.68E-07	3.08E+02	4.30E+02	6.91E+02
6.50	1.08E-01	5.71E-08	2.14E+02	3.47E+02	5.26E+02
7.50	1.38E-02	7.36E-09	1.58E+02	2.94E+02	4.24E+02
8.50	1.58E-03	8.38E-10	1.31E+02	2.79E+02	3.84E+02
9.50	1.25E-04	6.64E-11	9.59E+01	2.32E+02	3.07E+02
15.00	7.67E-11	4.07E-17	8.33E+02	3.56E+03	4.11E+03
25.00	4.55E-32	2.42E-38	5.04E+02	3.80E+03	4.03E+03
35.00	0.00E+00	0.00E+00	3.57E+02	3.52E+03	3.63E+03
45.00	0.00E+00	0.00E+00	3.39E+02	3.82E+03	3.90E+03
55.00	0.00E+00	0.00E+00	3.10E+01	3.74E+02	3.79E+02
65.00	0.00E+00	0.00E+00	7.84E+01	9.90E+02	1.00E+03
75.00	0.00E+00	0.00E+00	5.48E+01	7.13E+02	7.19E+02
85.00	0.00E+00	0.00E+00	3.68E+01	4.90E+02	4.93E+02
95.00	0.00E+00	0.00E+00	4.74E+01	6.41E+02	6.45E+02
125.00	0.00E+00	0.00E+00	3.50E+01	4.87E+02	4.89E+02

28.166940529499970 total grams airborne in tank
1.496470170227797E-005 total g/s out riser
4139.223228454590000 total grams lost out riser
20680.610890507700000 total grams settled on floor
23270.152797698970000 total grams made airborne
1577.847999811172000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	4.57E+01	1.37E+00	4.71E+01
1.50	1.47E+01	2.08E-02	1.96E+02	4.13E+01	2.36E+02
2.50	1.34E+01	1.92E-02	1.66E+02	8.36E+01	2.46E+02
3.50	2.26E+01	3.28E-02	2.66E+02	2.17E+02	4.74E+02
4.50	3.09E+01	4.53E-02	3.60E+02	3.91E+02	7.33E+02
5.50	2.88E+01	4.29E-02	3.46E+02	4.55E+02	7.78E+02
6.50	1.91E+01	2.89E-02	2.41E+02	3.72E+02	5.92E+02
7.50	1.34E+01	2.06E-02	1.78E+02	3.18E+02	4.76E+02
8.50	1.05E+01	1.66E-02	1.47E+02	3.03E+02	4.32E+02
9.50	7.29E+00	1.18E-02	1.08E+02	2.54E+02	3.46E+02
15.00	4.83E+01	9.27E-02	9.37E+02	3.95E+03	4.63E+03
25.00	1.89E+01	5.34E-02	5.67E+02	4.26E+03	4.53E+03
35.00	8.98E+00	3.75E-02	4.02E+02	3.95E+03	4.08E+03
45.00	5.97E+00	3.54E-02	3.81E+02	4.30E+03	4.38E+03

55.00	4.19E-01	3.23E-03	3.48E+01	4.20E+02	4.27E+02
65.00	8.42E-01	8.18E-03	8.82E+01	1.11E+03	1.13E+03
75.00	4.79E-01	5.71E-03	6.16E+01	8.02E+02	8.09E+02
85.00	2.67E-01	3.84E-03	4.14E+01	5.51E+02	5.55E+02
95.00	2.92E-01	4.94E-03	5.33E+01	7.21E+02	7.25E+02
125.00	1.49E-01	3.65E-03	3.94E+01	5.47E+02	5.50E+02

248.712842509150500 total grams airborne in tank
4.920605311635882E-001 total g/s out riser
4659.325851440430000 total grams lost out riser
23045.962646484370000 total grams settled on floor
26178.921707153320000 total grams made airborne
1775.078994035721000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	4.57E+01	1.50E+00	4.71E+01
1.50	1.09E+01	5.77E-06	1.96E+02	4.51E+01	2.36E+02
2.50	6.02E+00	3.20E-06	1.66E+02	9.09E+01	2.46E+02
3.50	4.86E+00	2.58E-06	2.66E+02	2.35E+02	4.74E+02
4.50	2.50E+00	1.33E-06	3.60E+02	4.20E+02	7.33E+02
5.50	6.92E-01	3.68E-07	3.46E+02	4.83E+02	7.78E+02
6.50	1.08E-01	5.71E-08	2.41E+02	3.91E+02	5.92E+02
7.50	1.38E-02	7.36E-09	1.78E+02	3.31E+02	4.76E+02
8.50	1.58E-03	8.38E-10	1.47E+02	3.14E+02	4.32E+02
9.50	1.25E-04	6.64E-11	1.08E+02	2.61E+02	3.46E+02
15.00	7.67E-11	4.07E-17	9.37E+02	4.00E+03	4.63E+03
25.00	4.55E-32	2.42E-38	5.67E+02	4.27E+03	4.53E+03
35.00	0.00E+00	0.00E+00	4.02E+02	3.96E+03	4.08E+03
45.00	0.00E+00	0.00E+00	3.81E+02	4.30E+03	4.38E+03
55.00	0.00E+00	0.00E+00	3.48E+01	4.21E+02	4.27E+02
65.00	0.00E+00	0.00E+00	8.82E+01	1.11E+03	1.13E+03
75.00	0.00E+00	0.00E+00	6.16E+01	8.02E+02	8.09E+02
85.00	0.00E+00	0.00E+00	4.14E+01	5.51E+02	5.55E+02
95.00	0.00E+00	0.00E+00	5.33E+01	7.21E+02	7.25E+02
125.00	0.00E+00	0.00E+00	3.94E+01	5.48E+02	5.50E+02

28.166946728383030 total grams airborne in tank
1.496470488550943E-005 total g/s out riser
4659.450382232666000 total grams lost out riser
23266.383999109270000 total grams settled on floor
26178.921707153320000 total grams made airborne
1775.078994035721000 total grams bypassed

**** OUTPUT @ 740.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	5.11E+01	1.54E+00	5.24E+01
1.50	1.47E+01	2.08E-02	2.18E+02	4.64E+01	2.62E+02
2.50	1.34E+01	1.92E-02	1.85E+02	9.38E+01	2.73E+02
3.50	2.26E+01	3.28E-02	2.96E+02	2.44E+02	5.26E+02
4.50	3.09E+01	4.53E-02	4.01E+02	4.38E+02	8.14E+02
5.50	2.88E+01	4.29E-02	3.85E+02	5.09E+02	8.64E+02

6.50	1.91E+01	2.89E-02	2.68E+02	4.15E+02	6.57E+02
7.50	1.34E+01	2.06E-02	1.97E+02	3.54E+02	5.29E+02
8.50	1.05E+01	1.66E-02	1.64E+02	3.38E+02	4.80E+02
9.50	7.29E+00	1.18E-02	1.20E+02	2.83E+02	3.84E+02
15.00	4.83E+01	9.27E-02	1.04E+03	4.40E+03	5.14E+03
25.00	1.89E+01	5.34E-02	6.30E+02	4.73E+03	5.04E+03
35.00	8.98E+00	3.75E-02	4.47E+02	4.39E+03	4.54E+03
45.00	5.97E+00	3.54E-02	4.24E+02	4.77E+03	4.87E+03
55.00	4.19E-01	3.23E-03	3.87E+01	4.67E+02	4.74E+02
65.00	8.42E-01	8.18E-03	9.80E+01	1.24E+03	1.25E+03
75.00	4.79E-01	5.71E-03	6.85E+01	8.91E+02	8.99E+02
85.00	2.67E-01	3.84E-03	4.60E+01	6.12E+02	6.17E+02
95.00	2.92E-01	4.94E-03	5.92E+01	8.01E+02	8.06E+02
125.00	1.49E-01	3.65E-03	4.38E+01	6.08E+02	6.11E+02

248.712843462824800 total grams airborne in tank
4.920605325605720E-001 total g/s out riser
5179.553001403809000 total grams lost out riser
25631.735747575760000 total grams settled on floor
29087.690723419190000 total grams made airborne
1972.309976816177000 total grams bypassed

**** OUTPUT @ 800.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	5.11E+01	1.67E+00	5.24E+01
1.50	1.09E+01	5.77E-06	2.18E+02	5.02E+01	2.62E+02
2.50	6.02E+00	3.20E-06	1.85E+02	1.01E+02	2.73E+02
3.50	4.86E+00	2.58E-06	2.96E+02	2.61E+02	5.26E+02
4.50	2.50E+00	1.33E-06	4.01E+02	4.66E+02	8.14E+02
5.50	6.92E-01	3.68E-07	3.85E+02	5.37E+02	8.64E+02
6.50	1.08E-01	5.71E-08	2.68E+02	4.34E+02	6.57E+02
7.50	1.38E-02	7.36E-09	1.97E+02	3.68E+02	5.29E+02
8.50	1.58E-03	8.38E-10	1.64E+02	3.49E+02	4.80E+02
9.50	1.25E-04	6.64E-11	1.20E+02	2.90E+02	3.84E+02
15.00	7.67E-11	4.07E-17	1.04E+03	4.45E+03	5.14E+03
25.00	4.55E-32	2.42E-38	6.30E+02	4.75E+03	5.04E+03
35.00	0.00E+00	0.00E+00	4.47E+02	4.40E+03	4.54E+03
45.00	0.00E+00	0.00E+00	4.24E+02	4.78E+03	4.87E+03
55.00	0.00E+00	0.00E+00	3.87E+01	4.68E+02	4.74E+02
65.00	0.00E+00	0.00E+00	9.80E+01	1.24E+03	1.25E+03
75.00	0.00E+00	0.00E+00	6.85E+01	8.91E+02	8.99E+02
85.00	0.00E+00	0.00E+00	4.60E+01	6.12E+02	6.17E+02
95.00	0.00E+00	0.00E+00	5.92E+01	8.01E+02	8.06E+02
125.00	0.00E+00	0.00E+00	4.38E+01	6.08E+02	6.11E+02

28.166947682057350 total grams airborne in tank
1.496470545394362E-005 total g/s out riser
5179.677417755127000 total grams lost out riser
25852.156844615940000 total grams settled on floor
29087.690723419190000 total grams made airborne
1972.309976816177000 total grams bypassed

**** OUTPUT @ 820.000000000000000 minutes ****

diam	airborne	outflow	totalout	totalflr	source

mcrn	g	g/s	g	g	g
.50	3.25E+00	4.58E-03	5.65E+01	1.72E+00	5.76E+01
1.50	1.47E+01	2.08E-02	2.41E+02	5.16E+01	2.88E+02
2.50	1.34E+01	1.92E-02	2.04E+02	1.04E+02	3.01E+02
3.50	2.26E+01	3.28E-02	3.26E+02	2.70E+02	5.79E+02
4.50	3.09E+01	4.53E-02	4.41E+02	4.85E+02	8.96E+02
5.50	2.88E+01	4.29E-02	4.23E+02	5.63E+02	9.50E+02
6.50	1.91E+01	2.89E-02	2.95E+02	4.58E+02	7.23E+02
7.50	1.34E+01	2.06E-02	2.17E+02	3.91E+02	5.82E+02
8.50	1.05E+01	1.66E-02	1.80E+02	3.73E+02	5.28E+02
9.50	7.29E+00	1.18E-02	1.32E+02	3.12E+02	4.22E+02
15.00	4.83E+01	9.27E-02	1.14E+03	4.84E+03	5.65E+03
25.00	1.89E+01	5.34E-02	6.93E+02	5.21E+03	5.54E+03
35.00	8.98E+00	3.75E-02	4.91E+02	4.83E+03	4.99E+03
45.00	5.97E+00	3.54E-02	4.66E+02	5.25E+03	5.36E+03
55.00	4.19E-01	3.23E-03	4.26E+01	5.14E+02	5.22E+02
65.00	8.42E-01	8.18E-03	1.08E+02	1.36E+03	1.38E+03
75.00	4.79E-01	5.71E-03	7.53E+01	9.80E+02	9.89E+02
85.00	2.67E-01	3.84E-03	5.06E+01	6.73E+02	6.78E+02
95.00	2.92E-01	4.94E-03	6.52E+01	8.81E+02	8.86E+02
125.00	1.49E-01	3.65E-03	4.82E+01	6.69E+02	6.72E+02

248.712843701243400 total grams airborne in tank
4.920605330262333E-001 total g/s out riser
5699.779956817627000 total grams lost out riser
28217.508383274080000 total grams settled on floor
31996.459739685060000 total grams made airborne
2169.540959596634000 total grams bypassed

**** OUTPUT @ 880.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	5.65E+01	1.85E+00	5.76E+01
1.50	1.09E+01	5.77E-06	2.41E+02	5.54E+01	2.88E+02
2.50	6.02E+00	3.20E-06	2.04E+02	1.11E+02	3.01E+02
3.50	4.86E+00	2.58E-06	3.26E+02	2.88E+02	5.79E+02
4.50	2.50E+00	1.33E-06	4.41E+02	5.13E+02	8.96E+02
5.50	6.92E-01	3.68E-07	4.23E+02	5.91E+02	9.50E+02
6.50	1.08E-01	5.71E-08	2.95E+02	4.77E+02	7.23E+02
7.50	1.38E-02	7.36E-09	2.17E+02	4.05E+02	5.82E+02
8.50	1.58E-03	8.38E-10	1.80E+02	3.84E+02	5.28E+02
9.50	1.25E-04	6.64E-11	1.32E+02	3.19E+02	4.22E+02
15.00	7.67E-11	4.07E-17	1.14E+03	4.89E+03	5.65E+03
25.00	4.55E-32	2.42E-38	6.93E+02	5.22E+03	5.54E+03
35.00	0.00E+00	0.00E+00	4.91E+02	4.84E+03	4.99E+03
45.00	0.00E+00	0.00E+00	4.66E+02	5.26E+03	5.36E+03
55.00	0.00E+00	0.00E+00	4.26E+01	5.14E+02	5.22E+02
65.00	0.00E+00	0.00E+00	1.08E+02	1.36E+03	1.38E+03
75.00	0.00E+00	0.00E+00	7.53E+01	9.80E+02	9.89E+02
85.00	0.00E+00	0.00E+00	5.06E+01	6.74E+02	6.78E+02
95.00	0.00E+00	0.00E+00	6.52E+01	8.81E+02	8.86E+02
125.00	0.00E+00	0.00E+00	4.82E+01	6.69E+02	6.72E+02

28.166947920475930 total grams airborne in tank
1.496470545394362E-005 total g/s out riser
5699.904548645020000 total grams lost out riser

28437.929888486860000 total grams settled on floor
31996.459739685060000 total grams made airborne
2169.540959596634000 total grams bypassed

**** OUTPUT @ 900.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	6.20E+01	1.89E+00	6.28E+01
1.50	1.47E+01	2.08E-02	2.64E+02	5.67E+01	3.14E+02
2.50	1.34E+01	1.92E-02	2.23E+02	1.14E+02	3.28E+02
3.50	2.26E+01	3.28E-02	3.56E+02	2.96E+02	6.32E+02
4.50	3.09E+01	4.53E-02	4.81E+02	5.32E+02	9.77E+02
5.50	2.88E+01	4.29E-02	4.62E+02	6.17E+02	1.04E+03
6.50	1.91E+01	2.89E-02	3.21E+02	5.02E+02	7.89E+02
7.50	1.34E+01	2.06E-02	2.37E+02	4.28E+02	6.35E+02
8.50	1.05E+01	1.66E-02	1.97E+02	4.08E+02	5.76E+02
9.50	7.29E+00	1.18E-02	1.44E+02	3.41E+02	4.61E+02
15.00	4.83E+01	9.27E-02	1.25E+03	5.29E+03	6.17E+03
25.00	1.89E+01	5.34E-02	7.56E+02	5.68E+03	6.05E+03
35.00	8.98E+00	3.75E-02	5.36E+02	5.27E+03	5.45E+03
45.00	5.97E+00	3.54E-02	5.08E+02	5.73E+03	5.85E+03
55.00	4.19E-01	3.23E-03	4.65E+01	5.61E+02	5.69E+02
65.00	8.42E-01	8.18E-03	1.18E+02	1.48E+03	1.50E+03
75.00	4.79E-01	5.71E-03	8.22E+01	1.07E+03	1.08E+03
85.00	2.67E-01	3.84E-03	5.52E+01	7.35E+02	7.40E+02
95.00	2.92E-01	4.94E-03	7.11E+01	9.61E+02	9.67E+02
125.00	1.49E-01	3.65E-03	5.25E+01	7.30E+02	7.33E+02

248.712843701243400 total grams airborne in tank
4.920605330262333E-001 total g/s out riser
6220.007072448730000 total grams lost out riser
30803.281484365460000 total grams settled on floor
34905.228786468510000 total grams made airborne
2366.771938800812000 total grams bypassed

**** OUTPUT @ 960.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	6.20E+01	2.02E+00	6.28E+01
1.50	1.09E+01	5.77E-06	2.64E+02	6.05E+01	3.14E+02
2.50	6.02E+00	3.20E-06	2.23E+02	1.22E+02	3.28E+02
3.50	4.86E+00	2.58E-06	3.56E+02	3.14E+02	6.32E+02
4.50	2.50E+00	1.33E-06	4.81E+02	5.60E+02	9.77E+02
5.50	6.92E-01	3.68E-07	4.62E+02	6.45E+02	1.04E+03
6.50	1.08E-01	5.71E-08	3.21E+02	5.21E+02	7.89E+02
7.50	1.38E-02	7.36E-09	2.37E+02	4.41E+02	6.35E+02
8.50	1.58E-03	8.38E-10	1.97E+02	4.18E+02	5.76E+02
9.50	1.25E-04	6.64E-11	1.44E+02	3.48E+02	4.61E+02
15.00	7.67E-11	4.07E-17	1.25E+03	5.34E+03	6.17E+03
25.00	4.55E-32	2.42E-38	7.56E+02	5.70E+03	6.05E+03
35.00	0.00E+00	0.00E+00	5.36E+02	5.28E+03	5.45E+03
45.00	0.00E+00	0.00E+00	5.08E+02	5.73E+03	5.85E+03
55.00	0.00E+00	0.00E+00	4.65E+01	5.61E+02	5.69E+02
65.00	0.00E+00	0.00E+00	1.18E+02	1.49E+03	1.50E+03

75.00	0.00E+00	0.00E+00	8.22E+01	1.07E+03	1.08E+03
85.00	0.00E+00	0.00E+00	5.52E+01	7.35E+02	7.40E+02
95.00	0.00E+00	0.00E+00	7.11E+01	9.61E+02	9.67E+02
125.00	0.00E+00	0.00E+00	5.25E+01	7.30E+02	7.33E+02

28.166947920475930 total grams airborne in tank
1.496470556763046E-005 total g/s out riser
6220.131557464600000 total grams lost out riser
31023.702993631360000 total grams settled on floor
34905.228786468510000 total grams made airborne
2366.771938800812000 total grams bypassed

**** OUTPUT @ 980.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	6.74E+01	2.06E+00	6.81E+01
1.50	1.47E+01	2.08E-02	2.87E+02	6.18E+01	3.40E+02
2.50	1.34E+01	1.92E-02	2.42E+02	1.25E+02	3.55E+02
3.50	2.26E+01	3.28E-02	3.86E+02	3.23E+02	6.84E+02
4.50	3.09E+01	4.53E-02	5.21E+02	5.78E+02	1.06E+03
5.50	2.88E+01	4.29E-02	5.00E+02	6.70E+02	1.12E+03
6.50	1.91E+01	2.89E-02	3.48E+02	5.45E+02	8.55E+02
7.50	1.34E+01	2.06E-02	2.57E+02	4.65E+02	6.88E+02
8.50	1.05E+01	1.66E-02	2.13E+02	4.43E+02	6.24E+02
9.50	7.29E+00	1.18E-02	1.56E+02	3.70E+02	4.99E+02
15.00	4.83E+01	9.27E-02	1.35E+03	5.73E+03	6.68E+03
25.00	1.89E+01	5.34E-02	8.19E+02	6.16E+03	6.55E+03
35.00	8.98E+00	3.75E-02	5.81E+02	5.71E+03	5.90E+03
45.00	5.97E+00	3.54E-02	5.51E+02	6.21E+03	6.33E+03
55.00	4.19E-01	3.23E-03	5.03E+01	6.07E+02	6.16E+02
65.00	8.42E-01	8.18E-03	1.27E+02	1.61E+03	1.63E+03
75.00	4.79E-01	5.71E-03	8.90E+01	1.16E+03	1.17E+03
85.00	2.67E-01	3.84E-03	5.98E+01	7.96E+02	8.02E+02
95.00	2.92E-01	4.94E-03	7.70E+01	1.04E+03	1.05E+03
125.00	1.49E-01	3.65E-03	5.69E+01	7.91E+02	7.94E+02

248.712843701243400 total grams airborne in tank
4.920605330262333E-001 total g/s out riser
6740.234165191650000 total grams lost out riser
33389.054535627370000 total grams settled on floor
37813.997833251950000 total grams made airborne
2564.002921581268000 total grams bypassed

**** OUTPUT @ 1040.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	6.74E+01	2.19E+00	6.81E+01
1.50	1.09E+01	5.77E-06	2.87E+02	6.56E+01	3.40E+02
2.50	6.02E+00	3.20E-06	2.42E+02	1.32E+02	3.55E+02
3.50	4.86E+00	2.58E-06	3.86E+02	3.40E+02	6.84E+02
4.50	2.50E+00	1.33E-06	5.21E+02	6.07E+02	1.06E+03
5.50	6.92E-01	3.68E-07	5.00E+02	6.98E+02	1.12E+03
6.50	1.08E-01	5.71E-08	3.48E+02	5.64E+02	8.55E+02
7.50	1.38E-02	7.36E-09	2.57E+02	4.78E+02	6.88E+02

8.50	1.58E-03	8.38E-10	2.13E+02	4.53E+02	6.24E+02
9.50	1.25E-04	6.64E-11	1.56E+02	3.77E+02	4.99E+02
15.00	7.67E-11	4.07E-17	1.35E+03	5.78E+03	6.68E+03
25.00	4.55E-32	2.42E-38	8.19E+02	6.17E+03	6.55E+03
35.00	0.00E+00	0.00E+00	5.81E+02	5.72E+03	5.90E+03
45.00	0.00E+00	0.00E+00	5.51E+02	6.21E+03	6.33E+03
55.00	0.00E+00	0.00E+00	5.03E+01	6.08E+02	6.16E+02
65.00	0.00E+00	0.00E+00	1.27E+02	1.61E+03	1.63E+03
75.00	0.00E+00	0.00E+00	8.90E+01	1.16E+03	1.17E+03
85.00	0.00E+00	0.00E+00	5.98E+01	7.96E+02	8.02E+02
95.00	0.00E+00	0.00E+00	7.70E+01	1.04E+03	1.05E+03
125.00	0.00E+00	0.00E+00	5.69E+01	7.91E+02	7.94E+02

28.166947920475930 total grams airborne in tank
1.496470556763046E-005 total g/s out riser
6740.358612060547000 total grams lost out riser
33609.476052761080000 total grams settled on floor
37813.997833251950000 total grams made airborne
2564.002921581268000 total grams bypassed

**** OUTPUT @ 1060.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	7.28E+01	2.24E+00	7.33E+01
1.50	1.47E+01	2.08E-02	3.10E+02	6.70E+01	3.67E+02
2.50	1.34E+01	1.92E-02	2.60E+02	1.35E+02	3.83E+02
3.50	2.26E+01	3.28E-02	4.16E+02	3.49E+02	7.37E+02
4.50	3.09E+01	4.53E-02	5.62E+02	6.25E+02	1.14E+03
5.50	2.88E+01	4.29E-02	5.39E+02	7.24E+02	1.21E+03
6.50	1.91E+01	2.89E-02	3.75E+02	5.89E+02	9.20E+02
7.50	1.34E+01	2.06E-02	2.76E+02	5.02E+02	7.41E+02
8.50	1.05E+01	1.66E-02	2.29E+02	4.78E+02	6.72E+02
9.50	7.29E+00	1.18E-02	1.68E+02	3.99E+02	5.38E+02
15.00	4.83E+01	9.27E-02	1.46E+03	6.18E+03	7.20E+03
25.00	1.89E+01	5.34E-02	8.81E+02	6.63E+03	7.05E+03
35.00	8.98E+00	3.75E-02	6.26E+02	6.15E+03	6.35E+03
45.00	5.97E+00	3.54E-02	5.93E+02	6.68E+03	6.82E+03
55.00	4.19E-01	3.23E-03	5.42E+01	6.54E+02	6.64E+02
65.00	8.42E-01	8.18E-03	1.37E+02	1.73E+03	1.75E+03
75.00	4.79E-01	5.71E-03	9.59E+01	1.25E+03	1.26E+03
85.00	2.67E-01	3.84E-03	6.44E+01	8.57E+02	8.63E+02
95.00	2.92E-01	4.94E-03	8.29E+01	1.12E+03	1.13E+03
125.00	1.49E-01	3.65E-03	6.13E+01	8.52E+02	8.55E+02

248.712843701243400 total grams airborne in tank
4.920605330262333E-001 total g/s out riser
7260.461128234863000 total grams lost out riser
35974.827728509900000 total grams settled on floor
40722.766883850100000 total grams made airborne
2761.233906269073000 total grams bypassed

**** OUTPUT @ 1120.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g

.50	3.11E+00	1.65E-06	7.28E+01	2.36E+00	7.33E+01
1.50	1.09E+01	5.77E-06	3.10E+02	7.08E+01	3.67E+02
2.50	6.02E+00	3.20E-06	2.61E+02	1.42E+02	3.83E+02
3.50	4.86E+00	2.58E-06	4.16E+02	3.67E+02	7.37E+02
4.50	2.50E+00	1.33E-06	5.62E+02	6.53E+02	1.14E+03
5.50	6.92E-01	3.68E-07	5.39E+02	7.52E+02	1.21E+03
6.50	1.08E-01	5.71E-08	3.75E+02	6.08E+02	9.20E+02
7.50	1.38E-02	7.36E-09	2.76E+02	5.15E+02	7.41E+02
8.50	1.58E-03	8.38E-10	2.29E+02	4.88E+02	6.72E+02
9.50	1.25E-04	6.64E-11	1.68E+02	4.06E+02	5.38E+02
15.00	7.67E-11	4.07E-17	1.46E+03	6.23E+03	7.20E+03
25.00	4.55E-32	2.42E-38	8.81E+02	6.65E+03	7.05E+03
35.00	0.00E+00	0.00E+00	6.26E+02	6.16E+03	6.35E+03
45.00	0.00E+00	0.00E+00	5.93E+02	6.69E+03	6.82E+03
55.00	0.00E+00	0.00E+00	5.42E+01	6.55E+02	6.64E+02
65.00	0.00E+00	0.00E+00	1.37E+02	1.73E+03	1.75E+03
75.00	0.00E+00	0.00E+00	9.59E+01	1.25E+03	1.26E+03
85.00	0.00E+00	0.00E+00	6.44E+01	8.57E+02	8.63E+02
95.00	0.00E+00	0.00E+00	8.29E+01	1.12E+03	1.13E+03
125.00	0.00E+00	0.00E+00	6.13E+01	8.52E+02	8.55E+02

28.166947920475930 total grams airborne in tank
1.496470556763046E-005 total g/s out riser
7260.585674285889000 total grams lost out riser
36195.249279975890000 total grams settled on floor
40722.766883850100000 total grams made airborne
2761.233906269073000 total grams bypassed

**** OUTPUT @ 1140.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	7.82E+01	2.41E+00	7.85E+01
1.50	1.47E+01	2.08E-02	3.32E+02	7.21E+01	3.93E+02
2.50	1.34E+01	1.92E-02	2.79E+02	1.45E+02	4.10E+02
3.50	2.26E+01	3.28E-02	4.46E+02	3.75E+02	7.90E+02
4.50	3.09E+01	4.53E-02	6.02E+02	6.72E+02	1.22E+03
5.50	2.88E+01	4.29E-02	5.77E+02	7.78E+02	1.30E+03
6.50	1.91E+01	2.89E-02	4.02E+02	6.32E+02	9.86E+02
7.50	1.34E+01	2.06E-02	2.96E+02	5.38E+02	7.94E+02
8.50	1.05E+01	1.66E-02	2.46E+02	5.12E+02	7.20E+02
9.50	7.29E+00	1.18E-02	1.80E+02	4.28E+02	5.76E+02
15.00	4.83E+01	9.27E-02	1.56E+03	6.62E+03	7.71E+03
25.00	1.89E+01	5.34E-02	9.44E+02	7.11E+03	7.56E+03
35.00	8.98E+00	3.75E-02	6.70E+02	6.59E+03	6.81E+03
45.00	5.97E+00	3.54E-02	6.35E+02	7.16E+03	7.31E+03
55.00	4.19E-01	3.23E-03	5.81E+01	7.01E+02	7.11E+02
65.00	8.42E-01	8.18E-03	1.47E+02	1.86E+03	1.88E+03
75.00	4.79E-01	5.71E-03	1.03E+02	1.34E+03	1.35E+03
85.00	2.67E-01	3.84E-03	6.90E+01	9.18E+02	9.25E+02
95.00	2.92E-01	4.94E-03	8.89E+01	1.20E+03	1.21E+03
125.00	1.49E-01	3.65E-03	6.57E+01	9.13E+02	9.16E+02

248.712843701243400 total grams airborne in tank
4.920605330262333E-001 total g/s out riser
7780.688201904297000 total grams lost out riser
38560.600939989090000 total grams settled on floor
43631.535934448240000 total grams made airborne

2958.464955806732000 total grams bypassed

**** OUTPUT @ 1200.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	7.82E+01	2.54E+00	7.85E+01
1.50	1.09E+01	5.77E-06	3.33E+02	7.59E+01	3.93E+02
2.50	6.02E+00	3.20E-06	2.79E+02	1.52E+02	4.10E+02
3.50	4.86E+00	2.58E-06	4.46E+02	3.93E+02	7.90E+02
4.50	2.50E+00	1.33E-06	6.02E+02	7.00E+02	1.22E+03
5.50	6.92E-01	3.68E-07	5.77E+02	8.06E+02	1.30E+03
6.50	1.08E-01	5.71E-08	4.02E+02	6.51E+02	9.86E+02
7.50	1.38E-02	7.36E-09	2.96E+02	5.52E+02	7.94E+02
8.50	1.58E-03	8.38E-10	2.46E+02	5.23E+02	7.20E+02
9.50	1.25E-04	6.64E-11	1.80E+02	4.35E+02	5.76E+02
15.00	7.67E-11	4.07E-17	1.56E+03	6.67E+03	7.71E+03
25.00	4.55E-32	2.42E-38	9.44E+02	7.12E+03	7.56E+03
35.00	0.00E+00	0.00E+00	6.70E+02	6.60E+03	6.81E+03
45.00	0.00E+00	0.00E+00	6.35E+02	7.17E+03	7.31E+03
55.00	0.00E+00	0.00E+00	5.81E+01	7.01E+02	7.11E+02
65.00	0.00E+00	0.00E+00	1.47E+02	1.86E+03	1.88E+03
75.00	0.00E+00	0.00E+00	1.03E+02	1.34E+03	1.35E+03
85.00	0.00E+00	0.00E+00	6.90E+01	9.19E+02	9.25E+02
95.00	0.00E+00	0.00E+00	8.89E+01	1.20E+03	1.21E+03
125.00	0.00E+00	0.00E+00	6.57E+01	9.13E+02	9.16E+02

28.166947920475930 total grams airborne in tank
1.496470556763046E-005 total g/s out riser
7780.812816619873000 total grams lost out riser
38781.022407531740000 total grams settled on floor
43631.535934448240000 total grams made airborne
2958.464955806732000 total grams bypassed

**** OUTPUT @ 1220.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	8.36E+01	2.58E+00	8.38E+01
1.50	1.47E+01	2.08E-02	3.55E+02	7.73E+01	4.19E+02
2.50	1.34E+01	1.92E-02	2.98E+02	1.55E+02	4.37E+02
3.50	2.26E+01	3.28E-02	4.75E+02	4.01E+02	8.42E+02
4.50	3.09E+01	4.53E-02	6.42E+02	7.19E+02	1.30E+03
5.50	2.88E+01	4.29E-02	6.16E+02	8.32E+02	1.38E+03
6.50	1.91E+01	2.89E-02	4.28E+02	6.75E+02	1.05E+03
7.50	1.34E+01	2.06E-02	3.16E+02	5.75E+02	8.47E+02
8.50	1.05E+01	1.66E-02	2.62E+02	5.47E+02	7.68E+02
9.50	7.29E+00	1.18E-02	1.92E+02	4.57E+02	6.14E+02
15.00	4.83E+01	9.27E-02	1.67E+03	7.07E+03	8.22E+03
25.00	1.89E+01	5.34E-02	1.01E+03	7.58E+03	8.06E+03
35.00	8.98E+00	3.75E-02	7.15E+02	7.03E+03	7.26E+03
45.00	5.97E+00	3.54E-02	6.78E+02	7.64E+03	7.80E+03
55.00	4.19E-01	3.23E-03	6.20E+01	7.48E+02	7.59E+02
65.00	8.42E-01	8.18E-03	1.57E+02	1.98E+03	2.00E+03
75.00	4.79E-01	5.71E-03	1.10E+02	1.43E+03	1.44E+03
85.00	2.67E-01	3.84E-03	7.36E+01	9.80E+02	9.87E+02

95.00	2.92E-01	4.94E-03	9.48E+01	1.28E+03	1.29E+03
125.00	1.49E-01	3.65E-03	7.00E+01	9.73E+02	9.77E+02

248.712843701243400 total grams airborne in tank
4.920605330262333E-001 total g/s out riser
8300.915332794189000 total grams lost out riser
41146.374037265780000 total grams settled on floor
46540.305046081540000 total grams made airborne
3155.695936679840000 total grams bypassed

**** OUTPUT @ 1280.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	8.36E+01	2.71E+00	8.38E+01
1.50	1.09E+01	5.77E-06	3.55E+02	8.11E+01	4.19E+02
2.50	6.02E+00	3.20E-06	2.98E+02	1.63E+02	4.37E+02
3.50	4.86E+00	2.58E-06	4.75E+02	4.19E+02	8.42E+02
4.50	2.50E+00	1.33E-06	6.42E+02	7.47E+02	1.30E+03
5.50	6.92E-01	3.68E-07	6.16E+02	8.60E+02	1.38E+03
6.50	1.08E-01	5.71E-08	4.28E+02	6.95E+02	1.05E+03
7.50	1.38E-02	7.36E-09	3.16E+02	5.88E+02	8.47E+02
8.50	1.58E-03	8.38E-10	2.62E+02	5.58E+02	7.68E+02
9.50	1.25E-04	6.64E-11	1.92E+02	4.64E+02	6.14E+02
15.00	7.67E-11	4.07E-17	1.67E+03	7.12E+03	8.22E+03
25.00	4.55E-32	2.42E-38	1.01E+03	7.60E+03	8.06E+03
35.00	0.00E+00	0.00E+00	7.15E+02	7.04E+03	7.26E+03
45.00	0.00E+00	0.00E+00	6.78E+02	7.65E+03	7.80E+03
55.00	0.00E+00	0.00E+00	6.20E+01	7.48E+02	7.59E+02
65.00	0.00E+00	0.00E+00	1.57E+02	1.98E+03	2.00E+03
75.00	0.00E+00	0.00E+00	1.10E+02	1.43E+03	1.44E+03
85.00	0.00E+00	0.00E+00	7.36E+01	9.80E+02	9.87E+02
95.00	0.00E+00	0.00E+00	9.48E+01	1.28E+03	1.29E+03
125.00	0.00E+00	0.00E+00	7.00E+01	9.74E+02	9.77E+02

28.166947920475930 total grams airborne in tank
1.496470556763046E-005 total g/s out riser
8301.039772033691000 total grams lost out riser
41366.795573234560000 total grams settled on floor
46540.305046081540000 total grams made airborne
3155.695936679840000 total grams bypassed

**** OUTPUT @ 1300.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	8.90E+01	2.75E+00	8.90E+01
1.50	1.47E+01	2.08E-02	3.78E+02	8.24E+01	4.45E+02
2.50	1.34E+01	1.92E-02	3.17E+02	1.66E+02	4.65E+02
3.50	2.26E+01	3.28E-02	5.05E+02	4.28E+02	8.95E+02
4.50	3.09E+01	4.53E-02	6.82E+02	7.65E+02	1.38E+03
5.50	2.88E+01	4.29E-02	6.54E+02	8.85E+02	1.47E+03
6.50	1.91E+01	2.89E-02	4.55E+02	7.19E+02	1.12E+03
7.50	1.34E+01	2.06E-02	3.36E+02	6.12E+02	9.00E+02
8.50	1.05E+01	1.66E-02	2.78E+02	5.82E+02	8.16E+02
9.50	7.29E+00	1.18E-02	2.04E+02	4.86E+02	6.53E+02

15.00	4.83E+01	9.27E-02	1.77E+03	7.51E+03	8.74E+03
25.00	1.89E+01	5.34E-02	1.07E+03	8.06E+03	8.56E+03
35.00	8.98E+00	3.75E-02	7.60E+02	7.47E+03	7.71E+03
45.00	5.97E+00	3.54E-02	7.20E+02	8.12E+03	8.28E+03
55.00	4.19E-01	3.23E-03	6.58E+01	7.94E+02	8.06E+02
65.00	8.42E-01	8.18E-03	1.67E+02	2.10E+03	2.13E+03
75.00	4.79E-01	5.71E-03	1.16E+02	1.51E+03	1.53E+03
85.00	2.67E-01	3.84E-03	7.82E+01	1.04E+03	1.05E+03
95.00	2.92E-01	4.94E-03	1.01E+02	1.36E+03	1.37E+03
125.00	1.49E-01	3.65E-03	7.44E+01	1.03E+03	1.04E+03

248.712843701243400 total grams airborne in tank
4.920605330262333E-001 total g/s out riser
8821.142440795898000 total grams lost out riser
43732.147020339970000 total grams settled on floor
49449.074279785160000 total grams made airborne
3352.926917552948000 total grams bypassed

**** OUTPUT @ 1360.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	8.90E+01	2.88E+00	8.90E+01
1.50	1.09E+01	5.77E-06	3.78E+02	8.62E+01	4.45E+02
2.50	6.02E+00	3.20E-06	3.17E+02	1.73E+02	4.65E+02
3.50	4.86E+00	2.58E-06	5.05E+02	4.45E+02	8.95E+02
4.50	2.50E+00	1.33E-06	6.82E+02	7.94E+02	1.38E+03
5.50	6.92E-01	3.68E-07	6.54E+02	9.13E+02	1.47E+03
6.50	1.08E-01	5.71E-08	4.55E+02	7.38E+02	1.12E+03
7.50	1.38E-02	7.36E-09	3.36E+02	6.25E+02	9.00E+02
8.50	1.58E-03	8.38E-10	2.78E+02	5.93E+02	8.16E+02
9.50	1.25E-04	6.64E-11	2.04E+02	4.93E+02	6.53E+02
15.00	7.67E-11	4.07E-17	1.77E+03	7.56E+03	8.74E+03
25.00	4.55E-32	2.42E-38	1.07E+03	8.07E+03	8.56E+03
35.00	0.00E+00	0.00E+00	7.60E+02	7.48E+03	7.71E+03
45.00	0.00E+00	0.00E+00	7.20E+02	8.12E+03	8.28E+03
55.00	0.00E+00	0.00E+00	6.58E+01	7.95E+02	8.06E+02
65.00	0.00E+00	0.00E+00	1.67E+02	2.10E+03	2.13E+03
75.00	0.00E+00	0.00E+00	1.16E+02	1.52E+03	1.53E+03
85.00	0.00E+00	0.00E+00	7.82E+01	1.04E+03	1.05E+03
95.00	0.00E+00	0.00E+00	1.01E+02	1.36E+03	1.37E+03
125.00	0.00E+00	0.00E+00	7.44E+01	1.03E+03	1.04E+03

28.166947920475930 total grams airborne in tank
1.496470556763046E-005 total g/s out riser
8821.266914367676000 total grams lost out riser
43952.568792819980000 total grams settled on floor
49449.074279785160000 total grams made airborne
3352.926917552948000 total grams bypassed

**** OUTPUT @ 1380.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	9.45E+01	2.93E+00	9.42E+01
1.50	1.47E+01	2.08E-02	4.01E+02	8.76E+01	4.71E+02

2.50	1.34E+01	1.92E-02	3.36E+02	1.76E+02	4.92E+02
3.50	2.26E+01	3.28E-02	5.35E+02	4.54E+02	9.48E+02
4.50	3.09E+01	4.53E-02	7.22E+02	8.12E+02	1.47E+03
5.50	2.88E+01	4.29E-02	6.93E+02	9.39E+02	1.56E+03
6.50	1.91E+01	2.89E-02	4.82E+02	7.62E+02	1.18E+03
7.50	1.34E+01	2.06E-02	3.55E+02	6.49E+02	9.53E+02
8.50	1.05E+01	1.66E-02	2.95E+02	6.17E+02	8.64E+02
9.50	7.29E+00	1.18E-02	2.16E+02	5.15E+02	6.91E+02
15.00	4.83E+01	9.27E-02	1.87E+03	7.96E+03	9.25E+03
25.00	1.89E+01	5.34E-02	1.13E+03	8.53E+03	9.07E+03
35.00	8.98E+00	3.75E-02	8.04E+02	7.91E+03	8.17E+03
45.00	5.97E+00	3.54E-02	7.63E+02	8.60E+03	8.77E+03
55.00	4.19E-01	3.23E-03	6.97E+01	8.41E+02	8.53E+02
65.00	8.42E-01	8.18E-03	1.76E+02	2.23E+03	2.25E+03
75.00	4.79E-01	5.71E-03	1.23E+02	1.60E+03	1.62E+03
85.00	2.67E-01	3.84E-03	8.28E+01	1.10E+03	1.11E+03
95.00	2.92E-01	4.94E-03	1.07E+02	1.44E+03	1.45E+03
125.00	1.49E-01	3.65E-03	7.88E+01	1.10E+03	1.10E+03

248.712843701243400 total grams airborne in tank
4.920605330262333E-001 total g/s out riser
9341.369583129883000 total grams lost out riser
46317.920300483700000 total grams settled on floor
52357.843391418460000 total grams made airborne
3550.157930850983000 total grams bypassed

**** OUTPUT @ 1440.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	9.45E+01	3.06E+00	9.42E+01
1.50	1.09E+01	5.77E-06	4.01E+02	9.14E+01	4.71E+02
2.50	6.02E+00	3.20E-06	3.36E+02	1.83E+02	4.92E+02
3.50	4.86E+00	2.58E-06	5.35E+02	4.72E+02	9.48E+02
4.50	2.50E+00	1.33E-06	7.22E+02	8.40E+02	1.47E+03
5.50	6.92E-01	3.68E-07	6.93E+02	9.67E+02	1.56E+03
6.50	1.08E-01	5.71E-08	4.82E+02	7.81E+02	1.18E+03
7.50	1.38E-02	7.36E-09	3.55E+02	6.62E+02	9.53E+02
8.50	1.58E-03	8.38E-10	2.95E+02	6.28E+02	8.64E+02
9.50	1.25E-04	6.64E-11	2.16E+02	5.22E+02	6.91E+02
15.00	7.67E-11	4.07E-17	1.87E+03	8.01E+03	9.25E+03
25.00	4.55E-32	2.42E-38	1.13E+03	8.55E+03	9.07E+03
35.00	0.00E+00	0.00E+00	8.04E+02	7.92E+03	8.17E+03
45.00	0.00E+00	0.00E+00	7.63E+02	8.60E+03	8.77E+03
55.00	0.00E+00	0.00E+00	6.97E+01	8.42E+02	8.53E+02
65.00	0.00E+00	0.00E+00	1.76E+02	2.23E+03	2.25E+03
75.00	0.00E+00	0.00E+00	1.23E+02	1.60E+03	1.62E+03
85.00	0.00E+00	0.00E+00	8.28E+01	1.10E+03	1.11E+03
95.00	0.00E+00	0.00E+00	1.07E+02	1.44E+03	1.45E+03
125.00	0.00E+00	0.00E+00	7.88E+01	1.10E+03	1.10E+03

28.166947920475930 total grams airborne in tank
1.496470556763046E-005 total g/s out riser
9341.494026184082000 total grams lost out riser
46538.342111587520000 total grams settled on floor
52357.843391418460000 total grams made airborne
3550.157930850983000 total grams bypassed

**** OUTPUT @ 1460.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.25E+00	4.58E-03	9.99E+01	3.10E+00	9.95E+01
1.50	1.47E+01	2.08E-02	4.24E+02	9.27E+01	4.97E+02
2.50	1.34E+01	1.92E-02	3.55E+02	1.86E+02	5.20E+02
3.50	2.26E+01	3.28E-02	5.65E+02	4.80E+02	1.00E+03
4.50	3.09E+01	4.53E-02	7.63E+02	8.59E+02	1.55E+03
5.50	2.88E+01	4.29E-02	7.31E+02	9.93E+02	1.64E+03
6.50	1.91E+01	2.89E-02	5.09E+02	8.06E+02	1.25E+03
7.50	1.34E+01	2.06E-02	3.75E+02	6.85E+02	1.01E+03
8.50	1.05E+01	1.66E-02	3.11E+02	6.52E+02	9.12E+02
9.50	7.29E+00	1.18E-02	2.28E+02	5.44E+02	7.30E+02
15.00	4.83E+01	9.27E-02	1.98E+03	8.40E+03	9.77E+03
25.00	1.89E+01	5.34E-02	1.20E+03	9.01E+03	9.57E+03
35.00	8.98E+00	3.75E-02	8.49E+02	8.35E+03	8.62E+03
45.00	5.97E+00	3.54E-02	8.05E+02	9.07E+03	9.26E+03
55.00	4.19E-01	3.23E-03	7.36E+01	8.88E+02	9.01E+02
65.00	8.42E-01	8.18E-03	1.86E+02	2.35E+03	2.38E+03
75.00	4.79E-01	5.71E-03	1.30E+02	1.69E+03	1.71E+03
85.00	2.67E-01	3.84E-03	8.74E+01	1.16E+03	1.17E+03
95.00	2.92E-01	4.94E-03	1.13E+02	1.52E+03	1.53E+03
125.00	1.49E-01	3.65E-03	8.32E+01	1.16E+03	1.16E+03

248.712843701243400 total grams airborne in tank
4.920605330262333E-001 total g/s out riser
9861.596694946289000 total grams lost out riser
48903.693588733670000 total grams settled on floor
55266.612472534180000 total grams made airborne
3747.388938426971000 total grams bypassed

**** OUTPUT @ 1520.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.11E+00	1.65E-06	9.99E+01	3.23E+00	9.95E+01
1.50	1.09E+01	5.77E-06	4.24E+02	9.65E+01	4.97E+02
2.50	6.02E+00	3.20E-06	3.55E+02	1.93E+02	5.20E+02
3.50	4.86E+00	2.58E-06	5.65E+02	4.98E+02	1.00E+03
4.50	2.50E+00	1.33E-06	7.63E+02	8.87E+02	1.55E+03
5.50	6.92E-01	3.68E-07	7.31E+02	1.02E+03	1.64E+03
6.50	1.08E-01	5.71E-08	5.09E+02	8.25E+02	1.25E+03
7.50	1.38E-02	7.36E-09	3.75E+02	6.99E+02	1.01E+03
8.50	1.58E-03	8.38E-10	3.11E+02	6.62E+02	9.12E+02
9.50	1.25E-04	6.64E-11	2.28E+02	5.51E+02	7.30E+02
15.00	7.67E-11	4.07E-17	1.98E+03	8.45E+03	9.77E+03
25.00	4.55E-32	2.42E-38	1.20E+03	9.02E+03	9.57E+03
35.00	0.00E+00	0.00E+00	8.49E+02	8.36E+03	8.62E+03
45.00	0.00E+00	0.00E+00	8.05E+02	9.08E+03	9.26E+03
55.00	0.00E+00	0.00E+00	7.36E+01	8.88E+02	9.01E+02
65.00	0.00E+00	0.00E+00	1.86E+02	2.35E+03	2.38E+03
75.00	0.00E+00	0.00E+00	1.30E+02	1.69E+03	1.71E+03
85.00	0.00E+00	0.00E+00	8.74E+01	1.16E+03	1.17E+03
95.00	0.00E+00	0.00E+00	1.13E+02	1.52E+03	1.53E+03
125.00	0.00E+00	0.00E+00	8.32E+01	1.16E+03	1.16E+03

28.166947920475930 total grams airborne in tank
1.496470556763046E-005 total g/s out riser
9861.721145629883000 total grams lost out riser
49124.114911079410000 total grams settled on floor
55266.612472534180000 total grams made airborne
3747.388938426971000 total grams bypassed

**** OUTPUT @ 1523.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
.50	3.15E+00	4.45E-03	1.01E+02	3.24E+00	1.00E+02
1.50	1.19E+01	1.72E-02	4.27E+02	9.67E+01	5.01E+02
2.50	8.15E+00	1.23E-02	3.57E+02	1.94E+02	5.24E+02
3.50	1.03E+01	1.66E-02	5.68E+02	4.99E+02	1.01E+03
4.50	1.20E+01	2.04E-02	7.65E+02	8.88E+02	1.56E+03
5.50	1.10E+01	1.94E-02	7.33E+02	1.02E+03	1.65E+03
6.50	7.84E+00	1.40E-02	5.11E+02	8.26E+02	1.26E+03
7.50	6.03E+00	1.09E-02	3.77E+02	7.00E+02	1.01E+03
8.50	5.23E+00	9.60E-03	3.12E+02	6.64E+02	9.19E+02
9.50	3.99E+00	7.43E-03	2.29E+02	5.52E+02	7.35E+02
15.00	3.85E+01	7.98E-02	1.99E+03	8.48E+03	9.84E+03
25.00	1.86E+01	5.29E-02	1.20E+03	9.08E+03	9.65E+03
35.00	8.97E+00	3.75E-02	8.55E+02	8.41E+03	8.69E+03
45.00	5.97E+00	3.54E-02	8.11E+02	9.15E+03	9.33E+03
55.00	4.19E-01	3.23E-03	7.41E+01	8.95E+02	9.08E+02
65.00	8.42E-01	8.18E-03	1.88E+02	2.37E+03	2.40E+03
75.00	4.79E-01	5.71E-03	1.31E+02	1.71E+03	1.72E+03
85.00	2.67E-01	3.84E-03	8.81E+01	1.17E+03	1.18E+03
95.00	2.92E-01	4.94E-03	1.13E+02	1.53E+03	1.54E+03
125.00	1.49E-01	3.65E-03	8.38E+01	1.17E+03	1.17E+03

154.117395445704500 total grams airborne in tank
3.674225870054215E-001 total g/s out riser
9917.394599914551000 total grams lost out riser
49408.390684843060000 total grams settled on floor
55702.927413940430000 total grams made airborne
3776.973650455475000 total grams bypassed

Table 5. Comparison of Dry and Liquid Aerosols
(PR=1 in./min. for all cases)

Tank Vol. (gal)	In-Leakage (scfm)	WH (in.)	Dry Aerosol (g)	Liquid Aerosol (g)	Liquid Aerosol w/.0635 bypass (g)
Worst Case					
500,000	2100	171	2976.3	191990.2	1002757.9
750,000	2100	266	4597.7	296558.8	1557886.0
1,000,000	2100	361	5676.9	405643.9	2117243.7
Anticipated Case					
500,000	500	171	1324.9	75327.2	893503.1
750,000	500	266	2056.6	116100.2	1388886.5
1,000,000	500	361	2717.6	159251.8	1886497.7

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

52W

ADDITIONAL PARAMETERS:

```
particle density, g/cc =        1.383000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     1060.895809739524000
bypass fraction =   0.000000000000000E+000

Output divisions in Period      1.000000000000000 =        1.000000
Output divisions in Period      2.000000000000000 =        1.000000
Output divisions in Period      3.000000000000000 =        1.000000
Output divisions in Period      4.000000000000000 =        1.000000
Output divisions in Period      5.000000000000000 =        1.000000
Output divisions in Period      6.000000000000000 =        1.000000
Output divisions in Period      7.000000000000000 =        1.000000
Output divisions in Period      8.000000000000000 =        1.000000
Output divisions in Period      9.000000000000000 =        1.000000
Output divisions in Period     10.000000000000000 =        1.000000
Output divisions in Period     11.000000000000000 =        1.000000
Output divisions in Period     12.000000000000000 =        1.000000
Output divisions in Period     13.000000000000000 =        1.000000
Output divisions in Period     14.000000000000000 =        1.000000
Output divisions in Period     15.000000000000000 =        1.000000
Output divisions in Period     16.000000000000000 =        1.000000
Output divisions in Period     17.000000000000000 =        1.000000
Output divisions in Period     18.000000000000000 =        1.000000

Flow out @    0.000000E+00 min =    2480.000000 cfm &    72000.000000g/m
Flow out @       20.000000 min =       1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =    2480.000000 cfm &    72000.000000g/m
Flow out @      100.000000 min =       1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =    2480.000000 cfm &    72000.000000g/m
Flow out @      180.000000 min =       1.000000 cfm &    0.000000E+00g/m
Flow out @      240.000000 min =    2480.000000 cfm &    72000.000000g/m
Flow out @      260.000000 min =       1.000000 cfm &    0.000000E+00g/m
Flow out @      320.000000 min =    2480.000000 cfm &    72000.000000g/m
Flow out @      340.000000 min =       1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =    2480.000000 cfm &    72000.000000g/m
Flow out @      420.000000 min =       1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =    2480.000000 cfm &    72000.000000g/m
Flow out @      500.000000 min =       1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =    2480.000000 cfm &    72000.000000g/m
Flow out @      580.000000 min =       1.000000 cfm &    0.000000E+00g/m
Flow out @      640.000000 min =    2480.000000 cfm &    72000.000000g/m
Flow out @      660.000000 min =       1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m

**** OUTPUT @       20.000000000000000 minutes ****

  diam     airborne    outflow     totalout    totalflr    source
  mcrn        g          g/s          g           g          g
```

6.50	6.99E+03	7.72E+00	6.18E+03	3.89E+03	1.71E+04
19.50	3.40E+03	3.75E+00	3.99E+03	2.22E+04	2.95E+04
32.50	1.76E+03	1.94E+00	2.22E+03	3.42E+04	3.81E+04
45.50	1.10E+03	1.21E+00	1.42E+03	4.26E+04	4.51E+04
58.50	7.90E+02	8.71E-01	1.03E+03	4.94E+04	5.12E+04
71.50	6.30E+02	6.95E-01	8.25E+02	5.51E+04	5.66E+04
84.50	5.21E+02	5.75E-01	6.84E+02	6.03E+04	6.15E+04
97.50	4.43E+02	4.89E-01	5.83E+02	6.50E+04	6.61E+04
110.50	3.84E+02	4.24E-01	5.06E+02	6.95E+04	7.03E+04
123.50	3.45E+02	3.81E-01	4.55E+02	7.36E+04	7.44E+04
136.50	3.14E+02	3.47E-01	4.15E+02	7.75E+04	7.82E+04
149.50	2.89E+02	3.19E-01	3.81E+02	8.11E+04	8.18E+04
162.50	2.67E+02	2.95E-01	3.52E+02	8.47E+04	8.53E+04
175.50	2.48E+02	2.74E-01	3.28E+02	8.81E+04	8.86E+04
188.50	2.34E+02	2.58E-01	3.09E+02	9.13E+04	9.19E+04
201.50	2.25E+02	2.48E-01	2.97E+02	9.45E+04	9.50E+04
214.50	2.16E+02	2.38E-01	2.86E+02	9.75E+04	9.80E+04
227.50	2.09E+02	2.30E-01	2.75E+02	1.00E+05	1.01E+05
240.50	2.02E+02	2.22E-01	2.66E+02	1.03E+05	1.04E+05
253.50	1.95E+02	2.15E-01	2.58E+02	1.06E+05	1.07E+05

18762.473556518550000 total grams airborne in tank
20.699599683284760 total g/s out riser
21048.505065917970000 total grams lost out riser
1400187.599365234000000 total grams settled on floor
1439998.546875000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.74E+02	2.55E-04	6.18E+03	1.03E+04	1.71E+04
19.50	8.71E-07	3.87E-13	3.99E+03	2.56E+04	2.95E+04
32.50	5.01E-24	2.23E-30	2.22E+03	3.59E+04	3.81E+04
45.50	0.00E+00	0.00E+00	1.42E+03	4.37E+04	4.51E+04
58.50	0.00E+00	0.00E+00	1.03E+03	5.02E+04	5.12E+04
71.50	0.00E+00	0.00E+00	8.25E+02	5.58E+04	5.66E+04
84.50	0.00E+00	0.00E+00	6.84E+02	6.08E+04	6.15E+04
97.50	0.00E+00	0.00E+00	5.83E+02	6.55E+04	6.61E+04
110.50	0.00E+00	0.00E+00	5.06E+02	6.98E+04	7.03E+04
123.50	0.00E+00	0.00E+00	4.55E+02	7.39E+04	7.44E+04
136.50	0.00E+00	0.00E+00	4.15E+02	7.78E+04	7.82E+04
149.50	0.00E+00	0.00E+00	3.81E+02	8.14E+04	8.18E+04
162.50	0.00E+00	0.00E+00	3.52E+02	8.49E+04	8.53E+04
175.50	0.00E+00	0.00E+00	3.28E+02	8.83E+04	8.86E+04
188.50	0.00E+00	0.00E+00	3.09E+02	9.16E+04	9.19E+04
201.50	0.00E+00	0.00E+00	2.97E+02	9.47E+04	9.50E+04
214.50	0.00E+00	0.00E+00	2.86E+02	9.77E+04	9.80E+04
227.50	0.00E+00	0.00E+00	2.75E+02	1.01E+05	1.01E+05
240.50	0.00E+00	0.00E+00	2.66E+02	1.04E+05	1.04E+05
253.50	0.00E+00	0.00E+00	2.58E+02	1.06E+05	1.07E+05

573.974610245569200 total grams airborne in tank
2.553364906141882E-004 total g/s out riser
21052.944580078120000 total grams lost out riser
1418371.658203125000000 total grams settled on floor
1439998.546875000000000 total grams made airborne

0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.06E+03	7.79E+00	1.27E+04	1.44E+04	3.41E+04
19.50	3.40E+03	3.75E+00	7.97E+03	4.77E+04	5.91E+04
32.50	1.76E+03	1.94E+00	4.44E+03	7.01E+04	7.63E+04
45.50	1.10E+03	1.21E+00	2.83E+03	8.63E+04	9.03E+04
58.50	7.90E+02	8.71E-01	2.06E+03	9.95E+04	1.02E+05
71.50	6.30E+02	6.95E-01	1.65E+03	1.11E+05	1.13E+05
84.50	5.21E+02	5.75E-01	1.37E+03	1.21E+05	1.23E+05
97.50	4.43E+02	4.89E-01	1.17E+03	1.31E+05	1.32E+05
110.50	3.84E+02	4.24E-01	1.01E+03	1.39E+05	1.41E+05
123.50	3.45E+02	3.81E-01	9.10E+02	1.47E+05	1.49E+05
136.50	3.14E+02	3.47E-01	8.29E+02	1.55E+05	1.56E+05
149.50	2.89E+02	3.19E-01	7.62E+02	1.63E+05	1.64E+05
162.50	2.67E+02	2.95E-01	7.05E+02	1.70E+05	1.71E+05
175.50	2.48E+02	2.74E-01	6.56E+02	1.76E+05	1.77E+05
188.50	2.34E+02	2.58E-01	6.18E+02	1.83E+05	1.84E+05
201.50	2.25E+02	2.48E-01	5.93E+02	1.89E+05	1.90E+05
214.50	2.16E+02	2.38E-01	5.71E+02	1.95E+05	1.96E+05
227.50	2.09E+02	2.30E-01	5.51E+02	2.01E+05	2.02E+05
240.50	2.02E+02	2.22E-01	5.33E+02	2.07E+05	2.08E+05
253.50	1.95E+02	2.15E-01	5.16E+02	2.12E+05	2.13E+05

18828.879806518550000 total grams airborne in tank
20.772861897945400 total g/s out riser
42413.007141113280000 total grams lost out riser
2818755.278320312000000 total grams settled on floor
2879997.093750000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.79E+02	2.58E-04	1.27E+04	2.09E+04	3.41E+04
19.50	8.71E-07	3.87E-13	7.97E+03	5.11E+04	5.91E+04
32.50	5.01E-24	2.23E-30	4.44E+03	7.19E+04	7.63E+04
45.50	0.00E+00	0.00E+00	2.83E+03	8.74E+04	9.03E+04
58.50	0.00E+00	0.00E+00	2.06E+03	1.00E+05	1.02E+05
71.50	0.00E+00	0.00E+00	1.65E+03	1.12E+05	1.13E+05
84.50	0.00E+00	0.00E+00	1.37E+03	1.22E+05	1.23E+05
97.50	0.00E+00	0.00E+00	1.17E+03	1.31E+05	1.32E+05
110.50	0.00E+00	0.00E+00	1.01E+03	1.40E+05	1.41E+05
123.50	0.00E+00	0.00E+00	9.10E+02	1.48E+05	1.49E+05
136.50	0.00E+00	0.00E+00	8.29E+02	1.56E+05	1.56E+05
149.50	0.00E+00	0.00E+00	7.62E+02	1.63E+05	1.64E+05
162.50	0.00E+00	0.00E+00	7.05E+02	1.70E+05	1.71E+05
175.50	0.00E+00	0.00E+00	6.56E+02	1.77E+05	1.77E+05
188.50	0.00E+00	0.00E+00	6.18E+02	1.83E+05	1.84E+05
201.50	0.00E+00	0.00E+00	5.93E+02	1.89E+05	1.90E+05
214.50	0.00E+00	0.00E+00	5.71E+02	1.95E+05	1.96E+05
227.50	0.00E+00	0.00E+00	5.51E+02	2.01E+05	2.02E+05

240.50	0.00E+00	0.00E+00	5.33E+02	2.07E+05	2.08E+05
253.50	0.00E+00	0.00E+00	5.16E+02	2.13E+05	2.13E+05

579.423890030725500 total grams airborne in tank
2.577606359644209E-004 total g/s out riser
42417.485839843750000 total grams lost out riser
2837000.246093750000000 total grams settled on floor
2879997.093750000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.06E+03	7.79E+00	1.92E+04	2.49E+04	5.12E+04
19.50	3.40E+03	3.75E+00	1.20E+04	7.33E+04	8.86E+04
32.50	1.76E+03	1.94E+00	6.66E+03	1.06E+05	1.14E+05
45.50	1.10E+03	1.21E+00	4.25E+03	1.30E+05	1.35E+05
58.50	7.90E+02	8.71E-01	3.09E+03	1.50E+05	1.54E+05
71.50	6.30E+02	6.95E-01	2.47E+03	1.67E+05	1.70E+05
84.50	5.21E+02	5.75E-01	2.05E+03	1.82E+05	1.85E+05
97.50	4.43E+02	4.89E-01	1.75E+03	1.96E+05	1.98E+05
110.50	3.84E+02	4.24E-01	1.52E+03	2.09E+05	2.11E+05
123.50	3.45E+02	3.81E-01	1.37E+03	2.21E+05	2.23E+05
136.50	3.14E+02	3.47E-01	1.24E+03	2.33E+05	2.35E+05
149.50	2.89E+02	3.19E-01	1.14E+03	2.44E+05	2.45E+05
162.50	2.67E+02	2.95E-01	1.06E+03	2.55E+05	2.56E+05
175.50	2.48E+02	2.74E-01	9.84E+02	2.65E+05	2.66E+05
188.50	2.34E+02	2.58E-01	9.27E+02	2.74E+05	2.76E+05
201.50	2.25E+02	2.48E-01	8.90E+02	2.84E+05	2.85E+05
214.50	2.16E+02	2.38E-01	8.57E+02	2.93E+05	2.94E+05
227.50	2.09E+02	2.30E-01	8.26E+02	3.02E+05	3.03E+05
240.50	2.02E+02	2.22E-01	7.99E+02	3.10E+05	3.11E+05
253.50	1.95E+02	2.15E-01	7.73E+02	3.19E+05	3.20E+05

18829.510177612300000 total grams airborne in tank
20.773557603359220 total g/s out riser
63780.506103515620000 total grams lost out riser
4237385.714843750000000 total grams settled on floor
4319995.632812500000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.79E+02	2.58E-04	1.92E+04	3.14E+04	5.12E+04
19.50	8.71E-07	3.87E-13	1.20E+04	7.67E+04	8.86E+04
32.50	5.01E-24	2.23E-30	6.66E+03	1.08E+05	1.14E+05
45.50	0.00E+00	0.00E+00	4.25E+03	1.31E+05	1.35E+05
58.50	0.00E+00	0.00E+00	3.09E+03	1.50E+05	1.54E+05
71.50	0.00E+00	0.00E+00	2.47E+03	1.67E+05	1.70E+05
84.50	0.00E+00	0.00E+00	2.05E+03	1.82E+05	1.85E+05
97.50	0.00E+00	0.00E+00	1.75E+03	1.96E+05	1.98E+05
110.50	0.00E+00	0.00E+00	1.52E+03	2.10E+05	2.11E+05
123.50	0.00E+00	0.00E+00	1.37E+03	2.22E+05	2.23E+05

136.50	0.00E+00	0.00E+00	1.24E+03	2.33E+05	2.35E+05
149.50	0.00E+00	0.00E+00	1.14E+03	2.44E+05	2.45E+05
162.50	0.00E+00	0.00E+00	1.06E+03	2.55E+05	2.56E+05
175.50	0.00E+00	0.00E+00	9.84E+02	2.65E+05	2.66E+05
188.50	0.00E+00	0.00E+00	9.27E+02	2.75E+05	2.76E+05
201.50	0.00E+00	0.00E+00	8.90E+02	2.84E+05	2.85E+05
214.50	0.00E+00	0.00E+00	8.57E+02	2.93E+05	2.94E+05
227.50	0.00E+00	0.00E+00	8.26E+02	3.02E+05	3.03E+05
240.50	0.00E+00	0.00E+00	7.99E+02	3.11E+05	3.11E+05
253.50	0.00E+00	0.00E+00	7.73E+02	3.19E+05	3.20E+05

579.475586808069200 total grams airborne in tank
2.577836279904817E-004 total g/s out riser
63784.984802246090000 total grams lost out riser
4255631.259765625000000 total grams settled on floor
4319995.632812500000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.06E+03	7.79E+00	2.57E+04	3.55E+04	6.82E+04
19.50	3.40E+03	3.75E+00	1.59E+04	9.89E+04	1.18E+05
32.50	1.76E+03	1.94E+00	8.88E+03	1.42E+05	1.53E+05
45.50	1.10E+03	1.21E+00	5.66E+03	1.74E+05	1.81E+05
58.50	7.90E+02	8.71E-01	4.12E+03	2.00E+05	2.05E+05
71.50	6.30E+02	6.95E-01	3.30E+03	2.22E+05	2.26E+05
84.50	5.21E+02	5.75E-01	2.74E+03	2.43E+05	2.46E+05
97.50	4.43E+02	4.89E-01	2.33E+03	2.62E+05	2.64E+05
110.50	3.84E+02	4.24E-01	2.02E+03	2.79E+05	2.81E+05
123.50	3.45E+02	3.81E-01	1.82E+03	2.95E+05	2.97E+05
136.50	3.14E+02	3.47E-01	1.66E+03	3.11E+05	3.13E+05
149.50	2.89E+02	3.19E-01	1.52E+03	3.25E+05	3.27E+05
162.50	2.67E+02	2.95E-01	1.41E+03	3.40E+05	3.41E+05
175.50	2.48E+02	2.74E-01	1.31E+03	3.53E+05	3.55E+05
188.50	2.34E+02	2.58E-01	1.24E+03	3.66E+05	3.67E+05
201.50	2.25E+02	2.48E-01	1.19E+03	3.79E+05	3.80E+05
214.50	2.16E+02	2.38E-01	1.14E+03	3.91E+05	3.92E+05
227.50	2.09E+02	2.30E-01	1.10E+03	4.02E+05	4.04E+05
240.50	2.02E+02	2.22E-01	1.07E+03	4.14E+05	4.15E+05
253.50	1.95E+02	2.15E-01	1.03E+03	4.25E+05	4.26E+05

18829.516036987300000 total grams airborne in tank
20.773563802242280 total g/s out riser
85148.035766601560000 total grams lost out riser
5656016.707031250000000 total grams settled on floor
5759994.187500000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.79E+02	2.58E-04	2.57E+04	4.20E+04	6.82E+04
19.50	8.71E-07	3.87E-13	1.59E+04	1.02E+05	1.18E+05

32.50	5.01E-24	2.23E-30	8.88E+03	1.44E+05	1.53E+05
45.50	0.00E+00	0.00E+00	5.66E+03	1.75E+05	1.81E+05
58.50	0.00E+00	0.00E+00	4.12E+03	2.01E+05	2.05E+05
71.50	0.00E+00	0.00E+00	3.30E+03	2.23E+05	2.26E+05
84.50	0.00E+00	0.00E+00	2.74E+03	2.43E+05	2.46E+05
97.50	0.00E+00	0.00E+00	2.33E+03	2.62E+05	2.64E+05
110.50	0.00E+00	0.00E+00	2.02E+03	2.79E+05	2.81E+05
123.50	0.00E+00	0.00E+00	1.82E+03	2.96E+05	2.97E+05
136.50	0.00E+00	0.00E+00	1.66E+03	3.11E+05	3.13E+05
149.50	0.00E+00	0.00E+00	1.52E+03	3.26E+05	3.27E+05
162.50	0.00E+00	0.00E+00	1.41E+03	3.40E+05	3.41E+05
175.50	0.00E+00	0.00E+00	1.31E+03	3.53E+05	3.55E+05
188.50	0.00E+00	0.00E+00	1.24E+03	3.66E+05	3.67E+05
201.50	0.00E+00	0.00E+00	1.19E+03	3.79E+05	3.80E+05
214.50	0.00E+00	0.00E+00	1.14E+03	3.91E+05	3.92E+05
227.50	0.00E+00	0.00E+00	1.10E+03	4.03E+05	4.04E+05
240.50	0.00E+00	0.00E+00	1.07E+03	4.14E+05	4.15E+05
253.50	0.00E+00	0.00E+00	1.03E+03	4.25E+05	4.26E+05

579.476075089319200 total grams airborne in tank
2.577838608211254E-004 total g/s out riser
85152.512695312500000 total grams lost out riser
5674262.320312500000000 total grams settled on floor
5759994.187500000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.06E+03	7.79E+00	3.22E+04	4.61E+04	8.53E+04
19.50	3.40E+03	3.75E+00	1.99E+04	1.24E+05	1.48E+05
32.50	1.76E+03	1.94E+00	1.11E+04	1.78E+05	1.91E+05
45.50	1.10E+03	1.21E+00	7.08E+03	2.18E+05	2.26E+05
58.50	7.90E+02	8.71E-01	5.15E+03	2.50E+05	2.56E+05
71.50	6.30E+02	6.95E-01	4.12E+03	2.78E+05	2.83E+05
84.50	5.21E+02	5.75E-01	3.42E+03	3.04E+05	3.08E+05
97.50	4.43E+02	4.89E-01	2.91E+03	3.27E+05	3.30E+05
110.50	3.84E+02	4.24E-01	2.53E+03	3.49E+05	3.52E+05
123.50	3.45E+02	3.81E-01	2.28E+03	3.69E+05	3.72E+05
136.50	3.14E+02	3.47E-01	2.07E+03	3.89E+05	3.91E+05
149.50	2.89E+02	3.19E-01	1.90E+03	4.07E+05	4.09E+05
162.50	2.67E+02	2.95E-01	1.76E+03	4.24E+05	4.27E+05
175.50	2.48E+02	2.74E-01	1.64E+03	4.41E+05	4.43E+05
188.50	2.34E+02	2.58E-01	1.55E+03	4.58E+05	4.59E+05
201.50	2.25E+02	2.48E-01	1.48E+03	4.73E+05	4.75E+05
214.50	2.16E+02	2.38E-01	1.43E+03	4.88E+05	4.90E+05
227.50	2.09E+02	2.30E-01	1.38E+03	5.03E+05	5.05E+05
240.50	2.02E+02	2.22E-01	1.33E+03	5.17E+05	5.19E+05
253.50	1.95E+02	2.15E-01	1.29E+03	5.31E+05	5.33E+05

18829.516036987300000 total grams airborne in tank
20.773564279079440 total g/s out riser
106515.563232421900000 total grams lost out riser
7074647.800781250000000 total grams settled on floor
7199992.726562500000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.79E+02	2.58E-04	3.22E+04	5.26E+04	8.53E+04
19.50	8.71E-07	3.87E-13	1.99E+04	1.28E+05	1.48E+05
32.50	5.01E-24	2.23E-30	1.11E+04	1.80E+05	1.91E+05
45.50	0.00E+00	0.00E+00	7.08E+03	2.19E+05	2.26E+05
58.50	0.00E+00	0.00E+00	5.15E+03	2.51E+05	2.56E+05
71.50	0.00E+00	0.00E+00	4.12E+03	2.79E+05	2.83E+05
84.50	0.00E+00	0.00E+00	3.42E+03	3.04E+05	3.08E+05
97.50	0.00E+00	0.00E+00	2.91E+03	3.27E+05	3.30E+05
110.50	0.00E+00	0.00E+00	2.53E+03	3.49E+05	3.52E+05
123.50	0.00E+00	0.00E+00	2.28E+03	3.70E+05	3.72E+05
136.50	0.00E+00	0.00E+00	2.07E+03	3.89E+05	3.91E+05
149.50	0.00E+00	0.00E+00	1.90E+03	4.07E+05	4.09E+05
162.50	0.00E+00	0.00E+00	1.76E+03	4.25E+05	4.27E+05
175.50	0.00E+00	0.00E+00	1.64E+03	4.42E+05	4.43E+05
188.50	0.00E+00	0.00E+00	1.55E+03	4.58E+05	4.59E+05
201.50	0.00E+00	0.00E+00	1.48E+03	4.73E+05	4.75E+05
214.50	0.00E+00	0.00E+00	1.43E+03	4.89E+05	4.90E+05
227.50	0.00E+00	0.00E+00	1.38E+03	5.03E+05	5.05E+05
240.50	0.00E+00	0.00E+00	1.33E+03	5.18E+05	5.19E+05
253.50	0.00E+00	0.00E+00	1.29E+03	5.31E+05	5.33E+05

579.476075089319200 total grams airborne in tank
2.577838608211254E-004 total g/s out riser
106520.044433593700000 total grams lost out riser
7092893.429687500000000 total grams settled on floor
7199992.726562500000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.06E+03	7.79E+00	3.87E+04	5.66E+04	1.02E+05
19.50	3.40E+03	3.75E+00	2.39E+04	1.50E+05	1.77E+05
32.50	1.76E+03	1.94E+00	1.33E+04	2.14E+05	2.29E+05
45.50	1.10E+03	1.21E+00	8.49E+03	2.61E+05	2.71E+05
58.50	7.90E+02	8.71E-01	6.18E+03	3.00E+05	3.07E+05
71.50	6.30E+02	6.95E-01	4.95E+03	3.34E+05	3.39E+05
84.50	5.21E+02	5.75E-01	4.11E+03	3.64E+05	3.69E+05
97.50	4.43E+02	4.89E-01	3.50E+03	3.93E+05	3.96E+05
110.50	3.84E+02	4.24E-01	3.03E+03	4.19E+05	4.22E+05
123.50	3.45E+02	3.81E-01	2.73E+03	4.43E+05	4.46E+05
136.50	3.14E+02	3.47E-01	2.49E+03	4.66E+05	4.69E+05
149.50	2.89E+02	3.19E-01	2.29E+03	4.88E+05	4.91E+05
162.50	2.67E+02	2.95E-01	2.11E+03	5.09E+05	5.12E+05
175.50	2.48E+02	2.74E-01	1.97E+03	5.30E+05	5.32E+05
188.50	2.34E+02	2.58E-01	1.85E+03	5.49E+05	5.51E+05
201.50	2.25E+02	2.48E-01	1.78E+03	5.68E+05	5.70E+05
214.50	2.16E+02	2.38E-01	1.71E+03	5.86E+05	5.88E+05
227.50	2.09E+02	2.30E-01	1.65E+03	6.04E+05	6.06E+05
240.50	2.02E+02	2.22E-01	1.60E+03	6.21E+05	6.23E+05
253.50	1.95E+02	2.15E-01	1.55E+03	6.38E+05	6.39E+05

18829.516036987300000 total grams airborne in tank
20.773564279079440 total g/s out riser
127883.089721679700000 total grams lost out riser
8493278.964843750000000 total grams settled on floor
8639991.234375000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.79E+02	2.58E-04	3.87E+04	6.31E+04	1.02E+05
19.50	8.71E-07	3.87E-13	2.39E+04	1.53E+05	1.77E+05
32.50	5.01E-24	2.23E-30	1.33E+04	2.16E+05	2.29E+05
45.50	0.00E+00	0.00E+00	8.49E+03	2.62E+05	2.71E+05
58.50	0.00E+00	0.00E+00	6.18E+03	3.01E+05	3.07E+05
71.50	0.00E+00	0.00E+00	4.95E+03	3.35E+05	3.39E+05
84.50	0.00E+00	0.00E+00	4.11E+03	3.65E+05	3.69E+05
97.50	0.00E+00	0.00E+00	3.50E+03	3.93E+05	3.96E+05
110.50	0.00E+00	0.00E+00	3.03E+03	4.19E+05	4.22E+05
123.50	0.00E+00	0.00E+00	2.73E+03	4.43E+05	4.46E+05
136.50	0.00E+00	0.00E+00	2.49E+03	4.67E+05	4.69E+05
149.50	0.00E+00	0.00E+00	2.29E+03	4.89E+05	4.91E+05
162.50	0.00E+00	0.00E+00	2.11E+03	5.10E+05	5.12E+05
175.50	0.00E+00	0.00E+00	1.97E+03	5.30E+05	5.32E+05
188.50	0.00E+00	0.00E+00	1.85E+03	5.49E+05	5.51E+05
201.50	0.00E+00	0.00E+00	1.78E+03	5.68E+05	5.70E+05
214.50	0.00E+00	0.00E+00	1.71E+03	5.86E+05	5.88E+05
227.50	0.00E+00	0.00E+00	1.65E+03	6.04E+05	6.06E+05
240.50	0.00E+00	0.00E+00	1.60E+03	6.21E+05	6.23E+05
253.50	0.00E+00	0.00E+00	1.55E+03	6.38E+05	6.39E+05

579.476075089319200 total grams airborne in tank
2.577838608211254E-004 total g/s out riser
127887.572387695300000 total grams lost out riser
8511524.601562500000000 total grams settled on floor
8639991.234375000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.06E+03	7.79E+00	4.52E+04	6.72E+04	1.19E+05
19.50	3.40E+03	3.75E+00	2.79E+04	1.76E+05	2.07E+05
32.50	1.76E+03	1.94E+00	1.55E+04	2.50E+05	2.67E+05
45.50	1.10E+03	1.21E+00	9.91E+03	3.05E+05	3.16E+05
58.50	7.90E+02	8.71E-01	7.21E+03	3.50E+05	3.58E+05
71.50	6.30E+02	6.95E-01	5.77E+03	3.90E+05	3.96E+05
84.50	5.21E+02	5.75E-01	4.79E+03	4.25E+05	4.31E+05
97.50	4.43E+02	4.89E-01	4.08E+03	4.58E+05	4.63E+05
110.50	3.84E+02	4.24E-01	3.54E+03	4.88E+05	4.92E+05
123.50	3.45E+02	3.81E-01	3.19E+03	5.17E+05	5.21E+05
136.50	3.14E+02	3.47E-01	2.90E+03	5.44E+05	5.47E+05
149.50	2.89E+02	3.19E-01	2.67E+03	5.70E+05	5.73E+05

162.50	2.67E+02	2.95E-01	2.47E+03	5.94E+05	5.97E+05
175.50	2.48E+02	2.74E-01	2.30E+03	6.18E+05	6.21E+05
188.50	2.34E+02	2.58E-01	2.16E+03	6.41E+05	6.43E+05
201.50	2.25E+02	2.48E-01	2.08E+03	6.63E+05	6.65E+05
214.50	2.16E+02	2.38E-01	2.00E+03	6.84E+05	6.86E+05
227.50	2.09E+02	2.30E-01	1.93E+03	7.04E+05	7.07E+05
240.50	2.02E+02	2.22E-01	1.86E+03	7.24E+05	7.26E+05
253.50	1.95E+02	2.15E-01	1.80E+03	7.44E+05	7.46E+05

18829.516036987300000 total grams airborne in tank
20.773564279079440 total g/s out riser
149250.624755859400000 total grams lost out riser
9911910.125000000000000 total grams settled on floor
1.007998969531250E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.79E+02	2.58E-04	4.52E+04	7.37E+04	1.19E+05
19.50	8.71E-07	3.87E-13	2.79E+04	1.79E+05	2.07E+05
32.50	5.01E-24	2.23E-30	1.55E+04	2.51E+05	2.67E+05
45.50	0.00E+00	0.00E+00	9.91E+03	3.06E+05	3.16E+05
58.50	0.00E+00	0.00E+00	7.21E+03	3.51E+05	3.58E+05
71.50	0.00E+00	0.00E+00	5.77E+03	3.90E+05	3.96E+05
84.50	0.00E+00	0.00E+00	4.79E+03	4.26E+05	4.31E+05
97.50	0.00E+00	0.00E+00	4.08E+03	4.58E+05	4.63E+05
110.50	0.00E+00	0.00E+00	3.54E+03	4.89E+05	4.92E+05
123.50	0.00E+00	0.00E+00	3.19E+03	5.17E+05	5.21E+05
136.50	0.00E+00	0.00E+00	2.90E+03	5.44E+05	5.47E+05
149.50	0.00E+00	0.00E+00	2.67E+03	5.70E+05	5.73E+05
162.50	0.00E+00	0.00E+00	2.47E+03	5.95E+05	5.97E+05
175.50	0.00E+00	0.00E+00	2.30E+03	6.18E+05	6.21E+05
188.50	0.00E+00	0.00E+00	2.16E+03	6.41E+05	6.43E+05
201.50	0.00E+00	0.00E+00	2.08E+03	6.63E+05	6.65E+05
214.50	0.00E+00	0.00E+00	2.00E+03	6.84E+05	6.86E+05
227.50	0.00E+00	0.00E+00	1.93E+03	7.05E+05	7.07E+05
240.50	0.00E+00	0.00E+00	1.86E+03	7.25E+05	7.26E+05
253.50	0.00E+00	0.00E+00	1.80E+03	7.44E+05	7.46E+05

579.476075089319200 total grams airborne in tank
2.577838608211254E-004 total g/s out riser
149255.103881835900000 total grams lost out riser
9930155.703125000000000 total grams settled on floor
1.007998969531250E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.06E+03	7.79E+00	5.17E+04	7.78E+04	1.36E+05
19.50	3.40E+03	3.75E+00	3.19E+04	2.01E+05	2.36E+05
32.50	1.76E+03	1.94E+00	1.78E+04	2.86E+05	3.05E+05
45.50	1.10E+03	1.21E+00	1.13E+04	3.49E+05	3.61E+05

58.50	7.90E+02	8.71E-01	8.24E+03	4.00E+05	4.09E+05
71.50	6.30E+02	6.95E-01	6.60E+03	4.45E+05	4.53E+05
84.50	5.21E+02	5.75E-01	5.48E+03	4.86E+05	4.92E+05
97.50	4.43E+02	4.89E-01	4.66E+03	5.23E+05	5.29E+05
110.50	3.84E+02	4.24E-01	4.05E+03	5.58E+05	5.63E+05
123.50	3.45E+02	3.81E-01	3.64E+03	5.91E+05	5.95E+05
136.50	3.14E+02	3.47E-01	3.32E+03	6.22E+05	6.25E+05
149.50	2.89E+02	3.19E-01	3.05E+03	6.51E+05	6.55E+05
162.50	2.67E+02	2.95E-01	2.82E+03	6.79E+05	6.82E+05
175.50	2.48E+02	2.74E-01	2.62E+03	7.06E+05	7.09E+05
188.50	2.34E+02	2.58E-01	2.47E+03	7.32E+05	7.35E+05
201.50	2.25E+02	2.48E-01	2.37E+03	7.57E+05	7.60E+05
214.50	2.16E+02	2.38E-01	2.28E+03	7.82E+05	7.84E+05
227.50	2.09E+02	2.30E-01	2.20E+03	8.05E+05	8.07E+05
240.50	2.02E+02	2.22E-01	2.13E+03	8.28E+05	8.30E+05
253.50	1.95E+02	2.15E-01	2.06E+03	8.50E+05	8.52E+05

18829.516036987300000 total grams airborne in tank
20.773564279079440 total g/s out riser
170618.152587890600000 total grams lost out riser
1.133054127343750E+007 total grams settled on floor
1.151998820312500E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.79E+02	2.58E-04	5.17E+04	8.42E+04	1.36E+05
19.50	8.71E-07	3.87E-13	3.19E+04	2.05E+05	2.36E+05
32.50	5.01E-24	2.23E-30	1.78E+04	2.87E+05	3.05E+05
45.50	0.00E+00	0.00E+00	1.13E+04	3.50E+05	3.61E+05
58.50	0.00E+00	0.00E+00	8.24E+03	4.01E+05	4.09E+05
71.50	0.00E+00	0.00E+00	6.60E+03	4.46E+05	4.53E+05
84.50	0.00E+00	0.00E+00	5.48E+03	4.87E+05	4.92E+05
97.50	0.00E+00	0.00E+00	4.66E+03	5.24E+05	5.29E+05
110.50	0.00E+00	0.00E+00	4.05E+03	5.59E+05	5.63E+05
123.50	0.00E+00	0.00E+00	3.64E+03	5.91E+05	5.95E+05
136.50	0.00E+00	0.00E+00	3.32E+03	6.22E+05	6.25E+05
149.50	0.00E+00	0.00E+00	3.05E+03	6.51E+05	6.55E+05
162.50	0.00E+00	0.00E+00	2.82E+03	6.80E+05	6.82E+05
175.50	0.00E+00	0.00E+00	2.62E+03	7.07E+05	7.09E+05
188.50	0.00E+00	0.00E+00	2.47E+03	7.33E+05	7.35E+05
201.50	0.00E+00	0.00E+00	2.37E+03	7.58E+05	7.60E+05
214.50	0.00E+00	0.00E+00	2.28E+03	7.82E+05	7.84E+05
227.50	0.00E+00	0.00E+00	2.20E+03	8.05E+05	8.07E+05
240.50	0.00E+00	0.00E+00	2.13E+03	8.28E+05	8.30E+05
253.50	0.00E+00	0.00E+00	2.06E+03	8.50E+05	8.52E+05

579.476075089319200 total grams airborne in tank
2.577838608211254E-004 total g/s out riser
170622.630615234400000 total grams lost out riser
1.134878683593750E+007 total grams settled on floor
1.151998820312500E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.06E+03	7.79E+00	5.82E+04	8.83E+04	1.54E+05
19.50	3.40E+03	3.75E+00	3.59E+04	2.27E+05	2.66E+05
32.50	1.76E+03	1.94E+00	2.00E+04	3.22E+05	3.43E+05
45.50	1.10E+03	1.21E+00	1.27E+04	3.92E+05	4.06E+05
58.50	7.90E+02	8.71E-01	9.27E+03	4.51E+05	4.61E+05
71.50	6.30E+02	6.95E-01	7.42E+03	5.01E+05	5.09E+05
84.50	5.21E+02	5.75E-01	6.16E+03	5.47E+05	5.54E+05
97.50	4.43E+02	4.89E-01	5.24E+03	5.89E+05	5.95E+05
110.50	3.84E+02	4.24E-01	4.55E+03	6.28E+05	6.33E+05
123.50	3.45E+02	3.81E-01	4.10E+03	6.65E+05	6.69E+05
136.50	3.14E+02	3.47E-01	3.73E+03	7.00E+05	7.04E+05
149.50	2.89E+02	3.19E-01	3.43E+03	7.33E+05	7.36E+05
162.50	2.67E+02	2.95E-01	3.17E+03	7.64E+05	7.68E+05
175.50	2.48E+02	2.74E-01	2.95E+03	7.95E+05	7.98E+05
188.50	2.34E+02	2.58E-01	2.78E+03	8.24E+05	8.27E+05
201.50	2.25E+02	2.48E-01	2.67E+03	8.52E+05	8.55E+05
214.50	2.16E+02	2.38E-01	2.57E+03	8.79E+05	8.82E+05
227.50	2.09E+02	2.30E-01	2.48E+03	9.06E+05	9.08E+05
240.50	2.02E+02	2.22E-01	2.40E+03	9.31E+05	9.34E+05
253.50	1.95E+02	2.15E-01	2.32E+03	9.56E+05	9.59E+05

18829.516036987300000 total grams airborne in tank
20.773564279079440 total g/s out riser
191985.680419921900000 total grams lost out riser
1.274917241406250E+007 total grams settled on floor
1.295998678125000E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.79E+02	2.58E-04	5.82E+04	9.48E+04	1.54E+05
19.50	8.71E-07	3.87E-13	3.59E+04	2.30E+05	2.66E+05
32.50	5.01E-24	2.23E-30	2.00E+04	3.23E+05	3.43E+05
45.50	0.00E+00	0.00E+00	1.27E+04	3.93E+05	4.06E+05
58.50	0.00E+00	0.00E+00	9.27E+03	4.51E+05	4.61E+05
71.50	0.00E+00	0.00E+00	7.42E+03	5.02E+05	5.09E+05
84.50	0.00E+00	0.00E+00	6.16E+03	5.47E+05	5.54E+05
97.50	0.00E+00	0.00E+00	5.24E+03	5.89E+05	5.95E+05
110.50	0.00E+00	0.00E+00	4.55E+03	6.29E+05	6.33E+05
123.50	0.00E+00	0.00E+00	4.10E+03	6.65E+05	6.69E+05
136.50	0.00E+00	0.00E+00	3.73E+03	7.00E+05	7.04E+05
149.50	0.00E+00	0.00E+00	3.43E+03	7.33E+05	7.36E+05
162.50	0.00E+00	0.00E+00	3.17E+03	7.65E+05	7.68E+05
175.50	0.00E+00	0.00E+00	2.95E+03	7.95E+05	7.98E+05
188.50	0.00E+00	0.00E+00	2.78E+03	8.24E+05	8.27E+05
201.50	0.00E+00	0.00E+00	2.67E+03	8.52E+05	8.55E+05
214.50	0.00E+00	0.00E+00	2.57E+03	8.79E+05	8.82E+05
227.50	0.00E+00	0.00E+00	2.48E+03	9.06E+05	9.08E+05
240.50	0.00E+00	0.00E+00	2.40E+03	9.32E+05	9.34E+05
253.50	0.00E+00	0.00E+00	2.32E+03	9.57E+05	9.59E+05

579.476075089319200 total grams airborne in tank

```
2.577838608211254E-004 total g/s out riser
191990.157226562500000 total grams lost out riser
1.276741798437500E+007 total grams settled on floor
1.295998678125000E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed
```

Table 5. Comparison of Dry and Liquid Aerosols
(PR=1 in./min. for all cases)

Tank Vol. (gal)	In-Leakage (scfm)	WH (in.)	Dry Aerosol (g)	Liquid Aerosol (g)	Liquid Aerosol w/.0635 bypass (g)
Worst Case					
500,000	2100	171	2976.3	191990.2	1002757.9
750,000	2100	266	4597.7	296558.8	1557886.0
1,000,000	2100	361	5676.9	405643.9	2117243.7
Anticipated Case					
500,000	500	171	1324.9	75327.2	893503.1
750,000	500	266	2056.6	116100.2	1388886.5
1,000,000	500	361	2717.6	159251.8	1886497.7

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

52WB

ADDITIONAL PARAMETERS:

```
particle density, g/cc =        1.383000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     1060.895809739524000
bypass fraction =   6.350000000000000E-002

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000
Output divisions in Period        3.000000000000000 =        1.000000
Output divisions in Period        4.000000000000000 =        1.000000
Output divisions in Period        5.000000000000000 =        1.000000
Output divisions in Period        6.000000000000000 =        1.000000
Output divisions in Period        7.000000000000000 =        1.000000
Output divisions in Period        8.000000000000000 =        1.000000
Output divisions in Period        9.000000000000000 =        1.000000
Output divisions in Period       10.000000000000000 =        1.000000
Output divisions in Period       11.000000000000000 =        1.000000
Output divisions in Period       12.000000000000000 =        1.000000
Output divisions in Period       13.000000000000000 =        1.000000
Output divisions in Period       14.000000000000000 =        1.000000
Output divisions in Period       15.000000000000000 =        1.000000
Output divisions in Period       16.000000000000000 =        1.000000
Output divisions in Period       17.000000000000000 =        1.000000
Output divisions in Period       18.000000000000000 =        1.000000


Flow out @    0.000000E+00 min =     2480.000000 cfm &    72000.000000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =     2480.000000 cfm &    72000.000000g/m
Flow out @      100.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =     2480.000000 cfm &    72000.000000g/m
Flow out @      180.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      240.000000 min =     2480.000000 cfm &    72000.000000g/m
Flow out @      260.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      320.000000 min =     2480.000000 cfm &    72000.000000g/m
Flow out @      340.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =     2480.000000 cfm &    72000.000000g/m
Flow out @      420.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =     2480.000000 cfm &    72000.000000g/m
Flow out @      500.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =     2480.000000 cfm &    72000.000000g/m
Flow out @      580.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      640.000000 min =     2480.000000 cfm &    72000.000000g/m
Flow out @      660.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m


**** OUTPUT @       20.000000000000000 minutes ****

  diam     airborne    outflow     totalout    totalflr    source
  mcrn        g          g/s          g           g          g
```

6.50	6.55E+03	8.13E+00	6.87E+03	3.64E+03	1.60E+04
19.50	3.19E+03	5.08E+00	5.61E+03	2.08E+04	2.77E+04
32.50	1.65E+03	3.84E+00	4.50E+03	3.20E+04	3.57E+04
45.50	1.03E+03	3.52E+00	4.19E+03	3.99E+04	4.23E+04
58.50	7.40E+02	3.52E+00	4.21E+03	4.62E+04	4.79E+04
71.50	5.90E+02	3.65E+00	4.37E+03	5.16E+04	5.30E+04
84.50	4.88E+02	3.79E+00	4.55E+03	5.65E+04	5.76E+04
97.50	4.15E+02	3.95E+00	4.74E+03	6.09E+04	6.19E+04
110.50	3.60E+02	4.12E+00	4.94E+03	6.50E+04	6.59E+04
123.50	3.23E+02	4.29E+00	5.15E+03	6.89E+04	6.96E+04
136.50	2.94E+02	4.46E+00	5.35E+03	7.25E+04	7.32E+04
149.50	2.70E+02	4.63E+00	5.55E+03	7.60E+04	7.66E+04
162.50	2.50E+02	4.79E+00	5.75E+03	7.93E+04	7.99E+04
175.50	2.33E+02	4.95E+00	5.94E+03	8.25E+04	8.30E+04
188.50	2.19E+02	5.10E+00	6.12E+03	8.55E+04	8.60E+04
201.50	2.10E+02	5.26E+00	6.31E+03	8.85E+04	8.90E+04
214.50	2.02E+02	5.41E+00	6.49E+03	9.13E+04	9.18E+04
227.50	1.95E+02	5.56E+00	6.67E+03	9.41E+04	9.45E+04
240.50	1.89E+02	5.70E+00	6.84E+03	9.67E+04	9.72E+04
253.50	1.83E+02	5.84E+00	7.01E+03	9.94E+04	9.98E+04

17571.056427001950000 total grams airborne in tank
95.585099458694460 total g/s out riser
111151.833007812500000 total grams lost out riser
1311275.676513672000000 total grams settled on floor
1348558.653320312000000 total grams made airborne
91439.909301757810000 total grams bypassed

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.38E+02	2.39E-04	6.87E+03	9.65E+03	1.60E+04
19.50	8.15E-07	3.63E-13	5.61E+03	2.39E+04	2.77E+04
32.50	4.69E-24	2.09E-30	4.50E+03	3.36E+04	3.57E+04
45.50	0.00E+00	0.00E+00	4.19E+03	4.09E+04	4.23E+04
58.50	0.00E+00	0.00E+00	4.21E+03	4.70E+04	4.79E+04
71.50	0.00E+00	0.00E+00	4.37E+03	5.22E+04	5.30E+04
84.50	0.00E+00	0.00E+00	4.55E+03	5.70E+04	5.76E+04
97.50	0.00E+00	0.00E+00	4.74E+03	6.13E+04	6.19E+04
110.50	0.00E+00	0.00E+00	4.94E+03	6.54E+04	6.59E+04
123.50	0.00E+00	0.00E+00	5.15E+03	6.92E+04	6.96E+04
136.50	0.00E+00	0.00E+00	5.35E+03	7.28E+04	7.32E+04
149.50	0.00E+00	0.00E+00	5.55E+03	7.63E+04	7.66E+04
162.50	0.00E+00	0.00E+00	5.75E+03	7.96E+04	7.99E+04
175.50	0.00E+00	0.00E+00	5.94E+03	8.27E+04	8.30E+04
188.50	0.00E+00	0.00E+00	6.12E+03	8.57E+04	8.60E+04
201.50	0.00E+00	0.00E+00	6.31E+03	8.87E+04	8.90E+04
214.50	0.00E+00	0.00E+00	6.49E+03	9.15E+04	9.18E+04
227.50	0.00E+00	0.00E+00	6.67E+03	9.43E+04	9.45E+04
240.50	0.00E+00	0.00E+00	6.84E+03	9.69E+04	9.72E+04
253.50	0.00E+00	0.00E+00	7.01E+03	9.95E+04	9.98E+04

537.527161459819400 total grams airborne in tank
2.391225865710821E-004 total g/s out riser
111155.990722656200000 total grams lost out riser
1328305.051757812000000 total grams settled on floor
1348558.653320312000000 total grams made airborne

91439.909301757810000 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	6.61E+03	8.20E+00	1.40E+04	1.35E+04	3.20E+04
19.50	3.19E+03	5.08E+00	1.12E+04	4.47E+04	5.53E+04
32.50	1.65E+03	3.84E+00	9.00E+03	6.56E+04	7.15E+04
45.50	1.03E+03	3.52E+00	8.38E+03	8.09E+04	8.45E+04
58.50	7.40E+02	3.52E+00	8.43E+03	9.32E+04	9.59E+04
71.50	5.90E+02	3.65E+00	8.73E+03	1.04E+05	1.06E+05
84.50	4.88E+02	3.79E+00	9.09E+03	1.13E+05	1.15E+05
97.50	4.15E+02	3.95E+00	9.48E+03	1.22E+05	1.24E+05
110.50	3.60E+02	4.12E+00	9.88E+03	1.30E+05	1.32E+05
123.50	3.23E+02	4.29E+00	1.03E+04	1.38E+05	1.39E+05
136.50	2.94E+02	4.46E+00	1.07E+04	1.45E+05	1.46E+05
149.50	2.70E+02	4.63E+00	1.11E+04	1.52E+05	1.53E+05
162.50	2.50E+02	4.79E+00	1.15E+04	1.59E+05	1.60E+05
175.50	2.33E+02	4.95E+00	1.19E+04	1.65E+05	1.66E+05
188.50	2.19E+02	5.10E+00	1.22E+04	1.71E+05	1.72E+05
201.50	2.10E+02	5.26E+00	1.26E+04	1.77E+05	1.78E+05
214.50	2.02E+02	5.41E+00	1.30E+04	1.83E+05	1.84E+05
227.50	1.95E+02	5.56E+00	1.33E+04	1.88E+05	1.89E+05
240.50	1.89E+02	5.70E+00	1.37E+04	1.94E+05	1.94E+05
253.50	1.83E+02	5.84E+00	1.40E+04	1.99E+05	2.00E+05

17633.245880126950000 total grams airborne in tank
95.653709650039670 total g/s out riser
222599.600585937500000 total grams lost out riser
2639764.271484375000000 total grams settled on floor
2697117.306640625000000 total grams made airborne
182879.818603515600000 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.43E+02	2.41E-04	1.40E+04	1.95E+04	3.20E+04
19.50	8.15E-07	3.63E-13	1.12E+04	4.79E+04	5.53E+04
32.50	4.69E-24	2.09E-30	9.00E+03	6.73E+04	7.15E+04
45.50	0.00E+00	0.00E+00	8.38E+03	8.19E+04	8.45E+04
58.50	0.00E+00	0.00E+00	8.43E+03	9.39E+04	9.59E+04
71.50	0.00E+00	0.00E+00	8.73E+03	1.04E+05	1.06E+05
84.50	0.00E+00	0.00E+00	9.09E+03	1.14E+05	1.15E+05
97.50	0.00E+00	0.00E+00	9.48E+03	1.23E+05	1.24E+05
110.50	0.00E+00	0.00E+00	9.88E+03	1.31E+05	1.32E+05
123.50	0.00E+00	0.00E+00	1.03E+04	1.38E+05	1.39E+05
136.50	0.00E+00	0.00E+00	1.07E+04	1.46E+05	1.46E+05
149.50	0.00E+00	0.00E+00	1.11E+04	1.53E+05	1.53E+05
162.50	0.00E+00	0.00E+00	1.15E+04	1.59E+05	1.60E+05
175.50	0.00E+00	0.00E+00	1.19E+04	1.65E+05	1.66E+05
188.50	0.00E+00	0.00E+00	1.22E+04	1.71E+05	1.72E+05
201.50	0.00E+00	0.00E+00	1.26E+04	1.77E+05	1.78E+05
214.50	0.00E+00	0.00E+00	1.30E+04	1.83E+05	1.84E+05
227.50	0.00E+00	0.00E+00	1.33E+04	1.89E+05	1.89E+05

240.50	0.00E+00	0.00E+00	1.37E+04	1.94E+05	1.94E+05
253.50	0.00E+00	0.00E+00	1.40E+04	1.99E+05	2.00E+05

542.630371909038100 total grams airborne in tank
2.413927872101139E-004 total g/s out riser
222603.791992187500000 total grams lost out riser
2656850.718750000000000 total grams settled on floor
2697117.306640625000000 total grams made airborne
182879.818603515600000 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	6.61E+03	8.20E+00	2.12E+04	2.34E+04	4.79E+04
19.50	3.19E+03	5.08E+00	1.68E+04	6.86E+04	8.30E+04
32.50	1.65E+03	3.84E+00	1.35E+04	9.93E+04	1.07E+05
45.50	1.03E+03	3.52E+00	1.26E+04	1.22E+05	1.27E+05
58.50	7.40E+02	3.52E+00	1.26E+04	1.40E+05	1.44E+05
71.50	5.90E+02	3.65E+00	1.31E+04	1.56E+05	1.59E+05
84.50	4.88E+02	3.79E+00	1.36E+04	1.70E+05	1.73E+05
97.50	4.15E+02	3.95E+00	1.42E+04	1.84E+05	1.86E+05
110.50	3.60E+02	4.12E+00	1.48E+04	1.96E+05	1.98E+05
123.50	3.23E+02	4.29E+00	1.54E+04	2.07E+05	2.09E+05
136.50	2.94E+02	4.46E+00	1.61E+04	2.18E+05	2.20E+05
149.50	2.70E+02	4.63E+00	1.67E+04	2.29E+05	2.30E+05
162.50	2.50E+02	4.79E+00	1.72E+04	2.38E+05	2.40E+05
175.50	2.33E+02	4.95E+00	1.78E+04	2.48E+05	2.49E+05
188.50	2.19E+02	5.10E+00	1.84E+04	2.57E+05	2.58E+05
201.50	2.10E+02	5.26E+00	1.89E+04	2.66E+05	2.67E+05
214.50	2.02E+02	5.41E+00	1.95E+04	2.74E+05	2.75E+05
227.50	1.95E+02	5.56E+00	2.00E+04	2.83E+05	2.84E+05
240.50	1.89E+02	5.70E+00	2.05E+04	2.91E+05	2.92E+05
253.50	1.83E+02	5.84E+00	2.10E+04	2.98E+05	2.99E+05

17633.836212158200000 total grams airborne in tank
95.654361009597780 total g/s out riser
334050.169921875000000 total grams lost out riser
3968311.750000000000000 total grams settled on floor
4045675.925781250000000 total grams made airborne
274319.731445312500000 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.43E+02	2.41E-04	2.12E+04	2.94E+04	4.79E+04
19.50	8.15E-07	3.63E-13	1.68E+04	7.18E+04	8.30E+04
32.50	4.69E-24	2.09E-30	1.35E+04	1.01E+05	1.07E+05
45.50	0.00E+00	0.00E+00	1.26E+04	1.23E+05	1.27E+05
58.50	0.00E+00	0.00E+00	1.26E+04	1.41E+05	1.44E+05
71.50	0.00E+00	0.00E+00	1.31E+04	1.57E+05	1.59E+05
84.50	0.00E+00	0.00E+00	1.36E+04	1.71E+05	1.73E+05
97.50	0.00E+00	0.00E+00	1.42E+04	1.84E+05	1.86E+05
110.50	0.00E+00	0.00E+00	1.48E+04	1.96E+05	1.98E+05
123.50	0.00E+00	0.00E+00	1.54E+04	2.08E+05	2.09E+05

136.50	0.00E+00	0.00E+00	1.61E+04	2.18E+05	2.20E+05
149.50	0.00E+00	0.00E+00	1.67E+04	2.29E+05	2.30E+05
162.50	0.00E+00	0.00E+00	1.72E+04	2.39E+05	2.40E+05
175.50	0.00E+00	0.00E+00	1.78E+04	2.48E+05	2.49E+05
188.50	0.00E+00	0.00E+00	1.84E+04	2.57E+05	2.58E+05
201.50	0.00E+00	0.00E+00	1.89E+04	2.66E+05	2.67E+05
214.50	0.00E+00	0.00E+00	1.95E+04	2.75E+05	2.75E+05
227.50	0.00E+00	0.00E+00	2.00E+04	2.83E+05	2.84E+05
240.50	0.00E+00	0.00E+00	2.05E+04	2.91E+05	2.92E+05
253.50	0.00E+00	0.00E+00	2.10E+04	2.99E+05	2.99E+05

542.678833823100600 total grams airborne in tank
2.414143385965671E-004 total g/s out riser
334054.362304687500000 total grams lost out riser
3985398.699218750000000 total grams settled on floor
4045675.925781250000000 total grams made airborne
274319.731445312500000 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	6.61E+03	8.20E+00	2.84E+04	3.33E+04	6.39E+04
19.50	3.19E+03	5.08E+00	2.24E+04	9.26E+04	1.11E+05
32.50	1.65E+03	3.84E+00	1.80E+04	1.33E+05	1.43E+05
45.50	1.03E+03	3.52E+00	1.68E+04	1.63E+05	1.69E+05
58.50	7.40E+02	3.52E+00	1.69E+04	1.87E+05	1.92E+05
71.50	5.90E+02	3.65E+00	1.75E+04	2.08E+05	2.12E+05
84.50	4.88E+02	3.79E+00	1.82E+04	2.27E+05	2.30E+05
97.50	4.15E+02	3.95E+00	1.90E+04	2.45E+05	2.48E+05
110.50	3.60E+02	4.12E+00	1.98E+04	2.61E+05	2.63E+05
123.50	3.23E+02	4.29E+00	2.06E+04	2.77E+05	2.79E+05
136.50	2.94E+02	4.46E+00	2.14E+04	2.91E+05	2.93E+05
149.50	2.70E+02	4.63E+00	2.22E+04	3.05E+05	3.06E+05
162.50	2.50E+02	4.79E+00	2.30E+04	3.18E+05	3.20E+05
175.50	2.33E+02	4.95E+00	2.37E+04	3.31E+05	3.32E+05
188.50	2.19E+02	5.10E+00	2.45E+04	3.43E+05	3.44E+05
201.50	2.10E+02	5.26E+00	2.52E+04	3.54E+05	3.56E+05
214.50	2.02E+02	5.41E+00	2.60E+04	3.66E+05	3.67E+05
227.50	1.95E+02	5.56E+00	2.67E+04	3.77E+05	3.78E+05
240.50	1.89E+02	5.70E+00	2.74E+04	3.88E+05	3.89E+05
253.50	1.83E+02	5.84E+00	2.80E+04	3.98E+05	3.99E+05

17633.841583251950000 total grams airborne in tank
95.654366731643680 total g/s out riser
445500.765625000000000 total grams lost out riser
5296859.742187500000000 total grams settled on floor
5394234.613281250000000 total grams made airborne
365759.637207031300000 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.43E+02	2.41E-04	2.84E+04	3.93E+04	6.39E+04
19.50	8.15E-07	3.63E-13	2.24E+04	9.58E+04	1.11E+05

32.50	4.69E-24	2.09E-30	1.80E+04	1.35E+05	1.43E+05
45.50	0.00E+00	0.00E+00	1.68E+04	1.64E+05	1.69E+05
58.50	0.00E+00	0.00E+00	1.69E+04	1.88E+05	1.92E+05
71.50	0.00E+00	0.00E+00	1.75E+04	2.09E+05	2.12E+05
84.50	0.00E+00	0.00E+00	1.82E+04	2.28E+05	2.30E+05
97.50	0.00E+00	0.00E+00	1.90E+04	2.45E+05	2.48E+05
110.50	0.00E+00	0.00E+00	1.98E+04	2.62E+05	2.63E+05
123.50	0.00E+00	0.00E+00	2.06E+04	2.77E+05	2.79E+05
136.50	0.00E+00	0.00E+00	2.14E+04	2.91E+05	2.93E+05
149.50	0.00E+00	0.00E+00	2.22E+04	3.05E+05	3.06E+05
162.50	0.00E+00	0.00E+00	2.30E+04	3.18E+05	3.20E+05
175.50	0.00E+00	0.00E+00	2.37E+04	3.31E+05	3.32E+05
188.50	0.00E+00	0.00E+00	2.45E+04	3.43E+05	3.44E+05
201.50	0.00E+00	0.00E+00	2.52E+04	3.55E+05	3.56E+05
214.50	0.00E+00	0.00E+00	2.60E+04	3.66E+05	3.67E+05
227.50	0.00E+00	0.00E+00	2.67E+04	3.77E+05	3.78E+05
240.50	0.00E+00	0.00E+00	2.74E+04	3.88E+05	3.89E+05
253.50	0.00E+00	0.00E+00	2.80E+04	3.98E+05	3.99E+05

542.679322104350600 total grams airborne in tank
2.414145423233803E-004 total g/s out riser
445504.960937500000000 total grams lost out riser
5313946.640625000000000 total grams settled on floor
5394234.613281250000000 total grams made airborne
365759.637207031300000 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	6.61E+03	8.20E+00	3.55E+04	4.31E+04	7.99E+04
19.50	3.19E+03	5.08E+00	2.80E+04	1.17E+05	1.38E+05
32.50	1.65E+03	3.84E+00	2.25E+04	1.67E+05	1.79E+05
45.50	1.03E+03	3.52E+00	2.10E+04	2.04E+05	2.11E+05
58.50	7.40E+02	3.52E+00	2.11E+04	2.34E+05	2.40E+05
71.50	5.90E+02	3.65E+00	2.18E+04	2.60E+05	2.65E+05
84.50	4.88E+02	3.79E+00	2.27E+04	2.84E+05	2.88E+05
97.50	4.15E+02	3.95E+00	2.37E+04	3.06E+05	3.09E+05
110.50	3.60E+02	4.12E+00	2.47E+04	3.27E+05	3.29E+05
123.50	3.23E+02	4.29E+00	2.57E+04	3.46E+05	3.48E+05
136.50	2.94E+02	4.46E+00	2.68E+04	3.64E+05	3.66E+05
149.50	2.70E+02	4.63E+00	2.78E+04	3.81E+05	3.83E+05
162.50	2.50E+02	4.79E+00	2.87E+04	3.98E+05	3.99E+05
175.50	2.33E+02	4.95E+00	2.97E+04	4.13E+05	4.15E+05
188.50	2.19E+02	5.10E+00	3.06E+04	4.29E+05	4.30E+05
201.50	2.10E+02	5.26E+00	3.15E+04	4.43E+05	4.45E+05
214.50	2.02E+02	5.41E+00	3.25E+04	4.57E+05	4.59E+05
227.50	1.95E+02	5.56E+00	3.33E+04	4.71E+05	4.73E+05
240.50	1.89E+02	5.70E+00	3.42E+04	4.84E+05	4.86E+05
253.50	1.83E+02	5.84E+00	3.50E+04	4.97E+05	4.99E+05

17633.841583251950000 total grams airborne in tank
95.654366731643680 total g/s out riser
556951.363281250000000 total grams lost out riser
6625407.679687500000000 total grams settled on floor
6742793.304687500000000 total grams made airborne
457199.543945312500000 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.43E+02	2.41E-04	3.55E+04	4.92E+04	7.99E+04
19.50	8.15E-07	3.63E-13	2.80E+04	1.20E+05	1.38E+05
32.50	4.69E-24	2.09E-30	2.25E+04	1.68E+05	1.79E+05
45.50	0.00E+00	0.00E+00	2.10E+04	2.05E+05	2.11E+05
58.50	0.00E+00	0.00E+00	2.11E+04	2.35E+05	2.40E+05
71.50	0.00E+00	0.00E+00	2.18E+04	2.61E+05	2.65E+05
84.50	0.00E+00	0.00E+00	2.27E+04	2.85E+05	2.88E+05
97.50	0.00E+00	0.00E+00	2.37E+04	3.07E+05	3.09E+05
110.50	0.00E+00	0.00E+00	2.47E+04	3.27E+05	3.29E+05
123.50	0.00E+00	0.00E+00	2.57E+04	3.46E+05	3.48E+05
136.50	0.00E+00	0.00E+00	2.68E+04	3.64E+05	3.66E+05
149.50	0.00E+00	0.00E+00	2.78E+04	3.81E+05	3.83E+05
162.50	0.00E+00	0.00E+00	2.87E+04	3.98E+05	3.99E+05
175.50	0.00E+00	0.00E+00	2.97E+04	4.14E+05	4.15E+05
188.50	0.00E+00	0.00E+00	3.06E+04	4.29E+05	4.30E+05
201.50	0.00E+00	0.00E+00	3.15E+04	4.43E+05	4.45E+05
214.50	0.00E+00	0.00E+00	3.25E+04	4.58E+05	4.59E+05
227.50	0.00E+00	0.00E+00	3.33E+04	4.71E+05	4.73E+05
240.50	0.00E+00	0.00E+00	3.42E+04	4.85E+05	4.86E+05
253.50	0.00E+00	0.00E+00	3.50E+04	4.98E+05	4.99E+05

542.679322104350600 total grams airborne in tank
2.414145423233803E-004 total g/s out riser
556955.558593750000000 total grams lost out riser
6642494.574218750000000 total grams settled on floor
6742793.304687500000000 total grams made airborne
457199.543945312500000 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	6.61E+03	8.20E+00	4.27E+04	5.30E+04	9.59E+04
19.50	3.19E+03	5.08E+00	3.37E+04	1.40E+05	1.66E+05
32.50	1.65E+03	3.84E+00	2.70E+04	2.00E+05	2.14E+05
45.50	1.03E+03	3.52E+00	2.52E+04	2.45E+05	2.54E+05
58.50	7.40E+02	3.52E+00	2.53E+04	2.81E+05	2.88E+05
71.50	5.90E+02	3.65E+00	2.62E+04	3.13E+05	3.18E+05
84.50	4.88E+02	3.79E+00	2.73E+04	3.41E+05	3.46E+05
97.50	4.15E+02	3.95E+00	2.84E+04	3.68E+05	3.71E+05
110.50	3.60E+02	4.12E+00	2.96E+04	3.92E+05	3.95E+05
123.50	3.23E+02	4.29E+00	3.09E+04	4.15E+05	4.18E+05
136.50	2.94E+02	4.46E+00	3.21E+04	4.37E+05	4.39E+05
149.50	2.70E+02	4.63E+00	3.33E+04	4.57E+05	4.60E+05
162.50	2.50E+02	4.79E+00	3.45E+04	4.77E+05	4.79E+05
175.50	2.33E+02	4.95E+00	3.56E+04	4.96E+05	4.98E+05
188.50	2.19E+02	5.10E+00	3.67E+04	5.14E+05	5.16E+05
201.50	2.10E+02	5.26E+00	3.79E+04	5.32E+05	5.34E+05
214.50	2.02E+02	5.41E+00	3.89E+04	5.49E+05	5.51E+05
227.50	1.95E+02	5.56E+00	4.00E+04	5.65E+05	5.67E+05
240.50	1.89E+02	5.70E+00	4.10E+04	5.81E+05	5.83E+05
253.50	1.83E+02	5.84E+00	4.20E+04	5.97E+05	5.99E+05

17633.841583251950000 total grams airborne in tank
95.654366731643680 total g/s out riser
668401.964843750000000 total grams lost out riser
7953955.621093750000000 total grams settled on floor
8091352.070312500000000 total grams made airborne
548639.454589843700000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.43E+02	2.41E-04	4.27E+04	5.91E+04	9.59E+04
19.50	8.15E-07	3.63E-13	3.37E+04	1.44E+05	1.66E+05
32.50	4.69E-24	2.09E-30	2.70E+04	2.02E+05	2.14E+05
45.50	0.00E+00	0.00E+00	2.52E+04	2.46E+05	2.54E+05
58.50	0.00E+00	0.00E+00	2.53E+04	2.82E+05	2.88E+05
71.50	0.00E+00	0.00E+00	2.62E+04	3.13E+05	3.18E+05
84.50	0.00E+00	0.00E+00	2.73E+04	3.42E+05	3.46E+05
97.50	0.00E+00	0.00E+00	2.84E+04	3.68E+05	3.71E+05
110.50	0.00E+00	0.00E+00	2.96E+04	3.92E+05	3.95E+05
123.50	0.00E+00	0.00E+00	3.09E+04	4.15E+05	4.18E+05
136.50	0.00E+00	0.00E+00	3.21E+04	4.37E+05	4.39E+05
149.50	0.00E+00	0.00E+00	3.33E+04	4.58E+05	4.60E+05
162.50	0.00E+00	0.00E+00	3.45E+04	4.77E+05	4.79E+05
175.50	0.00E+00	0.00E+00	3.56E+04	4.96E+05	4.98E+05
188.50	0.00E+00	0.00E+00	3.67E+04	5.14E+05	5.16E+05
201.50	0.00E+00	0.00E+00	3.79E+04	5.32E+05	5.34E+05
214.50	0.00E+00	0.00E+00	3.89E+04	5.49E+05	5.51E+05
227.50	0.00E+00	0.00E+00	4.00E+04	5.66E+05	5.67E+05
240.50	0.00E+00	0.00E+00	4.10E+04	5.82E+05	5.83E+05
253.50	0.00E+00	0.00E+00	4.20E+04	5.97E+05	5.99E+05

542.679322104350600 total grams airborne in tank
2.414145423233803E-004 total g/s out riser
668406.156250000000000 total grams lost out riser
7971042.613281250000000 total grams settled on floor
8091352.070312500000000 total grams made airborne
548639.454589843700000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	6.61E+03	8.20E+00	4.99E+04	6.29E+04	1.12E+05
19.50	3.19E+03	5.08E+00	3.93E+04	1.64E+05	1.94E+05
32.50	1.65E+03	3.84E+00	3.15E+04	2.34E+05	2.50E+05
45.50	1.03E+03	3.52E+00	2.93E+04	2.86E+05	2.96E+05
58.50	7.40E+02	3.52E+00	2.95E+04	3.28E+05	3.36E+05
71.50	5.90E+02	3.65E+00	3.06E+04	3.65E+05	3.71E+05
84.50	4.88E+02	3.79E+00	3.18E+04	3.98E+05	4.03E+05
97.50	4.15E+02	3.95E+00	3.32E+04	4.29E+05	4.33E+05
110.50	3.60E+02	4.12E+00	3.46E+04	4.57E+05	4.61E+05
123.50	3.23E+02	4.29E+00	3.60E+04	4.84E+05	4.87E+05
136.50	2.94E+02	4.46E+00	3.75E+04	5.09E+05	5.13E+05
149.50	2.70E+02	4.63E+00	3.89E+04	5.34E+05	5.36E+05

162.50	2.50E+02	4.79E+00	4.02E+04	5.57E+05	5.59E+05
175.50	2.33E+02	4.95E+00	4.16E+04	5.79E+05	5.81E+05
188.50	2.19E+02	5.10E+00	4.29E+04	6.00E+05	6.02E+05
201.50	2.10E+02	5.26E+00	4.42E+04	6.21E+05	6.23E+05
214.50	2.02E+02	5.41E+00	4.54E+04	6.40E+05	6.42E+05
227.50	1.95E+02	5.56E+00	4.67E+04	6.60E+05	6.62E+05
240.50	1.89E+02	5.70E+00	4.79E+04	6.78E+05	6.80E+05
253.50	1.83E+02	5.84E+00	4.90E+04	6.97E+05	6.98E+05

17633.841583251950000 total grams airborne in tank
95.654366731643680 total g/s out riser
779852.562500000000000 total grams lost out riser
9282503.625000000000000 total grams settled on floor
9439910.851562500000000 total grams made airborne
640079.363281250000000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.43E+02	2.41E-04	4.99E+04	6.90E+04	1.12E+05
19.50	8.15E-07	3.63E-13	3.93E+04	1.68E+05	1.94E+05
32.50	4.69E-24	2.09E-30	3.15E+04	2.36E+05	2.50E+05
45.50	0.00E+00	0.00E+00	2.93E+04	2.87E+05	2.96E+05
58.50	0.00E+00	0.00E+00	2.95E+04	3.29E+05	3.36E+05
71.50	0.00E+00	0.00E+00	3.06E+04	3.66E+05	3.71E+05
84.50	0.00E+00	0.00E+00	3.18E+04	3.99E+05	4.03E+05
97.50	0.00E+00	0.00E+00	3.32E+04	4.29E+05	4.33E+05
110.50	0.00E+00	0.00E+00	3.46E+04	4.58E+05	4.61E+05
123.50	0.00E+00	0.00E+00	3.60E+04	4.85E+05	4.87E+05
136.50	0.00E+00	0.00E+00	3.75E+04	5.10E+05	5.13E+05
149.50	0.00E+00	0.00E+00	3.89E+04	5.34E+05	5.36E+05
162.50	0.00E+00	0.00E+00	4.02E+04	5.57E+05	5.59E+05
175.50	0.00E+00	0.00E+00	4.16E+04	5.79E+05	5.81E+05
188.50	0.00E+00	0.00E+00	4.29E+04	6.00E+05	6.02E+05
201.50	0.00E+00	0.00E+00	4.42E+04	6.21E+05	6.23E+05
214.50	0.00E+00	0.00E+00	4.54E+04	6.41E+05	6.42E+05
227.50	0.00E+00	0.00E+00	4.67E+04	6.60E+05	6.62E+05
240.50	0.00E+00	0.00E+00	4.79E+04	6.79E+05	6.80E+05
253.50	0.00E+00	0.00E+00	4.90E+04	6.97E+05	6.98E+05

542.679322104350600 total grams airborne in tank
2.414145423233803E-004 total g/s out riser
779856.757812500000000 total grams lost out riser
9299590.750000000000000 total grams settled on floor
9439910.851562500000000 total grams made airborne
640079.363281250000000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	6.61E+03	8.20E+00	5.70E+04	7.28E+04	1.28E+05
19.50	3.19E+03	5.08E+00	4.49E+04	1.88E+05	2.21E+05
32.50	1.65E+03	3.84E+00	3.60E+04	2.68E+05	2.86E+05
45.50	1.03E+03	3.52E+00	3.35E+04	3.27E+05	3.38E+05

58.50	7.40E+02	3.52E+00	3.37E+04	3.75E+05	3.83E+05
71.50	5.90E+02	3.65E+00	3.49E+04	4.17E+05	4.24E+05
84.50	4.88E+02	3.79E+00	3.64E+04	4.55E+05	4.61E+05
97.50	4.15E+02	3.95E+00	3.79E+04	4.90E+05	4.95E+05
110.50	3.60E+02	4.12E+00	3.95E+04	5.23E+05	5.27E+05
123.50	3.23E+02	4.29E+00	4.12E+04	5.53E+05	5.57E+05
136.50	2.94E+02	4.46E+00	4.28E+04	5.82E+05	5.86E+05
149.50	2.70E+02	4.63E+00	4.44E+04	6.10E+05	6.13E+05
162.50	2.50E+02	4.79E+00	4.60E+04	6.36E+05	6.39E+05
175.50	2.33E+02	4.95E+00	4.75E+04	6.61E+05	6.64E+05
188.50	2.19E+02	5.10E+00	4.90E+04	6.86E+05	6.88E+05
201.50	2.10E+02	5.26E+00	5.05E+04	7.09E+05	7.12E+05
214.50	2.02E+02	5.41E+00	5.19E+04	7.32E+05	7.34E+05
227.50	1.95E+02	5.56E+00	5.33E+04	7.54E+05	7.56E+05
240.50	1.89E+02	5.70E+00	5.47E+04	7.75E+05	7.77E+05
253.50	1.83E+02	5.84E+00	5.61E+04	7.96E+05	7.98E+05

17633.841583251950000 total grams airborne in tank
95.654366731643680 total g/s out riser
891303.164062500000000 total grams lost out riser
1.061105181250000E+007 total grams settled on floor
1.078846950781250E+007 total grams made airborne
731519.271484375000000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.43E+02	2.41E-04	5.70E+04	7.89E+04	1.28E+05
19.50	8.15E-07	3.63E-13	4.49E+04	1.92E+05	2.21E+05
32.50	4.69E-24	2.09E-30	3.60E+04	2.69E+05	2.86E+05
45.50	0.00E+00	0.00E+00	3.35E+04	3.28E+05	3.38E+05
58.50	0.00E+00	0.00E+00	3.37E+04	3.76E+05	3.83E+05
71.50	0.00E+00	0.00E+00	3.49E+04	4.18E+05	4.24E+05
84.50	0.00E+00	0.00E+00	3.64E+04	4.56E+05	4.61E+05
97.50	0.00E+00	0.00E+00	3.79E+04	4.91E+05	4.95E+05
110.50	0.00E+00	0.00E+00	3.95E+04	5.23E+05	5.27E+05
123.50	0.00E+00	0.00E+00	4.12E+04	5.54E+05	5.57E+05
136.50	0.00E+00	0.00E+00	4.28E+04	5.83E+05	5.86E+05
149.50	0.00E+00	0.00E+00	4.44E+04	6.10E+05	6.13E+05
162.50	0.00E+00	0.00E+00	4.60E+04	6.36E+05	6.39E+05
175.50	0.00E+00	0.00E+00	4.75E+04	6.62E+05	6.64E+05
188.50	0.00E+00	0.00E+00	4.90E+04	6.86E+05	6.88E+05
201.50	0.00E+00	0.00E+00	5.05E+04	7.09E+05	7.12E+05
214.50	0.00E+00	0.00E+00	5.19E+04	7.32E+05	7.34E+05
227.50	0.00E+00	0.00E+00	5.33E+04	7.54E+05	7.56E+05
240.50	0.00E+00	0.00E+00	5.47E+04	7.75E+05	7.77E+05
253.50	0.00E+00	0.00E+00	5.61E+04	7.96E+05	7.98E+05

542.679322104350600 total grams airborne in tank
2.414145423233803E-004 total g/s out riser
891307.347656250000000 total grams lost out riser
1.062813868750000E+007 total grams settled on floor
1.078846950781250E+007 total grams made airborne
731519.271484375000000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

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diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	6.61E+03	8.20E+00	6.42E+04	8.27E+04	1.44E+05
19.50	3.19E+03	5.08E+00	5.05E+04	2.12E+05	2.49E+05
32.50	1.65E+03	3.84E+00	4.05E+04	3.01E+05	3.22E+05
45.50	1.03E+03	3.52E+00	3.77E+04	3.67E+05	3.80E+05
58.50	7.40E+02	3.52E+00	3.79E+04	4.22E+05	4.31E+05
71.50	5.90E+02	3.65E+00	3.93E+04	4.69E+05	4.77E+05
84.50	4.88E+02	3.79E+00	4.09E+04	5.12E+05	5.18E+05
97.50	4.15E+02	3.95E+00	4.27E+04	5.52E+05	5.57E+05
110.50	3.60E+02	4.12E+00	4.45E+04	5.88E+05	5.93E+05
123.50	3.23E+02	4.29E+00	4.63E+04	6.23E+05	6.27E+05
136.50	2.94E+02	4.46E+00	4.82E+04	6.55E+05	6.59E+05
149.50	2.70E+02	4.63E+00	5.00E+04	6.86E+05	6.90E+05
162.50	2.50E+02	4.79E+00	5.17E+04	7.16E+05	7.19E+05
175.50	2.33E+02	4.95E+00	5.34E+04	7.44E+05	7.47E+05
188.50	2.19E+02	5.10E+00	5.51E+04	7.72E+05	7.74E+05
201.50	2.10E+02	5.26E+00	5.68E+04	7.98E+05	8.01E+05
214.50	2.02E+02	5.41E+00	5.84E+04	8.23E+05	8.26E+05
227.50	1.95E+02	5.56E+00	6.00E+04	8.48E+05	8.51E+05
240.50	1.89E+02	5.70E+00	6.16E+04	8.72E+05	8.75E+05
253.50	1.83E+02	5.84E+00	6.31E+04	8.96E+05	8.98E+05

17633.841583251950000 total grams airborne in tank
95.654366731643680 total g/s out riser
1002753.753906250000000 total grams lost out riser
1.193959966406250E+007 total grams settled on floor
1.213702815625000E+007 total grams made airborne
822959.183593750000000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	5.43E+02	2.41E-04	6.42E+04	8.88E+04	1.44E+05
19.50	8.15E-07	3.63E-13	5.05E+04	2.15E+05	2.49E+05
32.50	4.69E-24	2.09E-30	4.05E+04	3.03E+05	3.22E+05
45.50	0.00E+00	0.00E+00	3.77E+04	3.69E+05	3.80E+05
58.50	0.00E+00	0.00E+00	3.79E+04	4.23E+05	4.31E+05
71.50	0.00E+00	0.00E+00	3.93E+04	4.70E+05	4.77E+05
84.50	0.00E+00	0.00E+00	4.09E+04	5.13E+05	5.18E+05
97.50	0.00E+00	0.00E+00	4.27E+04	5.52E+05	5.57E+05
110.50	0.00E+00	0.00E+00	4.45E+04	5.89E+05	5.93E+05
123.50	0.00E+00	0.00E+00	4.63E+04	6.23E+05	6.27E+05
136.50	0.00E+00	0.00E+00	4.82E+04	6.55E+05	6.59E+05
149.50	0.00E+00	0.00E+00	5.00E+04	6.86E+05	6.90E+05
162.50	0.00E+00	0.00E+00	5.17E+04	7.16E+05	7.19E+05
175.50	0.00E+00	0.00E+00	5.34E+04	7.44E+05	7.47E+05
188.50	0.00E+00	0.00E+00	5.51E+04	7.72E+05	7.74E+05
201.50	0.00E+00	0.00E+00	5.68E+04	7.98E+05	8.01E+05
214.50	0.00E+00	0.00E+00	5.84E+04	8.24E+05	8.26E+05
227.50	0.00E+00	0.00E+00	6.00E+04	8.48E+05	8.51E+05
240.50	0.00E+00	0.00E+00	6.16E+04	8.72E+05	8.75E+05
253.50	0.00E+00	0.00E+00	6.31E+04	8.96E+05	8.98E+05

542.679322104350600 total grams airborne in tank

```
 2.414145423233803E-004 total g/s out riser
1002757.937500000000000 total grams lost out riser
 1.195668660156250E+007 total grams settled on floor
 1.213702815625000E+007 total grams made airborne
 822959.183593750000000 total grams bypassed
```

Table 5. Comparison of Dry and Liquid Aerosols
(PR=1 in./min. for all cases)

Tank Vol. (gal)	In-Leakage (scfm)	WH (in.)	Dry Aerosol (g)	Liquid Aerosol (g)	Liquid Aerosol w/.0635 bypass (g)
Worst Case					
500,000	2100	171	2976.3	191990.2	1002757.9
750,000	2100	266	4597.7	296558.8	1557886.0
1,000,000	2100	361	5676.9	405643.9	2117243.7
Anticipated Case					
500,000	500	171	1324.9	75327.2	893503.1
750,000	500	266	2056.6	116100.2	1388886.5
1,000,000	500	361	2717.6	159251.8	1886497.7

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

20W

ADDITIONAL PARAMETERS:

```
particle density, g/cc =        1.383000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     1060.895809739524000
bypass fraction =   0.000000000000000E+000

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000
Output divisions in Period        3.000000000000000 =        1.000000
Output divisions in Period        4.000000000000000 =        1.000000
Output divisions in Period        5.000000000000000 =        1.000000
Output divisions in Period        6.000000000000000 =        1.000000
Output divisions in Period        7.000000000000000 =        1.000000
Output divisions in Period        8.000000000000000 =        1.000000
Output divisions in Period        9.000000000000000 =        1.000000
Output divisions in Period       10.000000000000000 =        1.000000
Output divisions in Period       11.000000000000000 =        1.000000
Output divisions in Period       12.000000000000000 =        1.000000
Output divisions in Period       13.000000000000000 =        1.000000
Output divisions in Period       14.000000000000000 =        1.000000
Output divisions in Period       15.000000000000000 =        1.000000
Output divisions in Period       16.000000000000000 =        1.000000
Output divisions in Period       17.000000000000000 =        1.000000
Output divisions in Period       18.000000000000000 =        1.000000

Flow out @    0.000000E+00 min =      880.000000 cfm &    72000.000000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      100.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      180.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      240.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      260.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      320.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      340.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      420.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      500.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      580.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      640.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      660.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m


**** OUTPUT @       20.000000000000000 minutes ****

  diam     airborne    outflow    totalout    totalflr    source
  mcrn        g          g/s         g           g          g
```

6.50	9.54E+03	3.73E+00	2.71E+03	4.81E+03	1.71E+04
19.50	3.77E+03	1.48E+00	1.55E+03	2.42E+04	2.95E+04
32.50	1.83E+03	7.16E-01	8.19E+02	3.55E+04	3.81E+04
45.50	1.12E+03	4.38E-01	5.13E+02	4.35E+04	4.51E+04
58.50	8.00E+02	3.13E-01	3.70E+02	5.00E+04	5.12E+04
71.50	6.36E+02	2.49E-01	2.96E+02	5.57E+04	5.66E+04
84.50	5.25E+02	2.06E-01	2.45E+02	6.07E+04	6.15E+04
97.50	4.46E+02	1.74E-01	2.08E+02	6.54E+04	6.61E+04
110.50	3.86E+02	1.51E-01	1.80E+02	6.98E+04	7.03E+04
123.50	3.47E+02	1.36E-01	1.62E+02	7.39E+04	7.44E+04
136.50	3.16E+02	1.24E-01	1.48E+02	7.77E+04	7.82E+04
149.50	2.90E+02	1.13E-01	1.36E+02	8.14E+04	8.18E+04
162.50	2.68E+02	1.05E-01	1.25E+02	8.49E+04	8.53E+04
175.50	2.49E+02	9.75E-02	1.17E+02	8.83E+04	8.86E+04
188.50	2.35E+02	9.18E-02	1.10E+02	9.15E+04	9.19E+04
201.50	2.25E+02	8.81E-02	1.05E+02	9.47E+04	9.50E+04
214.50	2.17E+02	8.48E-02	1.02E+02	9.77E+04	9.80E+04
227.50	2.09E+02	8.18E-02	9.79E+01	1.01E+05	1.01E+05
240.50	2.02E+02	7.90E-02	9.46E+01	1.03E+05	1.04E+05
253.50	1.95E+02	7.65E-02	9.16E+01	1.06E+05	1.07E+05

21801.408920288090000 total grams airborne in tank
8.534683406352997 total g/s out riser
8177.316368103027000 total grams lost out riser
1410019.837890625000000 total grams settled on floor
1439998.546875000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.83E+02	3.48E-04	2.72E+03	1.36E+04	1.71E+04
19.50	9.65E-07	4.29E-13	1.55E+03	2.80E+04	2.95E+04
32.50	5.21E-24	2.32E-30	8.19E+02	3.73E+04	3.81E+04
45.50	0.00E+00	0.00E+00	5.13E+02	4.46E+04	4.51E+04
58.50	0.00E+00	0.00E+00	3.70E+02	5.08E+04	5.12E+04
71.50	0.00E+00	0.00E+00	2.96E+02	5.63E+04	5.66E+04
84.50	0.00E+00	0.00E+00	2.45E+02	6.13E+04	6.15E+04
97.50	0.00E+00	0.00E+00	2.08E+02	6.59E+04	6.61E+04
110.50	0.00E+00	0.00E+00	1.80E+02	7.02E+04	7.03E+04
123.50	0.00E+00	0.00E+00	1.62E+02	7.42E+04	7.44E+04
136.50	0.00E+00	0.00E+00	1.48E+02	7.80E+04	7.82E+04
149.50	0.00E+00	0.00E+00	1.36E+02	8.17E+04	8.18E+04
162.50	0.00E+00	0.00E+00	1.25E+02	8.52E+04	8.53E+04
175.50	0.00E+00	0.00E+00	1.17E+02	8.85E+04	8.86E+04
188.50	0.00E+00	0.00E+00	1.10E+02	9.18E+04	9.19E+04
201.50	0.00E+00	0.00E+00	1.05E+02	9.49E+04	9.50E+04
214.50	0.00E+00	0.00E+00	1.02E+02	9.79E+04	9.80E+04
227.50	0.00E+00	0.00E+00	9.79E+01	1.01E+05	1.01E+05
240.50	0.00E+00	0.00E+00	9.46E+01	1.04E+05	1.04E+05
253.50	0.00E+00	0.00E+00	9.16E+01	1.06E+05	1.07E+05

782.551209461392300 total grams airborne in tank
3.481231983388641E-004 total g/s out riser
8183.279815673828000 total grams lost out riser
1431032.728515625000000 total grams settled on floor
1439998.546875000000000 total grams made airborne

0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.75E+03	3.82E+00	5.64E+03	1.87E+04	3.41E+04
19.50	3.77E+03	1.48E+00	3.09E+03	5.22E+04	5.91E+04
32.50	1.83E+03	7.16E-01	1.64E+03	7.28E+04	7.63E+04
45.50	1.12E+03	4.38E-01	1.03E+03	8.81E+04	9.03E+04
58.50	8.00E+02	3.13E-01	7.40E+02	1.01E+05	1.02E+05
71.50	6.36E+02	2.49E-01	5.91E+02	1.12E+05	1.13E+05
84.50	5.25E+02	2.06E-01	4.89E+02	1.22E+05	1.23E+05
97.50	4.46E+02	1.74E-01	4.16E+02	1.31E+05	1.32E+05
110.50	3.86E+02	1.51E-01	3.61E+02	1.40E+05	1.41E+05
123.50	3.47E+02	1.36E-01	3.24E+02	1.48E+05	1.49E+05
136.50	3.16E+02	1.24E-01	2.95E+02	1.56E+05	1.56E+05
149.50	2.90E+02	1.13E-01	2.71E+02	1.63E+05	1.64E+05
162.50	2.68E+02	1.05E-01	2.51E+02	1.70E+05	1.71E+05
175.50	2.49E+02	9.75E-02	2.33E+02	1.77E+05	1.77E+05
188.50	2.35E+02	9.18E-02	2.20E+02	1.83E+05	1.84E+05
201.50	2.25E+02	8.81E-02	2.11E+02	1.90E+05	1.90E+05
214.50	2.17E+02	8.48E-02	2.03E+02	1.96E+05	1.96E+05
227.50	2.09E+02	8.18E-02	1.96E+02	2.01E+05	2.02E+05
240.50	2.02E+02	7.90E-02	1.89E+02	2.07E+05	2.08E+05
253.50	1.95E+02	7.65E-02	1.83E+02	2.13E+05	2.13E+05

22014.110092163090000 total grams airborne in tank
8.617950379848480 total g/s out riser
16566.095077514650000 total grams lost out riser
2841416.875000000000000 total grams settled on floor
2879997.093750000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	8.00E+02	3.56E-04	5.64E+03	2.77E+04	3.41E+04
19.50	9.65E-07	4.29E-13	3.09E+03	5.60E+04	5.91E+04
32.50	5.21E-24	2.32E-30	1.64E+03	7.47E+04	7.63E+04
45.50	0.00E+00	0.00E+00	1.03E+03	8.92E+04	9.03E+04
58.50	0.00E+00	0.00E+00	7.40E+02	1.02E+05	1.02E+05
71.50	0.00E+00	0.00E+00	5.91E+02	1.13E+05	1.13E+05
84.50	0.00E+00	0.00E+00	4.89E+02	1.23E+05	1.23E+05
97.50	0.00E+00	0.00E+00	4.16E+02	1.32E+05	1.32E+05
110.50	0.00E+00	0.00E+00	3.61E+02	1.40E+05	1.41E+05
123.50	0.00E+00	0.00E+00	3.24E+02	1.48E+05	1.49E+05
136.50	0.00E+00	0.00E+00	2.95E+02	1.56E+05	1.56E+05
149.50	0.00E+00	0.00E+00	2.71E+02	1.63E+05	1.64E+05
162.50	0.00E+00	0.00E+00	2.51E+02	1.70E+05	1.71E+05
175.50	0.00E+00	0.00E+00	2.33E+02	1.77E+05	1.77E+05
188.50	0.00E+00	0.00E+00	2.20E+02	1.84E+05	1.84E+05
201.50	0.00E+00	0.00E+00	2.11E+02	1.90E+05	1.90E+05
214.50	0.00E+00	0.00E+00	2.03E+02	1.96E+05	1.96E+05
227.50	0.00E+00	0.00E+00	1.96E+02	2.02E+05	2.02E+05

240.50	0.00E+00	0.00E+00	1.89E+02	2.07E+05	2.08E+05
253.50	0.00E+00	0.00E+00	1.83E+02	2.13E+05	2.13E+05

800.005372059048600 total grams airborne in tank
3.558877801625857E-004 total g/s out riser
16572.183654785160000 total grams lost out riser
2862624.929687500000000 total grams settled on floor
2879997.093750000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.75E+03	3.82E+00	8.57E+03	3.29E+04	5.12E+04
19.50	3.77E+03	1.48E+00	4.64E+03	8.02E+04	8.86E+04
32.50	1.83E+03	7.16E-01	2.46E+03	1.10E+05	1.14E+05
45.50	1.12E+03	4.38E-01	1.54E+03	1.33E+05	1.35E+05
58.50	8.00E+02	3.13E-01	1.11E+03	1.52E+05	1.54E+05
71.50	6.36E+02	2.49E-01	8.87E+02	1.68E+05	1.70E+05
84.50	5.25E+02	2.06E-01	7.34E+02	1.83E+05	1.85E+05
97.50	4.46E+02	1.74E-01	6.24E+02	1.97E+05	1.98E+05
110.50	3.86E+02	1.51E-01	5.41E+02	2.10E+05	2.11E+05
123.50	3.47E+02	1.36E-01	4.86E+02	2.22E+05	2.23E+05
136.50	3.16E+02	1.24E-01	4.43E+02	2.34E+05	2.35E+05
149.50	2.90E+02	1.13E-01	4.07E+02	2.45E+05	2.45E+05
162.50	2.68E+02	1.05E-01	3.76E+02	2.55E+05	2.56E+05
175.50	2.49E+02	9.75E-02	3.50E+02	2.65E+05	2.66E+05
188.50	2.35E+02	9.18E-02	3.30E+02	2.75E+05	2.76E+05
201.50	2.25E+02	8.81E-02	3.16E+02	2.84E+05	2.85E+05
214.50	2.17E+02	8.48E-02	3.05E+02	2.93E+05	2.94E+05
227.50	2.09E+02	8.18E-02	2.94E+02	3.02E+05	3.03E+05
240.50	2.02E+02	7.90E-02	2.84E+02	3.11E+05	3.11E+05
253.50	1.95E+02	7.65E-02	2.75E+02	3.19E+05	3.20E+05

22018.854232788090000 total grams airborne in tank
8.619807422161102 total g/s out riser
24959.582733154300000 total grams lost out riser
4273017.203125000000000 total grams settled on floor
4319995.632812500000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	8.00E+02	3.56E-04	8.57E+03	4.18E+04	5.12E+04
19.50	9.65E-07	4.29E-13	4.64E+03	8.40E+04	8.86E+04
32.50	5.21E-24	2.32E-30	2.46E+03	1.12E+05	1.14E+05
45.50	0.00E+00	0.00E+00	1.54E+03	1.34E+05	1.35E+05
58.50	0.00E+00	0.00E+00	1.11E+03	1.52E+05	1.54E+05
71.50	0.00E+00	0.00E+00	8.87E+02	1.69E+05	1.70E+05
84.50	0.00E+00	0.00E+00	7.34E+02	1.84E+05	1.85E+05
97.50	0.00E+00	0.00E+00	6.24E+02	1.98E+05	1.98E+05
110.50	0.00E+00	0.00E+00	5.41E+02	2.10E+05	2.11E+05
123.50	0.00E+00	0.00E+00	4.86E+02	2.23E+05	2.23E+05

136.50	0.00E+00	0.00E+00	4.43E+02	2.34E+05	2.35E+05
149.50	0.00E+00	0.00E+00	4.07E+02	2.45E+05	2.45E+05
162.50	0.00E+00	0.00E+00	3.76E+02	2.56E+05	2.56E+05
175.50	0.00E+00	0.00E+00	3.50E+02	2.66E+05	2.66E+05
188.50	0.00E+00	0.00E+00	3.30E+02	2.75E+05	2.76E+05
201.50	0.00E+00	0.00E+00	3.16E+02	2.85E+05	2.85E+05
214.50	0.00E+00	0.00E+00	3.05E+02	2.94E+05	2.94E+05
227.50	0.00E+00	0.00E+00	2.94E+02	3.02E+05	3.03E+05
240.50	0.00E+00	0.00E+00	2.84E+02	3.11E+05	3.11E+05
253.50	0.00E+00	0.00E+00	2.75E+02	3.19E+05	3.20E+05

800.394654285611100 total grams airborne in tank
3.560609770576337E-004 total g/s out riser
24965.673767089840000 total grams lost out riser
4294229.593750000000000 total grams settled on floor
4319995.632812500000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.75E+03	3.82E+00	1.15E+04	4.70E+04	6.82E+04
19.50	3.77E+03	1.48E+00	6.19E+03	1.08E+05	1.18E+05
32.50	1.83E+03	7.16E-01	3.27E+03	1.47E+05	1.53E+05
45.50	1.12E+03	4.38E-01	2.05E+03	1.77E+05	1.81E+05
58.50	8.00E+02	3.13E-01	1.48E+03	2.02E+05	2.05E+05
71.50	6.36E+02	2.49E-01	1.18E+03	2.25E+05	2.26E+05
84.50	5.25E+02	2.06E-01	9.79E+02	2.45E+05	2.46E+05
97.50	4.46E+02	1.74E-01	8.32E+02	2.63E+05	2.64E+05
110.50	3.86E+02	1.51E-01	7.21E+02	2.80E+05	2.81E+05
123.50	3.47E+02	1.36E-01	6.48E+02	2.96E+05	2.97E+05
136.50	3.16E+02	1.24E-01	5.90E+02	3.12E+05	3.13E+05
149.50	2.90E+02	1.13E-01	5.42E+02	3.26E+05	3.27E+05
162.50	2.68E+02	1.05E-01	5.01E+02	3.40E+05	3.41E+05
175.50	2.49E+02	9.75E-02	4.67E+02	3.54E+05	3.55E+05
188.50	2.35E+02	9.18E-02	4.40E+02	3.67E+05	3.67E+05
201.50	2.25E+02	8.81E-02	4.22E+02	3.79E+05	3.80E+05
214.50	2.17E+02	8.48E-02	4.06E+02	3.91E+05	3.92E+05
227.50	2.09E+02	8.18E-02	3.92E+02	4.03E+05	4.04E+05
240.50	2.02E+02	7.90E-02	3.79E+02	4.15E+05	4.15E+05
253.50	1.95E+02	7.65E-02	3.66E+02	4.26E+05	4.26E+05

22018.959701538090000 total grams airborne in tank
8.619848906993866 total g/s out riser
33353.175018310550000 total grams lost out riser
5704622.085937500000000 total grams settled on floor
5759994.187500000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	8.00E+02	3.56E-04	1.15E+04	5.59E+04	6.82E+04
19.50	9.65E-07	4.29E-13	6.19E+03	1.12E+05	1.18E+05

32.50	5.21E-24	2.32E-30	3.27E+03	1.49E+05	1.53E+05
45.50	0.00E+00	0.00E+00	2.05E+03	1.78E+05	1.81E+05
58.50	0.00E+00	0.00E+00	1.48E+03	2.03E+05	2.05E+05
71.50	0.00E+00	0.00E+00	1.18E+03	2.25E+05	2.26E+05
84.50	0.00E+00	0.00E+00	9.79E+02	2.45E+05	2.46E+05
97.50	0.00E+00	0.00E+00	8.32E+02	2.63E+05	2.64E+05
110.50	0.00E+00	0.00E+00	7.21E+02	2.81E+05	2.81E+05
123.50	0.00E+00	0.00E+00	6.48E+02	2.97E+05	2.97E+05
136.50	0.00E+00	0.00E+00	5.90E+02	3.12E+05	3.13E+05
149.50	0.00E+00	0.00E+00	5.42E+02	3.27E+05	3.27E+05
162.50	0.00E+00	0.00E+00	5.01E+02	3.41E+05	3.41E+05
175.50	0.00E+00	0.00E+00	4.67E+02	3.54E+05	3.55E+05
188.50	0.00E+00	0.00E+00	4.40E+02	3.67E+05	3.67E+05
201.50	0.00E+00	0.00E+00	4.22E+02	3.80E+05	3.80E+05
214.50	0.00E+00	0.00E+00	4.06E+02	3.92E+05	3.92E+05
227.50	0.00E+00	0.00E+00	3.92E+02	4.03E+05	4.04E+05
240.50	0.00E+00	0.00E+00	3.79E+02	4.15E+05	4.15E+05
253.50	0.00E+00	0.00E+00	3.66E+02	4.26E+05	4.26E+05

800.403321277798600 total grams airborne in tank
3.560648478670844E-004 total g/s out riser
33359.265747070310000 total grams lost out riser
5725834.570312500000000 total grams settled on floor
5759994.187500000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.75E+03	3.82E+00	1.44E+04	6.11E+04	8.53E+04
19.50	3.77E+03	1.48E+00	7.73E+03	1.36E+05	1.48E+05
32.50	1.83E+03	7.16E-01	4.09E+03	1.85E+05	1.91E+05
45.50	1.12E+03	4.38E-01	2.56E+03	2.22E+05	2.26E+05
58.50	8.00E+02	3.13E-01	1.85E+03	2.53E+05	2.56E+05
71.50	6.36E+02	2.49E-01	1.48E+03	2.81E+05	2.83E+05
84.50	5.25E+02	2.06E-01	1.22E+03	3.06E+05	3.08E+05
97.50	4.46E+02	1.74E-01	1.04E+03	3.29E+05	3.30E+05
110.50	3.86E+02	1.51E-01	9.01E+02	3.50E+05	3.52E+05
123.50	3.47E+02	1.36E-01	8.11E+02	3.71E+05	3.72E+05
136.50	3.16E+02	1.24E-01	7.38E+02	3.90E+05	3.91E+05
149.50	2.90E+02	1.13E-01	6.78E+02	4.08E+05	4.09E+05
162.50	2.68E+02	1.05E-01	6.27E+02	4.26E+05	4.27E+05
175.50	2.49E+02	9.75E-02	5.83E+02	4.42E+05	4.43E+05
188.50	2.35E+02	9.18E-02	5.49E+02	4.59E+05	4.59E+05
201.50	2.25E+02	8.81E-02	5.27E+02	4.74E+05	4.75E+05
214.50	2.17E+02	8.48E-02	5.08E+02	4.89E+05	4.90E+05
227.50	2.09E+02	8.18E-02	4.90E+02	5.04E+05	5.05E+05
240.50	2.02E+02	7.90E-02	4.73E+02	5.18E+05	5.19E+05
253.50	1.95E+02	7.65E-02	4.58E+02	5.32E+05	5.33E+05

22018.962631225590000 total grams airborne in tank
8.619849860668182 total g/s out riser
41746.769958496090000 total grams lost out riser
7136227.046875000000000 total grams settled on floor
7199992.726562500000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	8.00E+02	3.56E-04	1.44E+04	7.01E+04	8.53E+04
19.50	9.65E-07	4.29E-13	7.73E+03	1.40E+05	1.48E+05
32.50	5.21E-24	2.32E-30	4.09E+03	1.87E+05	1.91E+05
45.50	0.00E+00	0.00E+00	2.56E+03	2.23E+05	2.26E+05
58.50	0.00E+00	0.00E+00	1.85E+03	2.54E+05	2.56E+05
71.50	0.00E+00	0.00E+00	1.48E+03	2.81E+05	2.83E+05
84.50	0.00E+00	0.00E+00	1.22E+03	3.06E+05	3.08E+05
97.50	0.00E+00	0.00E+00	1.04E+03	3.29E+05	3.30E+05
110.50	0.00E+00	0.00E+00	9.01E+02	3.51E+05	3.52E+05
123.50	0.00E+00	0.00E+00	8.11E+02	3.71E+05	3.72E+05
136.50	0.00E+00	0.00E+00	7.38E+02	3.90E+05	3.91E+05
149.50	0.00E+00	0.00E+00	6.78E+02	4.08E+05	4.09E+05
162.50	0.00E+00	0.00E+00	6.27E+02	4.26E+05	4.27E+05
175.50	0.00E+00	0.00E+00	5.83E+02	4.43E+05	4.43E+05
188.50	0.00E+00	0.00E+00	5.49E+02	4.59E+05	4.59E+05
201.50	0.00E+00	0.00E+00	5.27E+02	4.74E+05	4.75E+05
214.50	0.00E+00	0.00E+00	5.08E+02	4.90E+05	4.90E+05
227.50	0.00E+00	0.00E+00	4.90E+02	5.04E+05	5.05E+05
240.50	0.00E+00	0.00E+00	4.73E+02	5.18E+05	5.19E+05
253.50	0.00E+00	0.00E+00	4.58E+02	5.32E+05	5.33E+05

800.403504383267300 total grams airborne in tank
3.560649351785758E-004 total g/s out riser
41752.859680175780000 total grams lost out riser
7157439.578125000000000 total grams settled on floor
7199992.726562500000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.75E+03	3.82E+00	1.74E+04	7.53E+04	1.02E+05
19.50	3.77E+03	1.48E+00	9.28E+03	1.64E+05	1.77E+05
32.50	1.83E+03	7.16E-01	4.91E+03	2.22E+05	2.29E+05
45.50	1.12E+03	4.38E-01	3.08E+03	2.67E+05	2.71E+05
58.50	8.00E+02	3.13E-01	2.22E+03	3.04E+05	3.07E+05
71.50	6.36E+02	2.49E-01	1.77E+03	3.37E+05	3.39E+05
84.50	5.25E+02	2.06E-01	1.47E+03	3.67E+05	3.69E+05
97.50	4.46E+02	1.74E-01	1.25E+03	3.95E+05	3.96E+05
110.50	3.86E+02	1.51E-01	1.08E+03	4.21E+05	4.22E+05
123.50	3.47E+02	1.36E-01	9.73E+02	4.45E+05	4.46E+05
136.50	3.16E+02	1.24E-01	8.86E+02	4.68E+05	4.69E+05
149.50	2.90E+02	1.13E-01	8.13E+02	4.90E+05	4.91E+05
162.50	2.68E+02	1.05E-01	7.52E+02	5.11E+05	5.12E+05
175.50	2.49E+02	9.75E-02	7.00E+02	5.31E+05	5.32E+05
188.50	2.35E+02	9.18E-02	6.59E+02	5.50E+05	5.51E+05
201.50	2.25E+02	8.81E-02	6.33E+02	5.69E+05	5.70E+05
214.50	2.17E+02	8.48E-02	6.09E+02	5.87E+05	5.88E+05
227.50	2.09E+02	8.18E-02	5.88E+02	6.05E+05	6.06E+05
240.50	2.02E+02	7.90E-02	5.68E+02	6.22E+05	6.23E+05
253.50	1.95E+02	7.65E-02	5.50E+02	6.39E+05	6.39E+05

22018.962631225590000 total grams airborne in tank
8.619849860668182 total g/s out riser
50140.362182617190000 total grams lost out riser
8567832.070312500000000 total grams settled on floor
8639991.234375000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	8.00E+02	3.56E-04	1.74E+04	8.42E+04	1.02E+05
19.50	9.65E-07	4.29E-13	9.28E+03	1.68E+05	1.77E+05
32.50	5.21E-24	2.32E-30	4.91E+03	2.24E+05	2.29E+05
45.50	0.00E+00	0.00E+00	3.08E+03	2.68E+05	2.71E+05
58.50	0.00E+00	0.00E+00	2.22E+03	3.05E+05	3.07E+05
71.50	0.00E+00	0.00E+00	1.77E+03	3.38E+05	3.39E+05
84.50	0.00E+00	0.00E+00	1.47E+03	3.68E+05	3.69E+05
97.50	0.00E+00	0.00E+00	1.25E+03	3.95E+05	3.96E+05
110.50	0.00E+00	0.00E+00	1.08E+03	4.21E+05	4.22E+05
123.50	0.00E+00	0.00E+00	9.73E+02	4.45E+05	4.46E+05
136.50	0.00E+00	0.00E+00	8.86E+02	4.68E+05	4.69E+05
149.50	0.00E+00	0.00E+00	8.13E+02	4.90E+05	4.91E+05
162.50	0.00E+00	0.00E+00	7.52E+02	5.11E+05	5.12E+05
175.50	0.00E+00	0.00E+00	7.00E+02	5.31E+05	5.32E+05
188.50	0.00E+00	0.00E+00	6.59E+02	5.51E+05	5.51E+05
201.50	0.00E+00	0.00E+00	6.33E+02	5.69E+05	5.70E+05
214.50	0.00E+00	0.00E+00	6.09E+02	5.87E+05	5.88E+05
227.50	0.00E+00	0.00E+00	5.88E+02	6.05E+05	6.06E+05
240.50	0.00E+00	0.00E+00	5.68E+02	6.22E+05	6.23E+05
253.50	0.00E+00	0.00E+00	5.50E+02	6.39E+05	6.39E+05

800.403565418423600 total grams airborne in tank
3.560649351785758E-004 total g/s out riser
50146.455444335940000 total grams lost out riser
8589044.554687500000000 total grams settled on floor
8639991.234375000000000 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.75E+03	3.82E+00	2.03E+04	8.94E+04	1.19E+05
19.50	3.77E+03	1.48E+00	1.08E+04	1.92E+05	2.07E+05
32.50	1.83E+03	7.16E-01	5.73E+03	2.59E+05	2.67E+05
45.50	1.12E+03	4.38E-01	3.59E+03	3.11E+05	3.16E+05
58.50	8.00E+02	3.13E-01	2.59E+03	3.55E+05	3.58E+05
71.50	6.36E+02	2.49E-01	2.07E+03	3.93E+05	3.96E+05
84.50	5.25E+02	2.06E-01	1.71E+03	4.28E+05	4.31E+05
97.50	4.46E+02	1.74E-01	1.46E+03	4.61E+05	4.63E+05
110.50	3.86E+02	1.51E-01	1.26E+03	4.91E+05	4.92E+05
123.50	3.47E+02	1.36E-01	1.13E+03	5.19E+05	5.21E+05
136.50	3.16E+02	1.24E-01	1.03E+03	5.46E+05	5.47E+05
149.50	2.90E+02	1.13E-01	9.49E+02	5.71E+05	5.73E+05

162.50	2.68E+02	1.05E-01	8.78E+02	5.96E+05	5.97E+05
175.50	2.49E+02	9.75E-02	8.16E+02	6.19E+05	6.21E+05
188.50	2.35E+02	9.18E-02	7.69E+02	6.42E+05	6.43E+05
201.50	2.25E+02	8.81E-02	7.38E+02	6.64E+05	6.65E+05
214.50	2.17E+02	8.48E-02	7.11E+02	6.85E+05	6.86E+05
227.50	2.09E+02	8.18E-02	6.85E+02	7.06E+05	7.07E+05
240.50	2.02E+02	7.90E-02	6.62E+02	7.26E+05	7.26E+05
253.50	1.95E+02	7.65E-02	6.41E+02	7.45E+05	7.46E+05

22018.962631225590000 total grams airborne in tank
8.619849860668182 total g/s out riser
58533.958740234370000 total grams lost out riser
9999437.039062500000000 total grams settled on floor
1.007998969531250E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	8.00E+02	3.56E-04	2.03E+04	9.83E+04	1.19E+05
19.50	9.65E-07	4.29E-13	1.08E+04	1.96E+05	2.07E+05
32.50	5.21E-24	2.32E-30	5.73E+03	2.61E+05	2.67E+05
45.50	0.00E+00	0.00E+00	3.59E+03	3.12E+05	3.16E+05
58.50	0.00E+00	0.00E+00	2.59E+03	3.56E+05	3.58E+05
71.50	0.00E+00	0.00E+00	2.07E+03	3.94E+05	3.96E+05
84.50	0.00E+00	0.00E+00	1.71E+03	4.29E+05	4.31E+05
97.50	0.00E+00	0.00E+00	1.46E+03	4.61E+05	4.63E+05
110.50	0.00E+00	0.00E+00	1.26E+03	4.91E+05	4.92E+05
123.50	0.00E+00	0.00E+00	1.13E+03	5.19E+05	5.21E+05
136.50	0.00E+00	0.00E+00	1.03E+03	5.46E+05	5.47E+05
149.50	0.00E+00	0.00E+00	9.49E+02	5.72E+05	5.73E+05
162.50	0.00E+00	0.00E+00	8.78E+02	5.96E+05	5.97E+05
175.50	0.00E+00	0.00E+00	8.16E+02	6.20E+05	6.21E+05
188.50	0.00E+00	0.00E+00	7.69E+02	6.42E+05	6.43E+05
201.50	0.00E+00	0.00E+00	7.38E+02	6.64E+05	6.65E+05
214.50	0.00E+00	0.00E+00	7.11E+02	6.85E+05	6.86E+05
227.50	0.00E+00	0.00E+00	6.85E+02	7.06E+05	7.07E+05
240.50	0.00E+00	0.00E+00	6.62E+02	7.26E+05	7.26E+05
253.50	0.00E+00	0.00E+00	6.41E+02	7.45E+05	7.46E+05

800.403565418423600 total grams airborne in tank
3.560649351785758E-004 total g/s out riser
58540.049621582030000 total grams lost out riser
1.002064951562500E+007 total grams settled on floor
1.007998969531250E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.75E+03	3.82E+00	2.32E+04	1.04E+05	1.36E+05
19.50	3.77E+03	1.48E+00	1.24E+04	2.20E+05	2.36E+05
32.50	1.83E+03	7.16E-01	6.55E+03	2.97E+05	3.05E+05
45.50	1.12E+03	4.38E-01	4.10E+03	3.56E+05	3.61E+05

58.50	8.00E+02	3.13E-01	2.96E+03	4.06E+05	4.09E+05
71.50	6.36E+02	2.49E-01	2.36E+03	4.50E+05	4.53E+05
84.50	5.25E+02	2.06E-01	1.96E+03	4.90E+05	4.92E+05
97.50	4.46E+02	1.74E-01	1.66E+03	5.26E+05	5.29E+05
110.50	3.86E+02	1.51E-01	1.44E+03	5.61E+05	5.63E+05
123.50	3.47E+02	1.36E-01	1.30E+03	5.93E+05	5.95E+05
136.50	3.16E+02	1.24E-01	1.18E+03	6.24E+05	6.25E+05
149.50	2.90E+02	1.13E-01	1.08E+03	6.53E+05	6.55E+05
162.50	2.68E+02	1.05E-01	1.00E+03	6.81E+05	6.82E+05
175.50	2.49E+02	9.75E-02	9.33E+02	7.08E+05	7.09E+05
188.50	2.35E+02	9.18E-02	8.79E+02	7.34E+05	7.35E+05
201.50	2.25E+02	8.81E-02	8.44E+02	7.59E+05	7.60E+05
214.50	2.17E+02	8.48E-02	8.12E+02	7.83E+05	7.84E+05
227.50	2.09E+02	8.18E-02	7.83E+02	8.06E+05	8.07E+05
240.50	2.02E+02	7.90E-02	7.57E+02	8.29E+05	8.30E+05
253.50	1.95E+02	7.65E-02	7.33E+02	8.51E+05	8.52E+05

22018.962631225590000 total grams airborne in tank
8.619849860668182 total g/s out riser
66927.554870605470000 total grams lost out riser
1.143104193750000E+007 total grams settled on floor
1.151998820312500E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	8.00E+02	3.56E-04	2.32E+04	1.12E+05	1.36E+05
19.50	9.65E-07	4.29E-13	1.24E+04	2.24E+05	2.36E+05
32.50	5.21E-24	2.32E-30	6.55E+03	2.99E+05	3.05E+05
45.50	0.00E+00	0.00E+00	4.10E+03	3.57E+05	3.61E+05
58.50	0.00E+00	0.00E+00	2.96E+03	4.06E+05	4.09E+05
71.50	0.00E+00	0.00E+00	2.36E+03	4.50E+05	4.53E+05
84.50	0.00E+00	0.00E+00	1.96E+03	4.90E+05	4.92E+05
97.50	0.00E+00	0.00E+00	1.66E+03	5.27E+05	5.29E+05
110.50	0.00E+00	0.00E+00	1.44E+03	5.61E+05	5.63E+05
123.50	0.00E+00	0.00E+00	1.30E+03	5.94E+05	5.95E+05
136.50	0.00E+00	0.00E+00	1.18E+03	6.24E+05	6.25E+05
149.50	0.00E+00	0.00E+00	1.08E+03	6.53E+05	6.55E+05
162.50	0.00E+00	0.00E+00	1.00E+03	6.81E+05	6.82E+05
175.50	0.00E+00	0.00E+00	9.33E+02	7.08E+05	7.09E+05
188.50	0.00E+00	0.00E+00	8.79E+02	7.34E+05	7.35E+05
201.50	0.00E+00	0.00E+00	8.44E+02	7.59E+05	7.60E+05
214.50	0.00E+00	0.00E+00	8.12E+02	7.83E+05	7.84E+05
227.50	0.00E+00	0.00E+00	7.83E+02	8.07E+05	8.07E+05
240.50	0.00E+00	0.00E+00	7.57E+02	8.29E+05	8.30E+05
253.50	0.00E+00	0.00E+00	7.33E+02	8.52E+05	8.52E+05

800.403565418423600 total grams airborne in tank
3.560649351785758E-004 total g/s out riser
66933.645385742190000 total grams lost out riser
1.145225450781250E+007 total grams settled on floor
1.151998820312500E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.75E+03	3.82E+00	2.61E+04	1.18E+05	1.54E+05
19.50	3.77E+03	1.48E+00	1.39E+04	2.48E+05	2.66E+05
32.50	1.83E+03	7.16E-01	7.37E+03	3.34E+05	3.43E+05
45.50	1.12E+03	4.38E-01	4.61E+03	4.00E+05	4.06E+05
58.50	8.00E+02	3.13E-01	3.33E+03	4.56E+05	4.61E+05
71.50	6.36E+02	2.49E-01	2.66E+03	5.06E+05	5.09E+05
84.50	5.25E+02	2.06E-01	2.20E+03	5.51E+05	5.54E+05
97.50	4.46E+02	1.74E-01	1.87E+03	5.92E+05	5.95E+05
110.50	3.86E+02	1.51E-01	1.62E+03	6.31E+05	6.33E+05
123.50	3.47E+02	1.36E-01	1.46E+03	6.67E+05	6.69E+05
136.50	3.16E+02	1.24E-01	1.33E+03	7.02E+05	7.04E+05
149.50	2.90E+02	1.13E-01	1.22E+03	7.35E+05	7.36E+05
162.50	2.68E+02	1.05E-01	1.13E+03	7.66E+05	7.68E+05
175.50	2.49E+02	9.75E-02	1.05E+03	7.97E+05	7.98E+05
188.50	2.35E+02	9.18E-02	9.89E+02	8.26E+05	8.27E+05
201.50	2.25E+02	8.81E-02	9.49E+02	8.54E+05	8.55E+05
214.50	2.17E+02	8.48E-02	9.14E+02	8.81E+05	8.82E+05
227.50	2.09E+02	8.18E-02	8.81E+02	9.07E+05	9.08E+05
240.50	2.02E+02	7.90E-02	8.52E+02	9.33E+05	9.34E+05
253.50	1.95E+02	7.65E-02	8.25E+02	9.58E+05	9.59E+05

22018.962631225590000 total grams airborne in tank
8.619849860668182 total g/s out riser
75321.150329589840000 total grams lost out riser
1.286264699218750E+007 total grams settled on floor
1.295998678125000E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	8.00E+02	3.56E-04	2.61E+04	1.27E+05	1.54E+05
19.50	9.65E-07	4.29E-13	1.39E+04	2.52E+05	2.66E+05
32.50	5.21E-24	2.32E-30	7.37E+03	3.36E+05	3.43E+05
45.50	0.00E+00	0.00E+00	4.61E+03	4.02E+05	4.06E+05
58.50	0.00E+00	0.00E+00	3.33E+03	4.57E+05	4.61E+05
71.50	0.00E+00	0.00E+00	2.66E+03	5.07E+05	5.09E+05
84.50	0.00E+00	0.00E+00	2.20E+03	5.51E+05	5.54E+05
97.50	0.00E+00	0.00E+00	1.87E+03	5.93E+05	5.95E+05
110.50	0.00E+00	0.00E+00	1.62E+03	6.31E+05	6.33E+05
123.50	0.00E+00	0.00E+00	1.46E+03	6.68E+05	6.69E+05
136.50	0.00E+00	0.00E+00	1.33E+03	7.02E+05	7.04E+05
149.50	0.00E+00	0.00E+00	1.22E+03	7.35E+05	7.36E+05
162.50	0.00E+00	0.00E+00	1.13E+03	7.67E+05	7.68E+05
175.50	0.00E+00	0.00E+00	1.05E+03	7.97E+05	7.98E+05
188.50	0.00E+00	0.00E+00	9.89E+02	8.26E+05	8.27E+05
201.50	0.00E+00	0.00E+00	9.49E+02	8.54E+05	8.55E+05
214.50	0.00E+00	0.00E+00	9.14E+02	8.81E+05	8.82E+05
227.50	0.00E+00	0.00E+00	8.81E+02	9.07E+05	9.08E+05
240.50	0.00E+00	0.00E+00	8.52E+02	9.33E+05	9.34E+05
253.50	0.00E+00	0.00E+00	8.25E+02	9.58E+05	9.59E+05

800.403565418423600 total grams airborne in tank

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3.560649351785758E-004 total g/s out riser
 75327.239501953120000 total grams lost out riser
1.288385956250000E+007 total grams settled on floor
1.295998678125000E+007 total grams made airborne
0.000000000000000E+000 total grams bypassed
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Table 5. Comparison of Dry and Liquid Aerosols
(PR=1 in./min. for all cases)

Tank Vol. (gal)	In-Leakage (scfm)	WH (in.)	Dry Aerosol (g)	Liquid Aerosol (g)	Liquid Aerosol w/.0635 bypass (g)
Worst Case					
500,000	2100	171	2976.3	191990.2	1002757.9
750,000	2100	266	4597.7	296558.8	1557886.0
1,000,000	2100	361	5676.9	405643.9	2117243.7
Anticipated Case					
500,000	500	171	1324.9	75327.2	893503.1
750,000	500	266	2056.6	116100.2	1388886.5
1,000,000	500	361	2717.6	159251.8	1886497.7

TRANSIENT SETTLING OF NaNO3 PARTICLES IN WASTE TANKS

20WB

ADDITIONAL PARAMETERS:

```
particle density, g/cc =        1.383000000000000
tank temperature, degK =      294.300000000000000
tank pressure, abs atm =        1.000000000000000
tank floor area,m**2 =      410.433000000000000
tank volume, m**3 =     1060.895809739524000
bypass fraction =   6.350000000000000E-002

Output divisions in Period        1.000000000000000 =        1.000000
Output divisions in Period        2.000000000000000 =        1.000000
Output divisions in Period        3.000000000000000 =        1.000000
Output divisions in Period        4.000000000000000 =        1.000000
Output divisions in Period        5.000000000000000 =        1.000000
Output divisions in Period        6.000000000000000 =        1.000000
Output divisions in Period        7.000000000000000 =        1.000000
Output divisions in Period        8.000000000000000 =        1.000000
Output divisions in Period        9.000000000000000 =        1.000000
Output divisions in Period       10.000000000000000 =        1.000000
Output divisions in Period       11.000000000000000 =        1.000000
Output divisions in Period       12.000000000000000 =        1.000000
Output divisions in Period       13.000000000000000 =        1.000000
Output divisions in Period       14.000000000000000 =        1.000000
Output divisions in Period       15.000000000000000 =        1.000000
Output divisions in Period       16.000000000000000 =        1.000000
Output divisions in Period       17.000000000000000 =        1.000000
Output divisions in Period       18.000000000000000 =        1.000000


Flow out @    0.000000E+00 min =      880.000000 cfm &    72000.000000g/m
Flow out @       20.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @       80.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      100.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      160.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      180.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      240.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      260.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      320.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      340.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      400.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      420.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      480.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      500.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      560.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      580.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      640.000000 min =      880.000000 cfm &    72000.000000g/m
Flow out @      660.000000 min =        1.000000 cfm &    0.000000E+00g/m
Flow out @      720.000000 min =    0.000000E+00 cfm &    0.000000E+00g/m


**** OUTPUT @      20.000000000000000 minutes ****

  diam    airborne   outflow    totalout   totalflr   source
  mcrn       g         g/s         g          g          g
```

6.50	8.93E+03	4.40E+00	3.62E+03	4.50E+03	1.60E+04
19.50	3.53E+03	2.95E+00	3.32E+03	2.27E+04	2.77E+04
32.50	1.71E+03	2.69E+00	3.19E+03	3.32E+04	3.57E+04
45.50	1.05E+03	2.80E+00	3.35E+03	4.07E+04	4.23E+04
58.50	7.50E+02	3.00E+00	3.60E+03	4.68E+04	4.79E+04
71.50	5.96E+02	3.23E+00	3.87E+03	5.21E+04	5.30E+04
84.50	4.92E+02	3.45E+00	4.14E+03	5.69E+04	5.76E+04
97.50	4.17E+02	3.66E+00	4.39E+03	6.13E+04	6.19E+04
110.50	3.61E+02	3.86E+00	4.64E+03	6.53E+04	6.59E+04
123.50	3.25E+02	4.06E+00	4.87E+03	6.92E+04	6.96E+04
136.50	2.95E+02	4.25E+00	5.10E+03	7.28E+04	7.32E+04
149.50	2.71E+02	4.44E+00	5.32E+03	7.62E+04	7.66E+04
162.50	2.51E+02	4.61E+00	5.53E+03	7.95E+04	7.99E+04
175.50	2.33E+02	4.78E+00	5.74E+03	8.27E+04	8.30E+04
188.50	2.20E+02	4.95E+00	5.94E+03	8.57E+04	8.60E+04
201.50	2.11E+02	5.11E+00	6.13E+03	8.86E+04	8.90E+04
214.50	2.03E+02	5.27E+00	6.32E+03	9.15E+04	9.18E+04
227.50	1.96E+02	5.42E+00	6.50E+03	9.42E+04	9.45E+04
240.50	1.89E+02	5.57E+00	6.68E+03	9.69E+04	9.72E+04
253.50	1.83E+02	5.71E+00	6.85E+03	9.95E+04	9.98E+04

20417.020141601560000 total grams airborne in tank
84.192655086517330 total g/s out riser
99097.966064453120000 total grams lost out riser
1320483.561035156000000 total grams settled on floor
1348558.653320312000000 total grams made airborne
91439.909301757810000 total grams bypassed

**** OUTPUT @ 80.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.33E+02	3.26E-04	3.63E+03	1.27E+04	1.60E+04
19.50	9.04E-07	4.02E-13	3.32E+03	2.62E+04	2.77E+04
32.50	4.88E-24	2.17E-30	3.19E+03	3.50E+04	3.57E+04
45.50	0.00E+00	0.00E+00	3.35E+03	4.18E+04	4.23E+04
58.50	0.00E+00	0.00E+00	3.60E+03	4.76E+04	4.79E+04
71.50	0.00E+00	0.00E+00	3.87E+03	5.27E+04	5.30E+04
84.50	0.00E+00	0.00E+00	4.14E+03	5.74E+04	5.76E+04
97.50	0.00E+00	0.00E+00	4.39E+03	6.17E+04	6.19E+04
110.50	0.00E+00	0.00E+00	4.64E+03	6.57E+04	6.59E+04
123.50	0.00E+00	0.00E+00	4.87E+03	6.95E+04	6.96E+04
136.50	0.00E+00	0.00E+00	5.10E+03	7.31E+04	7.32E+04
149.50	0.00E+00	0.00E+00	5.32E+03	7.65E+04	7.66E+04
162.50	0.00E+00	0.00E+00	5.53E+03	7.98E+04	7.99E+04
175.50	0.00E+00	0.00E+00	5.74E+03	8.29E+04	8.30E+04
188.50	0.00E+00	0.00E+00	5.94E+03	8.59E+04	8.60E+04
201.50	0.00E+00	0.00E+00	6.13E+03	8.89E+04	8.90E+04
214.50	0.00E+00	0.00E+00	6.32E+03	9.17E+04	9.18E+04
227.50	0.00E+00	0.00E+00	6.50E+03	9.44E+04	9.45E+04
240.50	0.00E+00	0.00E+00	6.68E+03	9.71E+04	9.72E+04
253.50	0.00E+00	0.00E+00	6.85E+03	9.97E+04	9.98E+04

732.859253833689500 total grams airborne in tank
3.260173838881839E-004 total g/s out riser
99103.550781250000000 total grams lost out riser
1340162.137695312000000 total grams settled on floor
1348558.653320312000000 total grams made airborne

91439.909301757810000 total grams bypassed

**** OUTPUT @ 100.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.13E+03	4.48E+00	7.45E+03	1.75E+04	3.20E+04
19.50	3.53E+03	2.95E+00	6.65E+03	4.89E+04	5.53E+04
32.50	1.71E+03	2.69E+00	6.38E+03	6.82E+04	7.15E+04
45.50	1.05E+03	2.80E+00	6.69E+03	8.25E+04	8.45E+04
58.50	7.50E+02	3.00E+00	7.19E+03	9.44E+04	9.59E+04
71.50	5.96E+02	3.23E+00	7.74E+03	1.05E+05	1.06E+05
84.50	4.92E+02	3.45E+00	8.27E+03	1.14E+05	1.15E+05
97.50	4.17E+02	3.66E+00	8.78E+03	1.23E+05	1.24E+05
110.50	3.61E+02	3.86E+00	9.27E+03	1.31E+05	1.32E+05
123.50	3.25E+02	4.06E+00	9.75E+03	1.39E+05	1.39E+05
136.50	2.95E+02	4.25E+00	1.02E+04	1.46E+05	1.46E+05
149.50	2.71E+02	4.44E+00	1.06E+04	1.53E+05	1.53E+05
162.50	2.51E+02	4.61E+00	1.11E+04	1.59E+05	1.60E+05
175.50	2.33E+02	4.78E+00	1.15E+04	1.66E+05	1.66E+05
188.50	2.20E+02	4.95E+00	1.19E+04	1.72E+05	1.72E+05
201.50	2.11E+02	5.11E+00	1.23E+04	1.78E+05	1.78E+05
214.50	2.03E+02	5.27E+00	1.26E+04	1.83E+05	1.84E+05
227.50	1.96E+02	5.42E+00	1.30E+04	1.89E+05	1.89E+05
240.50	1.89E+02	5.57E+00	1.34E+04	1.94E+05	1.94E+05
253.50	1.83E+02	5.71E+00	1.37E+04	1.99E+05	2.00E+05

20616.214477539060000 total grams airborne in tank
84.270634651184080 total g/s out riser
198393.967285156200000 total grams lost out riser
2660986.892578125000000 total grams settled on floor
2697117.306640625000000 total grams made airborne
182879.818603515600000 total grams bypassed

**** OUTPUT @ 160.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.49E+02	3.33E-04	7.45E+03	2.59E+04	3.20E+04
19.50	9.04E-07	4.02E-13	6.65E+03	5.24E+04	5.53E+04
32.50	4.88E-24	2.17E-30	6.38E+03	6.99E+04	7.15E+04
45.50	0.00E+00	0.00E+00	6.69E+03	8.36E+04	8.45E+04
58.50	0.00E+00	0.00E+00	7.19E+03	9.52E+04	9.59E+04
71.50	0.00E+00	0.00E+00	7.74E+03	1.05E+05	1.06E+05
84.50	0.00E+00	0.00E+00	8.27E+03	1.15E+05	1.15E+05
97.50	0.00E+00	0.00E+00	8.78E+03	1.23E+05	1.24E+05
110.50	0.00E+00	0.00E+00	9.27E+03	1.31E+05	1.32E+05
123.50	0.00E+00	0.00E+00	9.75E+03	1.39E+05	1.39E+05
136.50	0.00E+00	0.00E+00	1.02E+04	1.46E+05	1.46E+05
149.50	0.00E+00	0.00E+00	1.06E+04	1.53E+05	1.53E+05
162.50	0.00E+00	0.00E+00	1.11E+04	1.60E+05	1.60E+05
175.50	0.00E+00	0.00E+00	1.15E+04	1.66E+05	1.66E+05
188.50	0.00E+00	0.00E+00	1.19E+04	1.72E+05	1.72E+05
201.50	0.00E+00	0.00E+00	1.23E+04	1.78E+05	1.78E+05
214.50	0.00E+00	0.00E+00	1.26E+04	1.83E+05	1.84E+05
227.50	0.00E+00	0.00E+00	1.30E+04	1.89E+05	1.89E+05

240.50	0.00E+00	0.00E+00	1.34E+04	1.94E+05	1.94E+05
253.50	0.00E+00	0.00E+00	1.37E+04	1.99E+05	2.00E+05

749.205079029002000 total grams airborne in tank
3.332889177201379E-004 total g/s out riser
198399.668945312500000 total grams lost out riser
2680848.222656250000000 total grams settled on floor
2697117.306640625000000 total grams made airborne
182879.818603515600000 total grams bypassed

**** OUTPUT @ 180.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.13E+03	4.48E+00	1.13E+04	3.08E+04	4.79E+04
19.50	3.53E+03	2.95E+00	9.97E+03	7.51E+04	8.30E+04
32.50	1.71E+03	2.69E+00	9.57E+03	1.03E+05	1.07E+05
45.50	1.05E+03	2.80E+00	1.00E+04	1.24E+05	1.27E+05
58.50	7.50E+02	3.00E+00	1.08E+04	1.42E+05	1.44E+05
71.50	5.96E+02	3.23E+00	1.16E+04	1.58E+05	1.59E+05
84.50	4.92E+02	3.45E+00	1.24E+04	1.72E+05	1.73E+05
97.50	4.17E+02	3.66E+00	1.32E+04	1.85E+05	1.86E+05
110.50	3.61E+02	3.86E+00	1.39E+04	1.97E+05	1.98E+05
123.50	3.25E+02	4.06E+00	1.46E+04	2.08E+05	2.09E+05
136.50	2.95E+02	4.25E+00	1.53E+04	2.19E+05	2.20E+05
149.50	2.71E+02	4.44E+00	1.60E+04	2.29E+05	2.30E+05
162.50	2.51E+02	4.61E+00	1.66E+04	2.39E+05	2.40E+05
175.50	2.33E+02	4.78E+00	1.72E+04	2.48E+05	2.49E+05
188.50	2.20E+02	4.95E+00	1.78E+04	2.58E+05	2.58E+05
201.50	2.11E+02	5.11E+00	1.84E+04	2.66E+05	2.67E+05
214.50	2.03E+02	5.27E+00	1.90E+04	2.75E+05	2.75E+05
227.50	1.96E+02	5.42E+00	1.95E+04	2.83E+05	2.84E+05
240.50	1.89E+02	5.57E+00	2.00E+04	2.91E+05	2.92E+05
253.50	1.83E+02	5.71E+00	2.06E+04	2.99E+05	2.99E+05

20620.657836914060000 total grams airborne in tank
84.272373676300050 total g/s out riser
297694.376953125000000 total grams lost out riser
4001680.625000000000000 total grams settled on floor
4045675.925781250000000 total grams made airborne
274319.731445312500000 total grams bypassed

**** OUTPUT @ 240.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.50E+02	3.33E-04	1.13E+04	3.92E+04	4.79E+04
19.50	9.04E-07	4.02E-13	9.97E+03	7.87E+04	8.30E+04
32.50	4.88E-24	2.17E-30	9.57E+03	1.05E+05	1.07E+05
45.50	0.00E+00	0.00E+00	1.00E+04	1.25E+05	1.27E+05
58.50	0.00E+00	0.00E+00	1.08E+04	1.43E+05	1.44E+05
71.50	0.00E+00	0.00E+00	1.16E+04	1.58E+05	1.59E+05
84.50	0.00E+00	0.00E+00	1.24E+04	1.72E+05	1.73E+05
97.50	0.00E+00	0.00E+00	1.32E+04	1.85E+05	1.86E+05
110.50	0.00E+00	0.00E+00	1.39E+04	1.97E+05	1.98E+05
123.50	0.00E+00	0.00E+00	1.46E+04	2.08E+05	2.09E+05

136.50	0.00E+00	0.00E+00	1.53E+04	2.19E+05	2.20E+05
149.50	0.00E+00	0.00E+00	1.60E+04	2.29E+05	2.30E+05
162.50	0.00E+00	0.00E+00	1.66E+04	2.39E+05	2.40E+05
175.50	0.00E+00	0.00E+00	1.72E+04	2.49E+05	2.49E+05
188.50	0.00E+00	0.00E+00	1.78E+04	2.58E+05	2.58E+05
201.50	0.00E+00	0.00E+00	1.84E+04	2.67E+05	2.67E+05
214.50	0.00E+00	0.00E+00	1.90E+04	2.75E+05	2.75E+05
227.50	0.00E+00	0.00E+00	1.95E+04	2.83E+05	2.84E+05
240.50	0.00E+00	0.00E+00	2.00E+04	2.91E+05	2.92E+05
253.50	0.00E+00	0.00E+00	2.06E+04	2.99E+05	2.99E+05

749.569642017283300 total grams airborne in tank
3.334511133672733E-004 total g/s out riser
297700.083984375000000 total grams lost out riser
4021545.960937500000000 total grams settled on floor
4045675.925781250000000 total grams made airborne
274319.731445312500000 total grams bypassed

**** OUTPUT @ 260.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.13E+03	4.48E+00	1.51E+04	4.40E+04	6.39E+04
19.50	3.53E+03	2.95E+00	1.33E+04	1.01E+05	1.11E+05
32.50	1.71E+03	2.69E+00	1.28E+04	1.38E+05	1.43E+05
45.50	1.05E+03	2.80E+00	1.34E+04	1.66E+05	1.69E+05
58.50	7.50E+02	3.00E+00	1.44E+04	1.90E+05	1.92E+05
71.50	5.96E+02	3.23E+00	1.55E+04	2.10E+05	2.12E+05
84.50	4.92E+02	3.45E+00	1.65E+04	2.29E+05	2.30E+05
97.50	4.17E+02	3.66E+00	1.76E+04	2.46E+05	2.48E+05
110.50	3.61E+02	3.86E+00	1.85E+04	2.62E+05	2.63E+05
123.50	3.25E+02	4.06E+00	1.95E+04	2.78E+05	2.79E+05
136.50	2.95E+02	4.25E+00	2.04E+04	2.92E+05	2.93E+05
149.50	2.71E+02	4.44E+00	2.13E+04	3.06E+05	3.06E+05
162.50	2.51E+02	4.61E+00	2.21E+04	3.19E+05	3.20E+05
175.50	2.33E+02	4.78E+00	2.30E+04	3.31E+05	3.32E+05
188.50	2.20E+02	4.95E+00	2.37E+04	3.44E+05	3.44E+05
201.50	2.11E+02	5.11E+00	2.45E+04	3.55E+05	3.56E+05
214.50	2.03E+02	5.27E+00	2.53E+04	3.67E+05	3.67E+05
227.50	1.96E+02	5.42E+00	2.60E+04	3.78E+05	3.78E+05
240.50	1.89E+02	5.57E+00	2.67E+04	3.88E+05	3.89E+05
253.50	1.83E+02	5.71E+00	2.74E+04	3.99E+05	3.99E+05

20620.756469726560000 total grams airborne in tank
84.272412776947020 total g/s out riser
396994.885742187500000 total grams lost out riser
5342378.546875000000000 total grams settled on floor
5394234.613281250000000 total grams made airborne
365759.637207031300000 total grams bypassed

**** OUTPUT @ 320.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.50E+02	3.33E-04	1.51E+04	5.24E+04	6.39E+04
19.50	9.04E-07	4.02E-13	1.33E+04	1.05E+05	1.11E+05

32.50	4.88E-24	2.17E-30	1.28E+04	1.40E+05	1.43E+05
45.50	0.00E+00	0.00E+00	1.34E+04	1.67E+05	1.69E+05
58.50	0.00E+00	0.00E+00	1.44E+04	1.90E+05	1.92E+05
71.50	0.00E+00	0.00E+00	1.55E+04	2.11E+05	2.12E+05
84.50	0.00E+00	0.00E+00	1.65E+04	2.30E+05	2.30E+05
97.50	0.00E+00	0.00E+00	1.76E+04	2.47E+05	2.48E+05
110.50	0.00E+00	0.00E+00	1.85E+04	2.63E+05	2.63E+05
123.50	0.00E+00	0.00E+00	1.95E+04	2.78E+05	2.79E+05
136.50	0.00E+00	0.00E+00	2.04E+04	2.92E+05	2.93E+05
149.50	0.00E+00	0.00E+00	2.13E+04	3.06E+05	3.06E+05
162.50	0.00E+00	0.00E+00	2.21E+04	3.19E+05	3.20E+05
175.50	0.00E+00	0.00E+00	2.30E+04	3.32E+05	3.32E+05
188.50	0.00E+00	0.00E+00	2.37E+04	3.44E+05	3.44E+05
201.50	0.00E+00	0.00E+00	2.45E+04	3.55E+05	3.56E+05
214.50	0.00E+00	0.00E+00	2.53E+04	3.67E+05	3.67E+05
227.50	0.00E+00	0.00E+00	2.60E+04	3.78E+05	3.78E+05
240.50	0.00E+00	0.00E+00	2.67E+04	3.88E+05	3.89E+05
253.50	0.00E+00	0.00E+00	2.74E+04	3.99E+05	3.99E+05

749.577759693064500 total grams airborne in tank
3.334547222422499E-004 total g/s out riser
397000.589843750000000 total grams lost out riser
5362244.019531250000000 total grams settled on floor
5394234.613281250000000 total grams made airborne
365759.637207031300000 total grams bypassed

**** OUTPUT @ 340.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.13E+03	4.48E+00	1.89E+04	5.72E+04	7.99E+04
19.50	3.53E+03	2.95E+00	1.66E+04	1.28E+05	1.38E+05
32.50	1.71E+03	2.69E+00	1.59E+04	1.73E+05	1.79E+05
45.50	1.05E+03	2.80E+00	1.67E+04	2.08E+05	2.11E+05
58.50	7.50E+02	3.00E+00	1.80E+04	2.37E+05	2.40E+05
71.50	5.96E+02	3.23E+00	1.93E+04	2.63E+05	2.65E+05
84.50	4.92E+02	3.45E+00	2.07E+04	2.86E+05	2.88E+05
97.50	4.17E+02	3.66E+00	2.20E+04	3.08E+05	3.09E+05
110.50	3.61E+02	3.86E+00	2.32E+04	3.28E+05	3.29E+05
123.50	3.25E+02	4.06E+00	2.44E+04	3.47E+05	3.48E+05
136.50	2.95E+02	4.25E+00	2.55E+04	3.65E+05	3.66E+05
149.50	2.71E+02	4.44E+00	2.66E+04	3.82E+05	3.83E+05
162.50	2.51E+02	4.61E+00	2.77E+04	3.99E+05	3.99E+05
175.50	2.33E+02	4.78E+00	2.87E+04	4.14E+05	4.15E+05
188.50	2.20E+02	4.95E+00	2.97E+04	4.29E+05	4.30E+05
201.50	2.11E+02	5.11E+00	3.07E+04	4.44E+05	4.45E+05
214.50	2.03E+02	5.27E+00	3.16E+04	4.58E+05	4.59E+05
227.50	1.96E+02	5.42E+00	3.25E+04	4.72E+05	4.73E+05
240.50	1.89E+02	5.57E+00	3.34E+04	4.85E+05	4.86E+05
253.50	1.83E+02	5.71E+00	3.43E+04	4.98E+05	4.99E+05

20620.758422851560000 total grams airborne in tank
84.272413253784180 total g/s out riser
496295.400390625000000 total grams lost out riser
6683076.597656250000000 total grams settled on floor
6742793.304687500000000 total grams made airborne
457199.543945312500000 total grams bypassed

**** OUTPUT @ 400.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.50E+02	3.33E-04	1.89E+04	6.56E+04	7.99E+04
19.50	9.04E-07	4.02E-13	1.66E+04	1.31E+05	1.38E+05
32.50	4.88E-24	2.17E-30	1.59E+04	1.75E+05	1.79E+05
45.50	0.00E+00	0.00E+00	1.67E+04	2.09E+05	2.11E+05
58.50	0.00E+00	0.00E+00	1.80E+04	2.38E+05	2.40E+05
71.50	0.00E+00	0.00E+00	1.93E+04	2.64E+05	2.65E+05
84.50	0.00E+00	0.00E+00	2.07E+04	2.87E+05	2.88E+05
97.50	0.00E+00	0.00E+00	2.20E+04	3.08E+05	3.09E+05
110.50	0.00E+00	0.00E+00	2.32E+04	3.29E+05	3.29E+05
123.50	0.00E+00	0.00E+00	2.44E+04	3.47E+05	3.48E+05
136.50	0.00E+00	0.00E+00	2.55E+04	3.65E+05	3.66E+05
149.50	0.00E+00	0.00E+00	2.66E+04	3.82E+05	3.83E+05
162.50	0.00E+00	0.00E+00	2.77E+04	3.99E+05	3.99E+05
175.50	0.00E+00	0.00E+00	2.87E+04	4.15E+05	4.15E+05
188.50	0.00E+00	0.00E+00	2.97E+04	4.30E+05	4.30E+05
201.50	0.00E+00	0.00E+00	3.07E+04	4.44E+05	4.45E+05
214.50	0.00E+00	0.00E+00	3.16E+04	4.58E+05	4.59E+05
227.50	0.00E+00	0.00E+00	3.25E+04	4.72E+05	4.73E+05
240.50	0.00E+00	0.00E+00	3.34E+04	4.85E+05	4.86E+05
253.50	0.00E+00	0.00E+00	3.43E+04	4.98E+05	4.99E+05

749.577942798533300 total grams airborne in tank
3.334548095537413E-004 total g/s out riser
496301.103515625000000 total grams lost out riser
6702942.125000000000000 total grams settled on floor
6742793.304687500000000 total grams made airborne
457199.543945312500000 total grams bypassed

**** OUTPUT @ 420.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.13E+03	4.48E+00	2.28E+04	7.05E+04	9.59E+04
19.50	3.53E+03	2.95E+00	1.99E+04	1.54E+05	1.66E+05
32.50	1.71E+03	2.69E+00	1.91E+04	2.08E+05	2.14E+05
45.50	1.05E+03	2.80E+00	2.01E+04	2.50E+05	2.54E+05
58.50	7.50E+02	3.00E+00	2.16E+04	2.85E+05	2.88E+05
71.50	5.96E+02	3.23E+00	2.32E+04	3.16E+05	3.18E+05
84.50	4.92E+02	3.45E+00	2.48E+04	3.44E+05	3.46E+05
97.50	4.17E+02	3.66E+00	2.63E+04	3.70E+05	3.71E+05
110.50	3.61E+02	3.86E+00	2.78E+04	3.94E+05	3.95E+05
123.50	3.25E+02	4.06E+00	2.92E+04	4.17E+05	4.18E+05
136.50	2.95E+02	4.25E+00	3.06E+04	4.38E+05	4.39E+05
149.50	2.71E+02	4.44E+00	3.19E+04	4.59E+05	4.60E+05
162.50	2.51E+02	4.61E+00	3.32E+04	4.78E+05	4.79E+05
175.50	2.33E+02	4.78E+00	3.44E+04	4.97E+05	4.98E+05
188.50	2.20E+02	4.95E+00	3.56E+04	5.15E+05	5.16E+05
201.50	2.11E+02	5.11E+00	3.68E+04	5.33E+05	5.34E+05
214.50	2.03E+02	5.27E+00	3.79E+04	5.50E+05	5.51E+05
227.50	1.96E+02	5.42E+00	3.90E+04	5.66E+05	5.67E+05
240.50	1.89E+02	5.57E+00	4.01E+04	5.82E+05	5.83E+05
253.50	1.83E+02	5.71E+00	4.11E+04	5.98E+05	5.99E+05

20620.759399414060000 total grams airborne in tank
84.272413730621340 total g/s out riser
595595.908203125000000 total grams lost out riser
8023774.585937500000000 total grams settled on floor
8091352.070312500000000 total grams made airborne
548639.454589843700000 total grams bypassed

**** OUTPUT @ 480.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.50E+02	3.33E-04	2.28E+04	7.89E+04	9.59E+04
19.50	9.04E-07	4.02E-13	1.99E+04	1.57E+05	1.66E+05
32.50	4.88E-24	2.17E-30	1.91E+04	2.10E+05	2.14E+05
45.50	0.00E+00	0.00E+00	2.01E+04	2.51E+05	2.54E+05
58.50	0.00E+00	0.00E+00	2.16E+04	2.86E+05	2.88E+05
71.50	0.00E+00	0.00E+00	2.32E+04	3.16E+05	3.18E+05
84.50	0.00E+00	0.00E+00	2.48E+04	3.44E+05	3.46E+05
97.50	0.00E+00	0.00E+00	2.63E+04	3.70E+05	3.71E+05
110.50	0.00E+00	0.00E+00	2.78E+04	3.94E+05	3.95E+05
123.50	0.00E+00	0.00E+00	2.92E+04	4.17E+05	4.18E+05
136.50	0.00E+00	0.00E+00	3.06E+04	4.38E+05	4.39E+05
149.50	0.00E+00	0.00E+00	3.19E+04	4.59E+05	4.60E+05
162.50	0.00E+00	0.00E+00	3.32E+04	4.79E+05	4.79E+05
175.50	0.00E+00	0.00E+00	3.44E+04	4.97E+05	4.98E+05
188.50	0.00E+00	0.00E+00	3.56E+04	5.16E+05	5.16E+05
201.50	0.00E+00	0.00E+00	3.68E+04	5.33E+05	5.34E+05
214.50	0.00E+00	0.00E+00	3.79E+04	5.50E+05	5.51E+05
227.50	0.00E+00	0.00E+00	3.90E+04	5.67E+05	5.67E+05
240.50	0.00E+00	0.00E+00	4.01E+04	5.83E+05	5.83E+05
253.50	0.00E+00	0.00E+00	4.11E+04	5.98E+05	5.99E+05

749.577942798533300 total grams airborne in tank
3.334548095537413E-004 total g/s out riser
595601.615234375000000 total grams lost out riser
8043640.234375000000000 total grams settled on floor
8091352.070312500000000 total grams made airborne
548639.454589843700000 total grams bypassed

**** OUTPUT @ 500.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.13E+03	4.48E+00	2.66E+04	8.37E+04	1.12E+05
19.50	3.53E+03	2.95E+00	2.33E+04	1.80E+05	1.94E+05
32.50	1.71E+03	2.69E+00	2.23E+04	2.43E+05	2.50E+05
45.50	1.05E+03	2.80E+00	2.34E+04	2.91E+05	2.96E+05
58.50	7.50E+02	3.00E+00	2.52E+04	3.32E+05	3.36E+05
71.50	5.96E+02	3.23E+00	2.71E+04	3.68E+05	3.71E+05
84.50	4.92E+02	3.45E+00	2.89E+04	4.01E+05	4.03E+05
97.50	4.17E+02	3.66E+00	3.07E+04	4.31E+05	4.33E+05
110.50	3.61E+02	3.86E+00	3.24E+04	4.60E+05	4.61E+05
123.50	3.25E+02	4.06E+00	3.41E+04	4.86E+05	4.87E+05
136.50	2.95E+02	4.25E+00	3.57E+04	5.11E+05	5.13E+05
149.50	2.71E+02	4.44E+00	3.73E+04	5.35E+05	5.36E+05

162.50	2.51E+02	4.61E+00	3.87E+04	5.58E+05	5.59E+05
175.50	2.33E+02	4.78E+00	4.02E+04	5.80E+05	5.81E+05
188.50	2.20E+02	4.95E+00	4.16E+04	6.01E+05	6.02E+05
201.50	2.11E+02	5.11E+00	4.29E+04	6.22E+05	6.23E+05
214.50	2.03E+02	5.27E+00	4.42E+04	6.42E+05	6.42E+05
227.50	1.96E+02	5.42E+00	4.55E+04	6.61E+05	6.62E+05
240.50	1.89E+02	5.57E+00	4.67E+04	6.79E+05	6.80E+05
253.50	1.83E+02	5.71E+00	4.80E+04	6.98E+05	6.98E+05

20620.759399414060000 total grams airborne in tank
84.272413730621340 total g/s out riser
694896.417968750000000 total grams lost out riser
9364472.796875000000000 total grams settled on floor
9439910.851562500000000 total grams made airborne
640079.363281250000000 total grams bypassed

**** OUTPUT @ 560.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.50E+02	3.33E-04	2.66E+04	9.21E+04	1.12E+05
19.50	9.04E-07	4.02E-13	2.33E+04	1.84E+05	1.94E+05
32.50	4.88E-24	2.17E-30	2.23E+04	2.45E+05	2.50E+05
45.50	0.00E+00	0.00E+00	2.34E+04	2.93E+05	2.96E+05
58.50	0.00E+00	0.00E+00	2.52E+04	3.33E+05	3.36E+05
71.50	0.00E+00	0.00E+00	2.71E+04	3.69E+05	3.71E+05
84.50	0.00E+00	0.00E+00	2.89E+04	4.02E+05	4.03E+05
97.50	0.00E+00	0.00E+00	3.07E+04	4.32E+05	4.33E+05
110.50	0.00E+00	0.00E+00	3.24E+04	4.60E+05	4.61E+05
123.50	0.00E+00	0.00E+00	3.41E+04	4.86E+05	4.87E+05
136.50	0.00E+00	0.00E+00	3.57E+04	5.12E+05	5.13E+05
149.50	0.00E+00	0.00E+00	3.73E+04	5.35E+05	5.36E+05
162.50	0.00E+00	0.00E+00	3.87E+04	5.58E+05	5.59E+05
175.50	0.00E+00	0.00E+00	4.02E+04	5.80E+05	5.81E+05
188.50	0.00E+00	0.00E+00	4.16E+04	6.02E+05	6.02E+05
201.50	0.00E+00	0.00E+00	4.29E+04	6.22E+05	6.23E+05
214.50	0.00E+00	0.00E+00	4.42E+04	6.42E+05	6.42E+05
227.50	0.00E+00	0.00E+00	4.55E+04	6.61E+05	6.62E+05
240.50	0.00E+00	0.00E+00	4.67E+04	6.80E+05	6.80E+05
253.50	0.00E+00	0.00E+00	4.80E+04	6.98E+05	6.98E+05

749.577942798533300 total grams airborne in tank
3.334548095537413E-004 total g/s out riser
694902.128906250000000 total grams lost out riser
9384338.398437500000000 total grams settled on floor
9439910.851562500000000 total grams made airborne
640079.363281250000000 total grams bypassed

**** OUTPUT @ 580.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.13E+03	4.48E+00	3.04E+04	9.69E+04	1.28E+05
19.50	3.53E+03	2.95E+00	2.66E+04	2.06E+05	2.21E+05
32.50	1.71E+03	2.69E+00	2.55E+04	2.78E+05	2.86E+05
45.50	1.05E+03	2.80E+00	2.68E+04	3.33E+05	3.38E+05

58.50	7.50E+02	3.00E+00	2.88E+04	3.80E+05	3.83E+05
71.50	5.96E+02	3.23E+00	3.10E+04	4.21E+05	4.24E+05
84.50	4.92E+02	3.45E+00	3.31E+04	4.59E+05	4.61E+05
97.50	4.17E+02	3.66E+00	3.51E+04	4.93E+05	4.95E+05
110.50	3.61E+02	3.86E+00	3.71E+04	5.25E+05	5.27E+05
123.50	3.25E+02	4.06E+00	3.90E+04	5.56E+05	5.57E+05
136.50	2.95E+02	4.25E+00	4.08E+04	5.84E+05	5.86E+05
149.50	2.71E+02	4.44E+00	4.26E+04	6.12E+05	6.13E+05
162.50	2.51E+02	4.61E+00	4.43E+04	6.38E+05	6.39E+05
175.50	2.33E+02	4.78E+00	4.59E+04	6.63E+05	6.64E+05
188.50	2.20E+02	4.95E+00	4.75E+04	6.87E+05	6.88E+05
201.50	2.11E+02	5.11E+00	4.90E+04	7.11E+05	7.12E+05
214.50	2.03E+02	5.27E+00	5.05E+04	7.33E+05	7.34E+05
227.50	1.96E+02	5.42E+00	5.20E+04	7.55E+05	7.56E+05
240.50	1.89E+02	5.57E+00	5.34E+04	7.77E+05	7.77E+05
253.50	1.83E+02	5.71E+00	5.48E+04	7.97E+05	7.98E+05

20620.759399414060000 total grams airborne in tank
84.272413730621340 total g/s out riser
794196.935546875000000 total grams lost out riser
1.070517091406250E+007 total grams settled on floor
1.078846950781250E+007 total grams made airborne
731519.271484375000000 total grams bypassed

**** OUTPUT @ 640.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.50E+02	3.33E-04	3.04E+04	1.05E+05	1.28E+05
19.50	9.04E-07	4.02E-13	2.66E+04	2.10E+05	2.21E+05
32.50	4.88E-24	2.17E-30	2.55E+04	2.80E+05	2.86E+05
45.50	0.00E+00	0.00E+00	2.68E+04	3.34E+05	3.38E+05
58.50	0.00E+00	0.00E+00	2.88E+04	3.81E+05	3.83E+05
71.50	0.00E+00	0.00E+00	3.10E+04	4.22E+05	4.24E+05
84.50	0.00E+00	0.00E+00	3.31E+04	4.59E+05	4.61E+05
97.50	0.00E+00	0.00E+00	3.51E+04	4.93E+05	4.95E+05
110.50	0.00E+00	0.00E+00	3.71E+04	5.26E+05	5.27E+05
123.50	0.00E+00	0.00E+00	3.90E+04	5.56E+05	5.57E+05
136.50	0.00E+00	0.00E+00	4.08E+04	5.85E+05	5.86E+05
149.50	0.00E+00	0.00E+00	4.26E+04	6.12E+05	6.13E+05
162.50	0.00E+00	0.00E+00	4.43E+04	6.38E+05	6.39E+05
175.50	0.00E+00	0.00E+00	4.59E+04	6.63E+05	6.64E+05
188.50	0.00E+00	0.00E+00	4.75E+04	6.87E+05	6.88E+05
201.50	0.00E+00	0.00E+00	4.90E+04	7.11E+05	7.12E+05
214.50	0.00E+00	0.00E+00	5.05E+04	7.33E+05	7.34E+05
227.50	0.00E+00	0.00E+00	5.20E+04	7.55E+05	7.56E+05
240.50	0.00E+00	0.00E+00	5.34E+04	7.77E+05	7.77E+05
253.50	0.00E+00	0.00E+00	5.48E+04	7.98E+05	7.98E+05

749.577942798533300 total grams airborne in tank
3.334548095537413E-004 total g/s out riser
794202.638671875000000 total grams lost out riser
1.072503650781250E+007 total grams settled on floor
1.078846950781250E+007 total grams made airborne
731519.271484375000000 total grams bypassed

**** OUTPUT @ 660.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	9.13E+03	4.48E+00	3.42E+04	1.10E+05	1.44E+05
19.50	3.53E+03	2.95E+00	2.99E+04	2.32E+05	2.49E+05
32.50	1.71E+03	2.69E+00	2.87E+04	3.13E+05	3.22E+05
45.50	1.05E+03	2.80E+00	3.01E+04	3.75E+05	3.80E+05
58.50	7.50E+02	3.00E+00	3.24E+04	4.28E+05	4.31E+05
71.50	5.96E+02	3.23E+00	3.48E+04	4.74E+05	4.77E+05
84.50	4.92E+02	3.45E+00	3.72E+04	5.16E+05	5.18E+05
97.50	4.17E+02	3.66E+00	3.95E+04	5.55E+05	5.57E+05
110.50	3.61E+02	3.86E+00	4.17E+04	5.91E+05	5.93E+05
123.50	3.25E+02	4.06E+00	4.39E+04	6.25E+05	6.27E+05
136.50	2.95E+02	4.25E+00	4.59E+04	6.57E+05	6.59E+05
149.50	2.71E+02	4.44E+00	4.79E+04	6.88E+05	6.90E+05
162.50	2.51E+02	4.61E+00	4.98E+04	7.18E+05	7.19E+05
175.50	2.33E+02	4.78E+00	5.16E+04	7.46E+05	7.47E+05
188.50	2.20E+02	4.95E+00	5.34E+04	7.73E+05	7.74E+05
201.50	2.11E+02	5.11E+00	5.52E+04	7.99E+05	8.01E+05
214.50	2.03E+02	5.27E+00	5.69E+04	8.25E+05	8.26E+05
227.50	1.96E+02	5.42E+00	5.85E+04	8.50E+05	8.51E+05
240.50	1.89E+02	5.57E+00	6.01E+04	8.74E+05	8.75E+05
253.50	1.83E+02	5.71E+00	6.17E+04	8.97E+05	8.98E+05

20620.759399414060000 total grams airborne in tank
84.272413730621340 total g/s out riser
893497.449218750000000 total grams lost out riser
1.204586896093750E+007 total grams settled on floor
1.213702815625000E+007 total grams made airborne
822959.183593750000000 total grams bypassed

**** OUTPUT @ 720.000000000000000 minutes ****

diam mcrn	airborne g	outflow g/s	totalout g	totalflr g	source g
6.50	7.50E+02	3.33E-04	3.42E+04	1.19E+05	1.44E+05
19.50	9.04E-07	4.02E-13	2.99E+04	2.36E+05	2.49E+05
32.50	4.88E-24	2.17E-30	2.87E+04	3.15E+05	3.22E+05
45.50	0.00E+00	0.00E+00	3.01E+04	3.76E+05	3.80E+05
58.50	0.00E+00	0.00E+00	3.24E+04	4.28E+05	4.31E+05
71.50	0.00E+00	0.00E+00	3.48E+04	4.74E+05	4.77E+05
84.50	0.00E+00	0.00E+00	3.72E+04	5.16E+05	5.18E+05
97.50	0.00E+00	0.00E+00	3.95E+04	5.55E+05	5.57E+05
110.50	0.00E+00	0.00E+00	4.17E+04	5.91E+05	5.93E+05
123.50	0.00E+00	0.00E+00	4.39E+04	6.25E+05	6.27E+05
136.50	0.00E+00	0.00E+00	4.59E+04	6.58E+05	6.59E+05
149.50	0.00E+00	0.00E+00	4.79E+04	6.88E+05	6.90E+05
162.50	0.00E+00	0.00E+00	4.98E+04	7.18E+05	7.19E+05
175.50	0.00E+00	0.00E+00	5.16E+04	7.46E+05	7.47E+05
188.50	0.00E+00	0.00E+00	5.34E+04	7.73E+05	7.74E+05
201.50	0.00E+00	0.00E+00	5.52E+04	8.00E+05	8.01E+05
214.50	0.00E+00	0.00E+00	5.69E+04	8.25E+05	8.26E+05
227.50	0.00E+00	0.00E+00	5.85E+04	8.50E+05	8.51E+05
240.50	0.00E+00	0.00E+00	6.01E+04	8.74E+05	8.75E+05
253.50	0.00E+00	0.00E+00	6.17E+04	8.97E+05	8.98E+05

749.577942798533300 total grams airborne in tank

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3.334548095537413E-004 total g/s out riser
893503.148437500000000 total grams lost out riser
1.206573463281250E+007 total grams settled on floor
1.213702815625000E+007 total grams made airborne
822959.183593750000000 total grams bypassed
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