AN APPROXIMATE SOLUTION TO THE
GENERAL EQUATION FOR THE COAGULATION
OF HETEROGENEOUS AEROSOLS

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ABSTRACT

Computer Program HAA-3 (Heterogeneous Aerosol Agglomeration - Version 3) was written to evaluate an approximation to the theoretical model of aerosol behavior. The approximation is the requirement that the size distribution function be log-normal; the parameters which characterize this distribution are functions of time. The program will allow any combination of Brownian agglomeration, gravitational agglomeration, settling, wall plating, leakage, and log-normal source (constant source rate). The program computes several useful physical quantities:

- 1) Plated, settled, suspended, and leaked volume fractions,
- 2) Time dependent geometric mean deviation $\sigma(t)$, number concentration $N(t)$, and geometric mean radius $r_g(t)$ for the log-normal distribution of the suspended material,
- 3) Time dependent 50% radius $r_{50}(t)$ for the suspended material,
- 4) Time dependent number and volume distributions (functions of radius) for the settled, plated, and leaked material, and
- 5) Time dependent effective radii for the suspended, settled, and plated material.

The equations, input instructions, and output description for Program HAA-3 are given.

I. INTRODUCTION

The integro-differential equation which describes aerosol behavior has previously been evaluated by numerical integration using the computer code HAA-2.⁽¹⁾ The physical model includes particle generation; Brownian, gravitational, and turbulent agglomeration; settling; plating; and leakage for spherical particles. Although the performance of HAA-2⁽¹⁾ is satisfactory for low aerosol concentrations (of less than 8 $\mu\text{gm/cc}$), the computing time required for greater concentrations becomes excessive. For very high concentrations, it is uncertain that, even with unlimited computer time, HAA-2 could carry out the evaluation with any degree of accuracy; hence, alternative methods have been sought.

An approximation to the equation has been developed.⁽²⁾ The integro-differential equation is replaced by three first-order differential equations. In order to do this, the time dependent particle number distribution is assumed to be log-normal. This approximation is fairly adequate, because both experiment and HAA-2 calculations indicate that both the source rate and the particle distributions are log-normal.⁽³⁾ First-order differential equations for the volume moments are obtained by analytic integration of the appropriate moments of the integro-differential equation. The resulting time dependent parameters for the log-normal distribution are functions only of the zeroth through the second moments; thus, only three differential equations must be solved.

The methods of integrating the moments of the integro-differential equation have been developed by Cohen.⁽²⁾ These methods have been extended by Vaughan⁽⁴⁾ and Hausknecht⁽⁵⁾ to include gravitational agglomeration. The integration methods require that the exponential term in the Cunningham correction be neglected. With the numerical values used in Reference 6, this approximation is expected to be acceptable for cases of interest. In addition, a constant, DELTA, in the plating terms of the equations, is assumed to be independent of time. This assumption is not an accurate representation of the actual plating mechanism, and further work on this term is needed;⁽⁷⁾ however, programs HAA-3 and HAA-2 have this assumption in common. At present, the turbulence terms in the collision kernel have been omitted.

Several additional first order simultaneous differential equations must be included with those for the volume moments in order to effect the desired output. These include equations for the plated volume, settled volume, leaked volume, plated numbers, settled numbers, and the time integrated suspended number for each discrete particle volume desired. Program HAA-3 uses library subroutine RKADAM⁽⁸⁾ to solve this system of up to 50 simultaneous differential equations.

II. THE EQUATIONS FOR THE APPROXIMATE SOLUTION

In terms of the number density distribution $n(v,t)$ of the suspended material, the integro-differential equation for the behavior of an heterogeneous aerosol is⁽¹⁾

$$\begin{aligned} \frac{\partial n(v,t)}{\partial t} = & \frac{1}{2} \int_0^v n(v',t)n(v-v',t)F(v,v-v')dv' \\ & - n(v,t) \int_0^\infty n(v',t)F(v,v')dv' - R(v)n(v,t) + S(v,t) \quad , \quad \dots (1) \end{aligned}$$

where:

$v = r^3$, that is, spherical particles are assumed,

r = particle radius,

$F(v,v')$ = normalized collision kernel which gives the probability of collision between two particles of radii, r and r' , due to Brownian motion and due to differences in settling velocities (gravity),

$R(v)$ = removal rate due to settling, wall plating, and leakage, and

$S(v,t)$ = source rate for particles of radius, r .

The first integral represents the rate of production of particles of size, v , due to all collisions between two particles of size, v' and $v-v'$. The second integral gives the rate at which particles of size, v , grow to larger sizes due to collisions with particles of size, v' . The collision kernel, $F(v_1,v_2)$, is given by

$$\begin{aligned} F(v_1, v_2) = & B_1 \left(\frac{1}{v_1^{\frac{1}{3}}} + \frac{1}{v_2^{\frac{1}{3}}} \right) \left\{ v_1^{-\frac{1}{3}} \left[1 + C_1(v_1) \right] + v_2^{-\frac{1}{3}} \left[1 + C_1(v_2) \right] \right\} \\ & + G_1 \left(\frac{1}{v_1^{\frac{1}{3}}} + \frac{1}{v_2^{\frac{1}{3}}} \right) \left| \frac{2}{v_1^{\frac{2}{3}}} \left[1 + C_1(v_1) \right] - \frac{2}{v_2^{\frac{2}{3}}} \left[1 + C_1(v_2) \right] \right| + T_1(v_1, v_2) \quad , \quad \dots (2) \end{aligned}$$

where:

$$B_1 = \frac{2}{3} \frac{kT}{\eta},$$

$$G_1 = \frac{2g\pi}{9\eta} (\delta - \delta_0),$$

$$C_1(v) = v^{-\frac{1}{3}} \left(A + B e^{-\lambda v^{\frac{1}{3}}} \right) \text{ (Cunningham Correction),}$$

k = Boltzmann's constant,

T = temperature,

η = viscosity,

g = acceleration due to gravity,

δ = density of aerosol material,

δ_0 = density of the fluid medium.

The term containing B_1 represents collisions due to Brownian motion; the term containing G_1 represents collisions due to differences in settling velocity (gravity). The $T_1(v_1, v_2)$ term represents collisions due to turbulence.

The removal rate, $R(v)$, is given by

$$R(v) = G_R v^{\frac{2}{3}} [1 + C_1(v)] + P_R v^{-\frac{1}{3}} [1 + C_1(v)] + R_L, \quad \dots (3)$$

where:

$$G_R = \frac{2g\delta}{9h\eta}, \text{ the settling constant,}$$

$$h = \text{height of chamber} \left(h = \frac{V_c}{A_F} \right),$$

$$P_R = \frac{kT A_w}{6\pi\eta\Delta V_c}, \text{ the plating constant,}$$

A_F = area of the floor,

A_w = area of surface for plating,

V_c = volume of chamber,

Δ = distance perpendicular to the wall over which a gradient of the particle density is assumed to exist (Δ is an adjustable parameter required to fit experimental data).

The term containing G_R is the removal rate due to settling; the term containing P_R is the removal rate due to plating. The R_L term is the removal rate due to leakage and is a constant, independent of particle size.

Equation 1 must be solved by numerical integration (Program HAA-2). This process consumes much machine time; thus, alternate methods of solution are desired.

An approximate solution of Equation 1 has been developed.⁽²⁾ The integro-differential equation is replaced by three simultaneous, first-order differential equations in which the dependence on v has been removed. In order to do this, the form of the solution must be assumed. Since both experiment and calculation (Program HAA-2) have indicated that the solution is very nearly log-normal,⁽³⁾ that type of solution has been used;

$$n(v,t) dv = \frac{N(t)}{\sqrt{2\pi u(t)}} \exp \left\{ -\frac{\left[\ln \frac{v}{V(t)} \right]^2}{2u(t)} \right\} \frac{dv}{v} , \quad \dots (4)$$

where

$N(t)$ = total concentration of suspended particles (all sizes),

$V(t)$ = logarithmic mean volume of a particle times $3/4\pi$, and

$u(t)$ = logarithmic variance.

By using $\mu(t) = \ln V(t)$ and $S = \ln v$, the volume moments times $(3/4\pi)^k$,

$$X_k(t) = \int_0^\infty n(v,t) v^k dv ,$$

may be evaluated; thus,

$$X_k(t) = N(t) \exp \left[k \mu(t) + \frac{1}{2} k^2 u(t) \right] . \quad \dots (5)$$

In particular,

$$X_0(t) = N(t) ,$$

$$X_1(t) = N(t) \exp \left[\mu(t) + \frac{1}{2} u(t) \right] ,$$

and

$$X_2(t) = N(t) \exp \left[2 \mu(t) + 2 u(t) \right] .$$

The following identities have been noted:⁽²⁾

$$u(t) = \ln \left[\frac{X_0(t) X_2(t)}{X_1^2(t)} \right] , \quad \dots (6)$$

and

$$\mu(t) = \frac{1}{2} \ln \left[\frac{X_1^4(t)}{X_0^3(t) X_2(t)} \right] . \quad \dots (7)$$

When Equation 1 is multiplied by v^k and integrated over all v , the results are first-order differential equations for the moments, X_k . With $F(v, v')$ and $R(v)$ written explicitly, these integrations have been carried out.^(2,4,5) Three additional assumptions have been made:

- 1) The source is releasing particles at a constant rate in a log-normal distribution,
- 2) The factor Δ in the plating term, $R(v)$, of Equation 3, is independent of time, and
- 3) The exponential term in the Cunningham correction may be neglected.

In addition, the turbulence term in the collision kernel has been omitted in this present work. The differential equations, simplified by Equations 5 through 7, are:

$$\begin{aligned} \frac{dX_0}{dt} = & S_0 - G_1 X_0 X_1 \left\{ e^{\frac{1}{3}\mu + \frac{1}{18}u} \left[e^{\frac{1}{3}u} \operatorname{erf}\left(\frac{2\sqrt{u}}{3}\right) + 2\operatorname{erf}\left(\frac{\sqrt{u}}{3}\right) \right] \right. \\ & \left. + A \left[\operatorname{erf}\left(\frac{\sqrt{u}}{2}\right) + e^{-\frac{2}{9}u} \operatorname{erf}\left(\frac{\sqrt{u}}{6}\right) \right] \right\} \\ & - B_1 X_0^2 \left[1 + e^{\frac{1}{9}u} + A e^{-\frac{1}{3}\mu + \frac{1}{18}u} \left(1 + e^{\frac{2}{9}u} \right) \right] \\ & - G_R X_0 \left[e^{\frac{2}{3}\mu + \frac{2}{9}u} + A e^{\frac{1}{3}\mu + \frac{1}{18}u} \right] - P_R X_0 \left[e^{-\frac{1}{3}\mu + \frac{1}{18}u} + A e^{-\frac{2}{3}\mu + \frac{2}{9}u} \right] - R_L X_0 , \quad \dots (8) \end{aligned}$$

$$\begin{aligned} \frac{dX_1}{dt} = S_1 - G_R X_1 \left[e^{\frac{2}{3}\mu + \frac{8}{9}u} + A e^{\frac{1}{3}\mu + \frac{7}{18}u} \right] \\ - P_R X_0 \left[e^{\frac{2}{3}\mu + \frac{2}{9}u} + A e^{\frac{1}{3}\mu + \frac{1}{18}u} \right] - R_L X_1, \text{ and} \quad \dots (9) \end{aligned}$$

$$\begin{aligned} \frac{dX_2}{dt} = S_2 + 2G_1 X_1 X_2 \left\{ e^{\frac{1}{3}\mu + \frac{7}{18}u} \left[e^{\frac{1}{3}u} \operatorname{erf}\left(\frac{2\sqrt{u}}{3}\right) + 2\operatorname{erf}\left(\frac{\sqrt{u}}{3}\right) \right] + A \left[\operatorname{erf}\left(\frac{\sqrt{u}}{2}\right) + e^{-\frac{2}{9}u} \operatorname{erf}\left(\frac{\sqrt{u}}{6}\right) \right] \right\} \\ + 2B_1 X_1^2 \left[1 + e^{\frac{1}{9}u} + A e^{-\frac{1}{3}\mu - \frac{5}{18}u} \left(1 + e^{\frac{2}{9}u} \right) \right] - G_R X_2 \left[e^{\frac{2}{3}\mu + \frac{8}{9}u} + A e^{\frac{1}{3}\mu + \frac{1}{18}u} \right] e^{\frac{2}{3}u} \\ - P_R X_1 \left[e^{\frac{2}{3}\mu + \frac{8}{9}u} + A e^{\frac{1}{3}\mu + \frac{7}{18}u} \right] - R_L X_2, \quad \dots (10) \end{aligned}$$

where X_0 , X_1 , X_2 , μ , and u are all functions of time, and where S_k are the volume moments times $[3/(4\pi)]^k$ of the source rate distribution obtained from Equation 5 in which $N(t)$ is the total source rate (all sizes) and μ and u are the parameters of the log-normal distribution for the source.

The solutions of Equations 8, 9, and 10 yield

- 1) $X_0(t)$, the total number of particles suspended per cm^3 of container volume, $N(t)$,
- 2) $X_1(t)$, the total volume (micron^3) of particles suspended times $3/(4\pi)$ per cm^3 of container volume,
- 3) $X_2(t)$,
- 4) $u(t)$, from Equation 6,
- 5) $\mu(t)$, from Equation 7, and
- 6) $n(v,t)$, from Equation 4.

Additional information is desired:

- 1) $V_P(t)$, the plated volume of particles times $3/(4\pi)$,
- 2) $V_S(t)$, the settled volume of particles times $3/(4\pi)$,
- 3) $V_L(t)$, the leaked volume of particles times $3/(4\pi)$,
- 4) $N_P(t)$, the plated number of particles,
- 5) $N_S(t)$, the settled number of particles, and
- 6) $N_T(v_i, t)$, the time integral of the suspended numbers of a discrete volume, v_i . This is required for calculation of plated, settled, and leaked number and volume distributions.

Simultaneous differential equations for these quantities can be written in terms of $X_0(t)$, $X_1(t)$, $u(t)$, and $\mu(t)$; and can be included with Equations 8, 9, and 10 as the system of equations to be solved.⁽⁵⁾ The additional equations are:

$$\frac{dV_P}{dt} = P_R X_0 \left[e^{\frac{2}{3}\mu + \frac{2}{9}u} + A e^{\frac{1}{3}\mu + \frac{1}{18}u} \right] , \quad \dots (11)$$

$$\frac{dV_S}{dt} = G_R X_1 \left[e^{\frac{2}{3}\mu + \frac{8}{9}u} + A e^{\frac{1}{3}\mu + \frac{7}{18}u} \right] , \quad \dots (12)$$

$$\frac{dV_L}{dt} = R_L X_1 , \quad \dots (13)$$

$$\frac{dN_P}{dt} = P_R X_0 \left[e^{-\frac{1}{3}\mu + \frac{1}{18}u} + A e^{-\frac{2}{3}\mu + \frac{2}{9}u} \right] , \quad \dots (14)$$

$$\frac{dN_S}{dt} = G_R X_0 \left[e^{\frac{2}{3}\mu + \frac{2}{9}u} + A e^{\frac{1}{3}\mu + \frac{1}{18}u} \right] , \text{ and } \dots (15)$$

$$\frac{dN_T(v_i, t)}{dt} = \frac{X_0}{\sqrt{2\pi u}} \exp \left[-\frac{(\ln v_i - \mu)^2}{2u} \right] \frac{1}{v_i} . \quad \dots (16)$$

Equation 16 is required for each discrete value, v_i , at which $N_T(v_i, t)$ is desired.

The equations for the number and volume distributions for the plated $D_P(v,t)$, the settled $D_S(v,t)$, and the leaked $D_L(v,t)$ material are obtained from the following relation.

$$\frac{dD_M(v,t)}{dt} = n(v,t) R_M(v) \quad ,$$

where $R_M(v)$ is the removal rate for process M. But, since the equation

$$\frac{dN_T(v_i,t)}{dt} = n(v_i,t)$$

has been solved (Equation 16); we have

$$D_M(v_i,t) = N_T(v_i,t) R_M(v_i) \quad .$$

By using Equation 3 for the forms of the removal rates and assuming that the exponential term of the Cunningham correction may be neglected, the time-dependent cumulative number distribution functions for discrete volumes are

$$D_P(v_i,t) = P_R \left[v_i^{-\frac{1}{3}} + A v_i^{-\frac{2}{3}} \right] N_T(v_i,t) \quad , \quad \dots (17)$$

$$D_S(v_i,t) = G_R \left[v_i^{\frac{2}{3}} + A v_i^{\frac{1}{3}} \right] N_T(v_i,t) \quad , \quad \dots (18)$$

$$D_L(v_i,t) = R_L N_T(v_i,t) \quad . \quad \dots (19)$$

The change in the number distribution during a time interval, $t_j - t_{j-1}$, may be found from

$$\Delta D_M(v_i,t_j) = D_M(v_i,t_j) - D_M(v_i,t_{j-1}) \quad \dots (20)$$

for process M. Since the distributions as functions of particle radius, $D'_M(r,t)$, are desired, the relations

$$D_M(v,t)dv = D'_M(r,t)dr \quad \text{and} \quad v = r^3$$

may be used to transform to functions of r ; thus

$$D'_M(r_i, t) = 3r_i^2 D_M(v_i, t) \quad \dots (21)$$

Volume distributions, $D'_{VM}(r_i, t)$, may be obtained by multiplying the number distribution by the discrete volume, $(4/3)\pi v_i$; thus,

$$D'_{VM}(r_i, t) = \frac{4}{3}\pi v_i D'_M(r_i, t) \quad \dots (22)$$

The change in the volume distribution during a time interval, $t_j - t_{j-1}$, may be found from,

$$\Delta D'_{VM}(r_i, t_j) = D'_{VM}(r_i, t_j) - D'_{VM}(r_i, t_{j-1}) \quad \dots (23)$$

Other parameters of interest may be obtained from the calculations described in this section. The geometric mean deviation, $\sigma_R(t)$, for the suspended material may be obtained from

$$\sigma_R(t) = \exp\left[\frac{1}{3} \sqrt{u(t)}\right] \quad \dots (24)$$

The logarithmic mean radius, r_g , for the suspended material is given by

$$r_g(t) = \exp[\mu(t)/3] \quad \dots (25)$$

The 50% radius, r_{50} , for the suspended material is

$$r_{50}(t) = \exp\left[3 \ln^2 \sigma_R(t) + \ln r_g(t)\right] \quad \dots (26)$$

Effective radii for the suspended material at any time and effective radii for the removed material during a time interval may be defined as:

$$R_{Aeff}(t) = \left[X_1(t)/X_0(t)\right]^{1/3} \quad (\text{suspended}) \quad \dots (27)$$

$$R_{Peff}(t_j) = \left[\frac{V_P(t_j) - V_P(t_{j-1})}{N_P(t_j) - N_P(t_{j-1})}\right] \quad (\text{plated}) \quad ; \quad \text{and} \quad \dots (28)$$

$$R_{Seff}(t_j) = \left[\frac{V_S(t_j) - V_S(t_{j-1})}{N_S(t_j) - N_S(t_{j-1})}\right] \quad (\text{settled}). \quad \dots (29)$$

The solutions to the set of first order simultaneous differential Equations 8 through 16 must be obtained by numerical integration; however, the magnitude of the calculations has been considerably reduced when compared to the numerical integration of Equation 1.

III. METHOD OF SOLUTION

The set of first order simultaneous differential equations (8 through 16) is solved by program HAA-3 by using the library subroutine RKADAM.⁽⁸⁾ This routine allows the user to select one of the following methods to perform the integration:

- 1) Single step 4th order Runge-Kutta method with fixed increment,
- 2) Adam Moulton method with third differences and fixed increment, or
- 3) Adams Moulton method with third differences and variable increment.

Methods 2 and 3 use Method 1 to generate starting values. Reference 9 contains a description of the above methods. For all cases checked thus far, Method 3 has been used; excellent results have been obtained.

The number of simultaneous differential equations that are solved depends on the options selected by the user. Equations 8 through 10 are always solved; but Equations 11 through 16 are optional.

The programming of the differential equations is contained in subroutine FUND which is called by subroutine RKADAM. The details of this programming appear in Appendix D; a listing of subroutine FUND along with the other HAA-3 subroutines (excluding subroutines RKADAM and AICRT3) are given in Appendix C.

As a check on the numerical accuracy of the integration, the volume concentration released by the source plus the initial airborne volume concentration is calculated at each time step; in addition, the sum of the airborne, settled, plated, and leaked volume concentrations (volume balance) is calculated. For all cases checked thus far, the two quantities have agreed through a minimum of 4 significant figures.

When a source is specified, it may be cut off after a time τ . The procedure used to effect this cutoff is as follows.

- 1) The integration is performed by using the designated method with the source included until the time is greater than or equal to τ .
- 2) The calculation is stopped, and the last time step eliminated; thus, the last time retained T_L is less than τ .

- 3) The integration is restarted by using the Adams Moulton method with third differences and a fixed increment equal to $\tau - T_L$; only one time step is done. Output is forced at the end of this step.
- 4) The integration is again restarted by using the designated method with the original trial time increment; however, the source is not used (ISORS is set equal to zero); the integration is continued until one of the termination criteria is satisfied.

The integration may be terminated in one of four ways.

- 1) When the number of time steps exceeds an input number, KMAX, the integration is terminated ($KMAX \leq 1000$);
- 2) When the time exceeds input value, TMAXIN, the integration is terminated;
- 3) When the ratio of the airborne volume concentration to the maximum value of that quantity is less than an input parameter, EPSL, the integration is terminated; or
- 4) When the integration step is not valid as determined by subroutine RKADAM, the integration is terminated; this occurs if the time step becomes zero during an Adams Moulton iteration. An error message will also be printed.

The present version of HAA-3 requires that the factor Δ in the plating term of Equation 3 be independent of time; however, provision has been made to allow Δ to be changed when the source cutoff time has been reached.

Output is obtained for every ISEQth time step and the source cutoff time. The time that is printed is the value at the end of the time step. Storage limitations, however, have put a limit of 200 on the number of times to be printed. If $KMAX/ISEQ$ (plus 1, if $MOD(KMAX, ISEQ)$ is not equal to zero) is greater than 200, storage space may be exceeded. The program makes this calculation and skips to the next case if the storage space could be exceeded.

Input instructions and sample input for HAA-3 are found in Appendix A. Output description and sample output are found in Appendix B.

IV. CONSTANTS USED IN THE PROGRAM

In Equation 2, the relations for agglomeration due to Brownian motion and gravity, the constants are:

$$k = 1.38 \times 10^{-16} \text{ ergs/}^\circ\text{K}$$

$$T = \text{input, } ^\circ\text{K}$$

$$\eta = \text{input, dyne sec/cm}^2,$$

$$g = 980.0 \text{ cm/sec}^2,$$

$$\delta = \text{input, gm/cm}^3,$$

$$\delta_o = 0.0,$$

$$A = 0.083 \text{ microns,}$$

$$B = \lambda = 0.0,$$

$$B_1 = 9.2 \times 10^{-17} \left(\frac{T}{\eta} \right) \frac{\text{cm}^3}{\text{particle} \cdot \text{sec}}, \text{ and}$$

$$G_1 = 6.84169 \times 10^{-14} \left(\frac{\delta}{\eta} \right) \frac{1}{\text{particle sec cm}} \left(\frac{\text{cm}}{\text{micron}} \right)^4.$$

In Equation 3, the removal rates, the constants are:

$$\frac{A_F}{V_C} = \text{input, cm}^{-1},$$

$$\frac{A_w}{V_C} = \text{input, cm}^{-1},$$

$$\Delta = \text{input, cm,}$$

$$G_R = 2.17778 \times 10^{-6} \frac{A_F \delta}{V_C \eta} \frac{1}{\text{cm}^2 \text{ sec}} \left(\frac{\text{cm}}{\text{micron}} \right)^2,$$

$$P_R = 7.32113 \times 10^{-14} \frac{A_w T}{V_C \eta \Delta} \frac{\text{cm}}{\text{sec}} \left(\frac{\text{micron}}{\text{cm}} \right), \text{ and}$$

$$R_L = \text{input, sec}^{-1};$$

where g , η , δ , and T have been described.

Other input constants are described in the input instructions, Appendix A.

V. OPTIONS

The HAA-3 program offers options to include any combination of the following terms to the moments differential equations:

- 1) the log-normal source (may be cut off after a specified time),
- 2) settling due to gravity,
- 3) wall plating,
- 4) leakage,
- 5) agglomeration due to Brownian motion, and/or
- 6) agglomeration due to gravity.

When any one of Items 2 through 4 are not selected, the appropriate volume and number concentration differential equations are not included in the set of simultaneous differential equations; in addition, the number and volume distribution calculations are not performed for that item.

Other options include:

- 1) An initial airborne concentration may be specified,
- 2) If the number, IVOL, of discrete particle volumes is set equal to zero, the time integrals of the suspended numbers of discrete volumes are not done; no distribution calculations are performed,
- 3) One of three methods to perform the integration may be selected (see Section III), and/or
- 4) The use of two Δ 's, one before source cutoff and one after source cutoff is optional.

Agglomeration due to turbulence is not available. For each combination of options, all associated output is both printed and plotted.

VI. CODE OPERATION

The HAA-3 code has been given a deck number, W50133. The code has been placed on a 2311 disk, WX0200. Table 1 gives a listing of the S/360 JCL cards required to run HAA-3.

TABLE 1
PROGRAM HAA-3 PROCEDURE AND JCL CARDS

```
//JOB LIB DD DSNAME=HELLMOD, UNIT=2311, VOLUME=SER=WX0200, - - - - X
//
//G EXEC PGM=W50133
//SYSCRT DD DSNAME=CRT, UNIT=(SYSCRT,, DEFER), DISP=(MOD, KEEP), - - - X
//
// VOLUME=SER=AICRTS, LABEL=(, NL)
//FT05F001 DD DDNAME=SYSIN
//FT06F001 DD SYSOUT=A
//SYSIN DD *
Insert input data here; multiple cases allowed.
/*
```

For cases in which IVOL=O (no distribution calculations) and the geometry indicated in the sample case Appendix A, a typical running time is 1 min per case on the IBM S/360 Model 50; up to 12 CRT's and less than 600 lines of printed output per case may be expected. However, if the number of time steps to be printed is increased (ISEQ decreased), the number of lines to be printed may approach 1000 per case.

If IVOL $\neq$ O (distributions are calculated), there will be approximately $2 * (IPLAT + ISETL + ILEAK) * \frac{N}{10}$ additional CRT's per case where N is the number of time steps that are printed; since N is unknown before the run, it must be estimated. The additional lines printed will be approximately $12 * (IPLAT + ISETL + ILEAK) * N$. Running time will be less than 2 min per case.

When the calculation of the effective radii (Equations 27 through 29) is being performed, spurious results and possibly division by zero may result at

large values of time. This may occur if the change in volume and the change in numbers are very nearly zero; the precision of the calculation may not be sufficient to give accurate differences. Zero may be calculated for the denominator, and division by zero may occur. An error message will be printed for each division by zero. For similar reasons, the calculation of the change in the distributions (Equation 20) may be inaccurate at large values of time.

VII. REFERENCES

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APPENDIX A

INPUT DATA INSTRUCTIONS AND SAMPLE DATA SHEETS

APPENDIX A

INPUT INSTRUCTIONS AND SAMPLE DATA SHEETS

A list of input quantities, their definitions, and card formats are given below. The set of 8 cards (7 if IVOL = 0) is required for each HAA-3 case. As many HAA-3 cases as desired may be run.

CARD 1 – FORMAT (12A4)

<u>Item</u>	<u>Definition</u>
TITLE	= 48 literal characters for printed output and CRT titles in Columns 1 through 48

CARD 2 – FORMAT (6I12)

<u>Item</u>	<u>Definition</u>
ISETL	= 1 – Yes/0 – No, settling term
IPLAT	= 1 – Yes/0 – No, plating term
ILEAK	= 1 – Yes/0 – No, leakage term
LAGGB	= 1 – Yes/0 – No, Brownian motion agglomeration term
LAGGG	= 1 – Yes/0 – No, gravity agglomeration term
LAGGT	= not used

CARD 3 – FORMAT (5I12)

<u>Item</u>	<u>Definition</u>
ISORS	= 1 – Yes/0 – No, source term
INDIN	method of integration
	= 2, Adams Moulton with fixed incrementing
	= 1, Runge-Kutta with fixed incrementing
	= 0, Adams Moulton with variable incrementing
KMAX	= Maximum number of time steps; must be less than, or equal to 1000

AI-AEC-MEMO-12880

<u>Item</u>	<u>Definition</u>
ISEQ	= Increment for time step index at which output is desired. Output is obtained for the initial time, the source cutoff time, and at time index $N + \text{ISEQ}$ where N is the index of the previous time at which output occurred. The values of ISEQ and KMAX must satisfy this relation: $(\text{KMAX}/\text{ISEQ}) + 2 \leq 200$.
IVOL	= Number of discrete radii for the distribution calculations. $\text{IVOL} \leq 42$; use $\text{IVOL} = 0$ for no distribution calculations.

CARD 4 - FORMAT (6E12.4)

<u>Item</u>	<u>Definition</u>
S0	= Source rate, particle/(cc*sec)
SIGSOR	σ_v , = Source geometric mean deviation (volume), microns**3
VSOR	= Source 50% radius cubed, microns**3
XIN(1)	= Initial concentration of aerosol, particles/cm**3
SIGAIR	σ_v , = Aerosol geometric mean deviation (volume), microns**3
VAIR	= Aerosol 50% radius cubed, microns**3

Special Notes for Card 4

1. If $\text{ISORS} = 0$, $\text{XIN}(1)$, SIGAIR , and VAIR must be non-zero; S0 , SIGSOR , and VSOR are not used.
2. If $\text{XIN}(1) = 0.0$, SIGAIR and VAIR are not used.
3. SIGSOR and SIGAIR are values of the volume σ_v as defined by $u = \ln^2 \sigma_v$ and u is defined in Equation (4). Also $\sigma_v = \sigma_R^3$ where σ_R is the value of sigma when Equation 4 is written as a function of radius.

Special Notes for Card 4 (Continued)

4. VSOR and VAIR are values of V50 as defined by

$$V50 = \exp [\ln^2 \sigma_v + \ln V] , \text{ and } V \text{ is defined in Equation 4.}$$

$$\text{Also, } V50 = (R50)^3.$$

CARD 5 – FORMAT (6E12.4)

<u>Item</u>	<u>Definition</u>
T0	= Initial time, sec
TAUIN	= Source cutoff time, sec (not used if ISORS = 0)
TMAXIN	= Maximum time, sec; problem will be terminated if this time is exceeded.
HIN	= Initial time step, sec
TOLIN	= Convergence criterion, referred to only when INDIN = 0; values between 10^{-3} and 10^{-7} are typical. Current HAA-3 runs use 10^{-3} with success. See Reference 8 for complete description (TOLIN = TOL).
RVL	= Leakage rate, per sec.

CARD 6 – FORMAT (6E12.4)

<u>Item</u>	<u>Definition</u>
AFOV	= Area of floor/volume of chamber, per cm.
RHO	= Density of aerosol material, gm/cc.
VISC	= Viscosity of air, dyne sec/cm**2.
AWOV	= Area of wall/volume of chamber, per cm.
TEMP	= Temperature, degrees K.
DELTA	= Constant Δ , cm, in plating equation (3); if a DELTA1 is specified on Card 8; then, this DELTA is used only until the source is cut off.

CARD 7 - FORMAT (6E12.4) - Omit this card type if IVOL = 0

<u>Item</u>	<u>Definition</u>
(VI(I), I = 1, IVOL)	= Discrete radii, microns, at which distribution calculations will be made. A maximum of 7 cards may be required.

CARD 8 - FORMAT (2E12.4)

<u>Item</u>	<u>Definition</u>
EPSL	= When the volume ratio suspended divided by the maximum volume ratio suspended is less than EPSL, the problem is terminated. (Volume ratio suspended is defined as the volume suspended divided by the total volume released.)
DELTA1	= Constant Δ , cm, in plating Equation (3); this DELTA1 is used after the source is cut off. If DELTA1 is zero or left blank, it is set equal to DELTA.

In order to illustrate the input required for an HAA-3 run, sample input data sheets are given for one case.

FORTRAN FIXED 10 DIGIT DECIMAL DATA

DECK NO. _____ PROGRAMMER _____ DATE _____ PAGE 1 of 3 JOB NO. _____

NUMBER	IDENTIFICATION	DESCRIPTION DO NOT KEY PUNCH
1 H A A - 3 C H E C K		48 literal characters for printed output and CRT titles
13 O U T L T C - 1 G		
25 E O M E T R Y N O		
37 L E A K A G E		
49	73 80	
61	1 0	
1	1	IS E T L = 1 include settling in equations
13	1	I P L A T = 1 include plating in equations
25	0	I L E A K = 0 omit leakage terms in equations
37	1	I A G G B = 1 include Brownian motion agglomeration
49	1 73 80	I A G G G = 1 include gravity agglomeration
61	0 2 0	I A G G T = 0 not used
1	1	I S O R S = 1 include source in equations
13	0	I N D I N = 0 use Adams Moulton with variable incrementing
25	5 5 0	K M A X = 550 maximum number of time steps
37	3	I S E Q = 3 output every 3rd time step
49	3 0 73 80	I V O L = 30 number of discrete radii for distributions
61	3 0	
1	1 . 6 9 + 4	S 0 source rate, particles/(cc*sec)
13	8 . 0	S I G S O R σ (volume) for the source (microns**3)
25	0 . 2 1 6	V S O R source 50% radius cubed (microns**3)
37	0 . 0	X I N (1) initial concentration of aerosol
49	0 . 0 73 80	not used when X I N (1) = 0.0
61	0 . 0 4 0	

FORTRAN FIXED 10 DIGIT DECIMAL DATA

DECK NO. _____ PROGRAMMER _____ DATE _____ PAGE 2 of 3 JOB NO. _____

	NUMBER	IDENTIFICATION	DESCRIPTION DO NOT KEY PUNCH
1	0 . 0		T0 initial time, sec
13	1 0 0 0 . 0		TAUIN source cutoff time, sec
25	2 0 0 0 0 . 0		TMAXIN maximum time, sec
37	1 . 0		HIN initial time step
49	0 . 0 0 1	73	TOLIN convergence criterion
61	0 . 0	5 0	RVL leakage rate (RVL = 0.0, no leakage)
1	5 . 5 - 3		AFOV area floor/volume chamber, per cm
13	2 . 2 7		RHO density of aerosol material, gm/cc
25	1 . 8 1 2 6 - 4		VISC viscosity of air, dyne sec/cm**2
37	9 . 2 - 2		AWOV area wall/volume chamber, per cm
49	2 9 0 . 6 4	73	TEMP temperature, degrees K
61	1 . 0 - 4	6 0	DELTA constant Δ in plating term, cm
1	0 . 1 0		(VI(I), I = 1, IVOL) discrete radii, microns, at which
13	0 . 1 5		distribution calculations will be made.
25	0 . 2 0		These cards are required because IVOL $\neq$ 0.
37	0 . 2 5		
49	0 . 3 0	73	
61	0 . 4 0	7 1	
1	0 . 5 0		continued
13	0 . 6 0		
25	0 . 8 0		
37	1 . 0 0		
49	1 . 5 0	73	
61	2 . 0 0	7 2	

FORTRAN FIXED 10 DIGIT DECIMAL DATA

DECK NO. _____ PROGRAMMER _____ DATE _____ PAGE 3 of 3 JOB NO. _____

	NUMBER	IDENTIFICATION	DESCRIPTION DO NOT KEY PUNCH
1	2 . 5 0		continued
13	3 . 0 0		
25	3 . 5 0		
37	4 . 0 0		
49	5 . 0 0	73 80	
61	6 . 0 0	7 3	
1	8 . 0 0		continued
13	1 0 . 0		
25	1 1 . 0		
37	1 2 . 0		
49	1 3 . 0	73 80	
61	1 4 . 0	7 4	
1	1 5 . 0		continued
13	1 6 . 0		
25	1 7 . 0		
37	1 8 . 0		
49	1 9 . 0	73 80	
61	2 0 . 0	7 5	
1	0 . 0 1		EPSL volume/max volume shutoff ratio
13			DELTA1 since entry is blank, DELTA1 = DELTA
25			
37			
49		73 80	
61		8 0	

APPENDIX B

OUTPUT DESCRIPTION AND SAMPLE OUTPUT

APPENDIX B

OUTPUT DESCRIPTION AND SAMPLE OUTPUT

Every page of HAA-3 output is headed by the program name and the input title for the case.

HAA-3 prints all of the input data. One page of output is produced if IVOL equals zero. If IVOL does not equal zero, a second page containing the discrete radii will be printed. The printed input data are self-explanatory.

HAA-3 then prints one page of calculated constants and initial conditions. The initial log-normal distribution parameters u , μ , and X_0 for the suspended material are printed; in addition, the initial first and second moments are given. If X_0 is zero ($XIN(1) = 0.0$ on the first page of printed input), the comment "no suspended material" replaces the printed parameters for the suspended material. The log-normal distribution parameters u , μ , and S_0 for the source are printed; also the first and second moments are given. If ISORS is zero, the comment "no source" replaces the printed source parameters.

The number of simultaneous differential equations that must be solved for the combination of input options selected is then printed. This is followed by the settling constant G_R , the plating constant P_R , the agglomeration due to gravity constant G_1 , and the Brownian motion agglomeration constant B_1 (see Section IV).

The remaining output data are the time dependent results of the solutions to the simultaneous differential equations; all output quantities are both printed and plotted.

The first two pages contain the volume balance $VBAL(t)$ and volume released $VREL(t)$ respectively.

$$VBAL(t) = \frac{4}{3} \pi [X_1(t) + V_P(t) + V_S(t) + V_L(t)] \quad , \quad \text{(See Equations 9, 11, 12, and 13),}$$

where t = time. $VBAL(t)$ = the total volume (microns³) of material per cm³ of container volume.

$$VREL(t) = \frac{4}{3} \pi [X_1(t_0) + (t - t_0) * S_1] , \quad \text{for } t_0 \leq t \leq \tau ;$$

and

$$VREL(t) = \frac{4}{3} \pi [X_1(t_o) + \tau * S_1], \quad \text{for } t > \tau;$$

where t_o = the initial time and τ = the source cutoff time. $VREL(t)$ = the total volume (microns³) of material released by the source per cm³ of container volumes plus the total volume (microns³) initially suspended. $VBAL(t)$ should be equal to $VREL(t)$ if the solution of the simultaneous differential equations is accurate. Both $VBAL(t)$ and $VREL(t)$ should increase in value until the source is cut off; then, both should remain constant. These two quantities are plotted on the same page.

The next data that appear are:

1) Volume ratio plated $= \frac{4}{3} \pi V_P(t)/VREL(\tau)$, (if IPLAT = 1),

where V_P is obtained from Equation 11;

2) Volume ratio settled $= \frac{4}{3} \pi V_S(t)/VREL(\tau)$, (if ISETL = 1),

where V_S is obtained from Equation 12;

3) Volume ratio suspended $= \frac{4}{3} \pi X_1(t)/VREL(\tau)$,

where X_1 is obtained from Equation 9; and

4) Volume ratio leaked $= \frac{4}{3} \pi V_L(t)/VREL(\tau)$, (if ILEAK = 1),

where V_L is obtained from Equation 13;

5) $\sigma_R(t)$ is from Equation 24;

6) $r_g(t)$ is from Equation 25;

7) $r_{50}(t)$ is from Equation 26;

8) Suspended number/cm³, $X_o(t)$ is from Equation 8;

9) The settled number distributions (function of particle radius) for each of 10 times are followed by the settled volume distributions for the same times. This is repeated until all printout values of the time are

used; since the initial time is omitted, the first set will contain 9 values of time. The plots of the number distributions for each set will be overlaid on one page; this will be followed by the volume distributions for the same set overlaid on one page. A distribution is defined as the change in the actual distribution during the time interval as indicated in Equations 20 and 23. All distributions are functions of radius; the change of variable from radius cubed to radius is indicated in Equation 21. For the settled number and volume distributions, Equations 18, 20, 21, 22, and 23 are used. This is omitted if IVOL = 0 or ISETL = 0;

- 10) The plated number and volume distributions are from Equations 17, 20, 21, 22, and 23; the comments in 9) above apply here. This is omitted if IVOL = 0 or IPLAT = 0;
- 11) $R_{Aeff}(t)$ is from Equation 27;
- 12) $R_{Seff}(t)$ is from Equation 29 (if ISETL = 1);
- 13) $R_{Peff}(t)$ is from Equation 28 (if IPLAT = 1); and
- 14) The leaked number and volume distributions are from Equations 19, 20, 21, 22, and 23; the comments in 9) above apply here. This is omitted if IVOL = 0 or ILEAK = 0.

For the distribution and effective radii calculations, the precision of the machine may not be sufficient at large times (see Section VI for details). If the distribution is zero at any radius, that distribution is not plotted.

In order to illustrate the output from an HAA-3 run, a sample printout for one case is given. The input for this case is the sample input given in Appendix A. The printout is followed by the CRT plots of the results.

PROGRAM HAA-3 - AEROSOL LOG-NORMAL - INPUT PAGE 1

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLING TERMS (1=YES/0=NO)	ISETL = 1
PLATING TERMS (1=YES/0=NO)	IPLAT = 1
LEAKAGE TERMS (1=YES/0=NO)	ILEAK = 0
AGGLOMERATION, BROWNIAN (1=YES/0=NO)	IAGGB = 1
AGGLOMERATION, GRAVITY (1=YES/0=NO)	IAGGG = 1
AGGLOMERATION, TURBULENCE (1=YES/0=NO)	IAGGT = 0
SOURCE TERMS (1=YES/0=NO)	ISJRS = 1
METHOD OF INTEGRATION	INDIN = 0
(2 = ADAMS MOULTON WITH FIXED INCREMENTING)	
(1 = RUNGE-KUTTA WITH FIXED INCREMENTING)	
(0 = ADAMS MOULTON WITH VARIABLE INCREMENTING)	
MAXIMUM NUMBER OF TIME STEPS (I.E. 1000)	KMAX = 550
INCREMENT FOR TIME INDEX FOR OUTPUT	ISEQ = 3
NUMBER OF DISCRETE VOLUMES FOR DISTRIBUTION CALC.	IVOL = 30
SOURCE RATE, PARTICLES/(CM**3*SEC)	SO = 1.690E 04
SOURCE SIGMA (VOLUME)	SIGSOR = 8.000E 00
SOURCE 50 PERCENT VOLUME SIZE, MICRONS**3	VSJR = 2.160E-01
INITIAL CONCENTRATION OF AEROSOL, PARTICLES/CM**3	XIN(1) = 0.0
AEROSOL SIGMA (VOLUME)	SIGAIR = 0.0
AEROSOL 50 PERCENT VOLUME SIZE, MICRONS**3	VAIR = 0.0
INITIAL TIME, SEC	TO = 0.0
SOURCE CUTOFF TIME, SEC	TAUIN = 1.000E 03
MAXIMUM TIME, SEC	TMAXIN = 2.000E 04
TIME STEP, INITIAL, SEC	HIN = 1.000E 00
CONVERGENCE CRITERION	TOLIN = 1.000E-03
LEAKAGE RATE, PER SECCAD	RVL = 0.0
AREA OF FLOOR/VOLUME, PER CM	AFOV = 5.500E-03
DENSITY OF AEROSOL MATERIAL, GM/CM**3	RHO = 2.270E 00
VISCOSITY OF AIR, DYNE SEC/CM**2	VISC = 1.813E-04
AREA OF WALL/VOLUME, PER CM	AWOV = 9.200E-02
TEMPERATURE, DEGREES K	TEMP = 2.906E 02
DELTA	DELTA = 1.000E-04
VOLUME/VOL. MAX SHUTOFF RATIO	EPSL = 1.000E-02
DELTA AFTER SOURCE CUTOFF	DELTA1 = 1.000E-04

PROGRAM HAA-3 - AEROSOL LOG-NORMAL - INPUT PAGE 2

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

DISCRETE RADII, MICRONS, FOR DISTRIBUTION CALC.		DISCRETE RADII, MICRONS, FOR DISTRIBUTION CALC.		DISCRETE RADII, MICRONS, FOR DISTRIBUTION CALC.		DISCRETE RADII, MICRONS, FOR DISTRIBUTION CALC.	
INDEX	RADIUS	INDEX	RADIUS	INDEX	RADIUS	INDEX	RADIUS
1	1.000E-01	2	1.500E-01	3	2.000E-01	4	2.500E-01
6	4.000E-01	7	5.000E-01	8	6.000E-01	9	8.000E-01
11	1.500E 00	12	2.000E 00	13	2.500E 00	14	3.000E 00
16	4.000E 00	17	5.000E 00	18	6.000E 00	19	8.000E 00
21	1.100E 01	22	1.200E 01	23	1.300E 01	24	1.400E 01
26	1.600E 01	27	1.700E 01	28	1.800E 01	29	1.900E 01
						30	2.000E 01

PROGRAM HAA-3 - AEROSOL LOG-NORMAL - INITIAL CONDITIONS

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

NO SUSPENDED MATERIAL

SOURCE

U = 4.3241E 00
MU = -5.8566E 00
S0 = 1.6900E 04
S1 = 4.2013E 02
S2 = 7.8849E 02

NUMBER OF DIFFERENTIAL EQ. = 37
SETTLING CONSTANT, GR = 1.5000D-04
PLATING CONSTANT, PR = 1.0800D-04
GRAV. AGGLOM. CONST., G1 = 8.5682D-10
BROWNIAN AGGLOM. CONST., B1 = 1.4752D-10

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

VOLUME BALANCE, CUBIC MICRONS

INDEX	TIME, SEC	VOLUME	INDEX	TIME, SEC	VOLUME	INDEX	TIME, SEC	VOLUME
1	0.0	0.0	2	3.000E 00	5.279E 03	3	6.000E 00	1.056E 04
4	1.100E 01	1.936E 04	5	1.900E 01	3.344E 04	6	3.100E 01	5.455E 04
7	5.500E 01	9.679E 04	8	9.500E 01	1.672E 05	9	1.430E 02	2.517E 05
10	1.910E 02	3.361E 05	11	2.710E 02	4.769E 05	12	3.670E 02	6.459E 05
13	4.630E 02	8.148E 05	14	6.550E 02	1.153E 06	15	8.470E 02	1.491E 06
16	1.000E 03	1.760E 06	17	1.003E 03	1.760E 06	18	1.006E 03	1.760E 06
19	1.011E 03	1.760E 06	20	1.019E 03	1.760E 06	21	1.031E 03	1.760E 06
22	1.055E 03	1.760E 06	23	1.095E 03	1.760E 06	24	1.159E 03	1.760E 06
25	1.255E 03	1.760E 06	26	1.351E 03	1.760E 06	27	1.447E 03	1.760E 06
28	1.575E 03	1.760E 06	29	1.767E 03	1.760E 06	30	1.959E 03	1.760E 06
31	2.151E 03	1.760E 06	32	2.343E 03	1.760E 06	33	2.663E 03	1.760E 06
34	3.047E 03	1.760E 06	35	3.431E 03	1.760E 06	36	3.815E 03	1.760E 06
37	4.199E 03	1.760E 06	38	4.583E 03	1.760E 06	39	5.351E 03	1.760E 06
40	6.119E 03	1.760E 06	41	6.887E 03	1.760E 06	42	7.655E 03	1.760E 06
43	8.423E 03	1.760E 06	44	9.191E 03	1.760E 06	45	9.959E 03	1.760E 06
46	1.073E 04	1.760E 06	47	1.149E 04	1.760E 06	48	1.226E 04	1.760E 06
49	1.303E 04	1.760E 06	50	1.405E 04	1.760E 06			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

VOLUME RELEASED, CUBIC MICRONS

INDEX	TIME, SEC	VOLUME	INDEX	TIME, SEC	VOLUME	INDEX	TIME, SEC	VOLUME
1	0.0	0.0	2	3.000E 00	5.279E 03	3	6.000E 00	1.056E 04
4	1.100E 01	1.936E 04	5	1.900E 01	3.344E 04	6	3.100E 01	5.455E 04
7	5.500E 01	9.679E 04	8	9.500E 01	1.672E 05	9	1.430E 02	2.517E 05
10	1.910E 02	3.361E 05	11	2.710E 02	4.769E 05	12	3.670E 02	6.459E 05
13	4.630E 02	8.148E 05	14	6.550E 02	1.153E 06	15	8.470E 02	1.491E 06
16	1.000E 03	1.760E 06	17	1.003E 03	1.760E 06	18	1.006E 03	1.760E 06
19	1.011E 03	1.760E 06	20	1.019E 03	1.760E 06	21	1.031E 03	1.760E 06
22	1.055E 03	1.760E 06	23	1.095E 03	1.760E 06	24	1.159E 03	1.760E 06
25	1.255E 03	1.760E 06	26	1.351E 03	1.760E 06	27	1.447E 03	1.760E 06
28	1.575E 03	1.760E 06	29	1.767E 03	1.760E 06	30	1.959E 03	1.760E 06
31	2.151E 03	1.760E 06	32	2.343E 03	1.760E 06	33	2.663E 03	1.760E 06
34	3.047E 03	1.760E 06	35	3.431E 03	1.760E 06	36	3.815E 03	1.760E 06
37	4.199E 03	1.760E 06	38	4.583E 03	1.760E 06	39	5.351E 03	1.760E 06
40	6.119E 03	1.760E 06	41	6.887E 03	1.760E 06	42	7.655E 03	1.760E 06
43	8.423E 03	1.760E 06	44	9.191E 03	1.760E 06	45	9.959E 03	1.760E 06
46	1.073E 04	1.760E 06	47	1.149E 04	1.760E 06	48	1.226E 04	1.760E 06
49	1.303E 04	1.760E 06	50	1.405E 04	1.760E 06			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

VOLUME RATIO PLATED ON WALL

INDEX	TIME, SEC	RATIO	INDEX	TIME, SEC	RATIO	INDEX	TIME, SEC	RATIO
1	0.0	0.0	2	3.000E 00	1.322E-06	3	6.000E 00	5.284E-06
4	1.100E 01	1.774E-05	5	1.900E 01	5.281E-05	6	3.100E 01	1.401E-04
7	5.500E 01	4.381E-04	8	9.500E 01	1.291E-03	9	1.430E 02	2.877E-03
10	1.910E 02	5.042E-03	11	2.710E 02	9.842E-03	12	3.670E 02	1.738E-02
13	4.630E 02	2.665E-02	14	6.550E 02	4.965E-02	15	8.470E 02	7.763E-02
16	1.000E 03	1.028E-01	17	1.003E 03	1.033E-01	18	1.006E 03	1.038E-01
19	1.011E 03	1.047E-01	20	1.019E 03	1.060E-01	21	1.031E 03	1.080E-01
22	1.055E 03	1.119E-01	23	1.095E 03	1.182E-01	24	1.159E 03	1.276E-01
25	1.255E 03	1.406E-01	26	1.351E 03	1.524E-01	27	1.447E 03	1.633E-01
28	1.575E 03	1.766E-01	29	1.767E 03	1.943E-01	30	1.959E 03	2.098E-01
31	2.151E 03	2.235E-01	32	2.343E 03	2.356E-01	33	2.663E 03	2.531E-01
34	3.047E 03	2.705E-01	35	3.431E 03	2.849E-01	36	3.815E 03	2.968E-01
37	4.199E 03	3.069E-01	38	4.583E 03	3.155E-01	39	5.351E 03	3.291E-01
40	6.119E 03	3.393E-01	41	6.887E 03	3.471E-01	42	7.655E 03	3.530E-01
43	8.423E 03	3.576E-01	44	9.191E 03	3.612E-01	45	9.959E 03	3.641E-01
46	1.073E 04	3.663E-01	47	1.149E 04	3.681E-01	48	1.226E 04	3.695E-01
49	1.303E 04	3.707E-01	50	1.405E 04	3.718E-01			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

VOLUME RATIO SETTLED ON FLOOR

INDEX	TIME, SEC	RATIO	INDEX	TIME, SEC	RATIO	INDEX	TIME, SEC	RATIO
1	0.0	0.0	2	3.000E 00	6.770E-07	3	6.000E 00	2.704E-06
4	1.100E 01	9.069E-06	5	1.900E 01	2.696E-05	6	3.100E 01	7.140E-05
7	5.500E 01	2.226E-04	8	9.500E 01	6.552E-04	9	1.430E 02	1.465E-03
10	1.910E 02	2.585E-03	11	2.710E 02	5.137E-03	12	3.670E 02	9.334E-03
13	4.630E 02	1.480E-02	14	6.550E 02	2.974E-02	15	8.470E 02	5.053E-02
16	1.000E 03	7.185E-02	17	1.003E 03	7.231E-02	18	1.006E 03	7.278E-02
19	1.011E 03	7.355E-02	20	1.019E 03	7.479E-02	21	1.031E 03	7.667E-02
22	1.055E 03	8.045E-02	23	1.095E 03	8.683E-02	24	1.159E 03	9.724E-02
25	1.255E 03	1.132E-01	26	1.351E 03	1.296E-01	27	1.447E 03	1.462E-01
28	1.575E 03	1.686E-01	29	1.767E 03	2.020E-01	30	1.959E 03	2.348E-01
31	2.151E 03	2.664E-01	32	2.343E 03	2.962E-01	33	2.663E 03	3.417E-01
34	3.047E 03	3.887E-01	35	3.431E 03	4.279E-01	36	3.815E 03	4.602E-01
37	4.199E 03	4.868E-01	38	4.583E 03	5.086E-01	39	5.351E 03	5.415E-01
40	6.119E 03	5.642E-01	41	6.887E 03	5.801E-01	42	7.655E 03	5.915E-01
43	8.423E 03	5.997E-01	44	9.191E 03	6.057E-01	45	9.959E 03	6.102E-01
46	1.073E 04	6.135E-01	47	1.149E 04	6.160E-01	48	1.226E 04	6.179E-01
49	1.303E 04	6.194E-01	50	1.405E 04	6.209E-01			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

VOLUME RATIO SUSPENDED IN AIR

INDEX	TIME, SEC	RATIO	INDEX	TIME, SEC	RATIO	INDEX	TIME, SEC	RATIO
1	0.0	0.0	2	3.000E 00	2.998E-03	3	6.000E 00	5.992E-03
4	1.100E 01	1.097E-02	5	1.900E 01	1.892E-02	6	3.100E 01	3.079E-02
7	5.500E 01	5.434E-02	8	9.500E 01	9.305E-02	9	1.430E 02	1.387E-01
10	1.910E 02	1.834E-01	11	2.710E 02	2.560E-01	12	3.670E 02	3.403E-01
13	4.630E 02	4.215E-01	14	6.550E 02	5.756E-01	15	8.470E 02	7.188E-01
16	1.000E 03	8.253E-01	17	1.003E 03	8.244E-01	18	1.006E 03	8.234E-01
19	1.011E 03	8.218E-01	20	1.019E 03	8.192E-01	21	1.031E 03	8.153E-01
22	1.055E 03	8.076E-01	23	1.095E 03	7.950E-01	24	1.159E 03	7.752E-01
25	1.255E 03	7.462E-01	26	1.351E 03	7.180E-01	27	1.447E 03	6.904E-01
28	1.575E 03	6.548E-01	29	1.767E 03	6.036E-01	30	1.959E 03	5.554E-01
31	2.151E 03	5.102E-01	32	2.343E 03	4.681E-01	33	2.663E 03	4.052E-01
34	3.047E 03	3.408E-01	35	3.431E 03	2.873E-01	36	3.815E 03	2.430E-01
37	4.199E 03	2.063E-01	38	4.583E 03	1.759E-01	39	5.351E 03	1.293E-01
40	6.119E 03	9.646E-02	41	6.887E 03	7.282E-02	42	7.655E 03	5.553E-02
43	8.423E 03	4.270E-02	44	9.191E 03	3.307E-02	45	9.959E 03	2.577E-02
46	1.073E 04	2.018E-02	47	1.149E 04	1.587E-02	48	1.226E 04	1.253E-02
49	1.303E 04	9.924E-03	50	1.405E 04	7.304E-03			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SIGMA, SUSPENDED MATERIAL

INDEX	TIME, SEC	SIGMA	INDEX	TIME, SEC	SIGMA	INDEX	TIME, SEC	SIGMA
2	3.000E 00	1.999E 00	3	6.000E 00	1.998E 00	4	1.100E 01	1.997E 00
5	1.900E 01	1.994E 00	6	3.100E 01	1.990E 00	7	5.500E 01	1.983E 00
8	9.500E 01	1.970E 00	9	1.430E 02	1.955E 00	10	1.910E 02	1.941E 00
11	2.710E 02	1.919E 00	12	3.670E 02	1.896E 00	13	4.630E 02	1.878E 00
14	6.550E 02	1.854E 00	15	8.470E 02	1.843E 00	16	1.000E 03	1.841E 00
17	1.003E 03	1.840E 00	18	1.006E 03	1.839E 00	19	1.011E 03	1.837E 00
20	1.019E 03	1.834E 00	21	1.031E 03	1.830E 00	22	1.055E 03	1.822E 00
23	1.095E 03	1.811E 00	24	1.159E 03	1.797E 00	25	1.255E 03	1.781E 00
26	1.351E 03	1.768E 00	27	1.447E 03	1.758E 00	28	1.575E 03	1.746E 00
29	1.767E 03	1.732E 00	30	1.959E 03	1.718E 00	31	2.151E 03	1.705E 00
32	2.343E 03	1.693E 00	33	2.663E 03	1.671E 00	34	3.047E 03	1.646E 00
35	3.431E 03	1.621E 00	36	3.815E 03	1.598E 00	37	4.199E 03	1.577E 00
38	4.583E 03	1.557E 00	39	5.351E 03	1.522E 00	40	6.119E 03	1.492E 00
41	6.887E 03	1.466E 00	42	7.655E 03	1.444E 00	43	8.423E 03	1.424E 00
44	9.191E 03	1.407E 00	45	9.959E 03	1.392E 00	46	1.073E 04	1.378E 00
47	1.149E 04	1.365E 00	48	1.226E 04	1.354E 00	49	1.303E 04	1.344E 00
50	1.405E 04	1.331E 00						

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 7

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

RG, MICRONS, SUSPENDED MATERIAL

INDEX	TIME, SEC	RG	INDEX	TIME, SEC	RG	INDEX	TIME, SEC	RG
2	3.000E 00	1.422E-01	3	6.000E 00	1.425E-01	4	1.100E 01	1.429E-01
5	1.900E 01	1.437E-01	6	3.100E 01	1.448E-01	7	5.500E 01	1.473E-01
8	9.500E 01	1.517E-01	9	1.430E 02	1.575E-01	10	1.910E 02	1.636E-01
11	2.710E 02	1.741E-01	12	3.670E 02	1.863E-01	13	4.630E 02	1.978E-01
14	6.550E 02	2.179E-01	15	8.470E 02	2.339E-01	16	1.000E 03	2.439E-01
17	1.003E 03	2.449E-01	18	1.006E 03	2.460E-01	19	1.011E 03	2.478E-01
20	1.019E 03	2.506E-01	21	1.031E 03	2.547E-01	22	1.055E 03	2.625E-01
23	1.095E 03	2.746E-01	24	1.159E 03	2.922E-01	25	1.255E 03	3.152E-01
26	1.351E 03	3.353E-01	27	1.447E 03	3.534E-01	28	1.575E 03	3.749E-01
29	1.767E 03	4.035E-01	30	1.959E 03	4.287E-01	31	2.151E 03	4.514E-01
32	2.343E 03	4.721E-01	33	2.663E 03	5.030E-01	34	3.047E 03	5.349E-01
35	3.431E 03	5.620E-01	36	3.815E 03	5.849E-01	37	4.199E 03	6.044E-01
38	4.583E 03	6.210E-01	39	5.351E 03	6.472E-01	40	6.119E 03	6.664E-01
41	6.887E 03	6.806E-01	42	7.655E 03	6.912E-01	43	8.423E 03	6.993E-01
44	9.191E 03	7.056E-01	45	9.959E 03	7.104E-01	46	1.073E 04	7.142E-01
47	1.149E 04	7.172E-01	48	1.226E 04	7.196E-01	49	1.303E 04	7.216E-01
50	1.405E 04	7.236E-01						

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 8

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

R50, MICRONS, SUSPENDED MATERIAL

INDEX	TIME, SEC	R50	INDEX	TIME, SEC	R50	INDEX	TIME, SEC	R50
2	3.000E 00	5.999E-01	3	6.000E 00	5.999E-01	4	1.100E 01	5.998E-01
5	1.900E 01	5.998E-01	6	3.100E 01	5.998E-01	7	5.500E 01	6.004E-01
8	9.500E 01	6.026E-01	9	1.430E 02	6.066E-01	10	1.910E 02	6.119E-01
11	2.710E 02	6.224E-01	12	3.670E 02	6.367E-01	13	4.630E 02	6.519E-01
14	6.550E 02	6.837E-01	15	8.470E 02	7.174E-01	16	1.000E 03	7.458E-01
17	1.003E 03	7.474E-01	18	1.006E 03	7.490E-01	19	1.011E 03	7.516E-01
20	1.019E 03	7.557E-01	21	1.031E 03	7.618E-01	22	1.055E 03	7.735E-01
23	1.095E 03	7.919E-01	24	1.159E 03	8.190E-01	25	1.255E 03	8.555E-01
26	1.351E 03	8.881E-01	27	1.447E 03	9.175E-01	28	1.575E 03	9.524E-01
29	1.767E 03	9.968E-01	30	1.959E 03	1.033E 00	31	2.151E 03	1.061E 00
32	2.343E 03	1.084E 00	33	2.663E 03	1.109E 00	34	3.047E 03	1.126E 00
35	3.431E 03	1.132E 00	36	3.815E 03	1.131E 00	37	4.199E 03	1.126E 00
38	4.583E 03	1.118E 00	39	5.351E 03	1.099E 00	40	6.119E 03	1.077E 00
41	6.887E 03	1.056E 00	42	7.655E 03	1.036E 00	43	8.423E 03	1.018E 00
44	9.191E 03	1.001E 00	45	9.959E 03	9.857E-01	46	1.073E 04	9.719E-01
47	1.149E 04	9.594E-01	48	1.226E 04	9.480E-01	49	1.303E 04	9.376E-01
50	1.405E 04	9.252E-01						

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

CONCENTRATION OF SUSPENDED MATERIAL, PART/CC

INDEX	TIME, SEC	CONC.	INDEX	TIME, SEC	CONC.	INDEX	TIME, SEC	CONC.
1	0.0	0.0	2	3.000E 00	5.054E 04	3	6.000E 00	1.007E 05
4	1.100E 01	1.836E 05	5	1.900E 01	3.143E 05	6	3.100E 01	5.052E 05
7	5.500E 01	8.682E 05	8	9.500E 01	1.414E 06	9	1.430E 02	1.972E 06
10	1.910E 02	2.431E 06	11	2.710E 02	3.016E 06	12	3.670E 02	3.499E 06
13	4.630E 02	3.824E 06	14	6.550E 02	4.206E 06	15	8.470E 02	4.395E 06
16	1.000E 03	4.471E 06	17	1.003E 03	4.421E 06	18	1.006E 03	4.373E 06
19	1.011E 03	4.295E 06	20	1.019E 03	4.176E 06	21	1.031E 03	4.008E 06
22	1.055E 03	3.709E 06	23	1.095E 03	3.293E 06	24	1.159E 03	2.782E 06
25	1.255E 03	2.239E 06	26	1.351E 03	1.856E 06	27	1.447E 03	1.571E 06
28	1.575E 03	1.289E 06	29	1.767E 03	9.943E 05	30	1.959E 03	7.920E 05
31	2.151E 03	6.463E 05	32	2.343E 03	5.374E 05	33	2.663E 03	4.083E 05
34	3.047E 03	3.063E 05	35	3.431E 03	2.378E 05	36	3.815E 03	1.896E 05
37	4.199E 03	1.543E 05	38	4.583E 03	1.276E 05	39	5.351E 03	9.061E 04
40	6.119E 03	6.664E 04	41	6.887E 03	5.021E 04	42	7.655E 03	3.849E 04
43	8.423E 03	2.988E 04	44	9.191E 03	2.341E 04	45	9.959E 03	1.848E 04
46	1.073E 04	1.466E 04	47	1.149E 04	1.168E 04	48	1.226E 04	9.343E 03
49	1.303E 04	7.492E 03	50	1.405E 04	5.601E 03			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 3.0000E 00 SEC
1.0546E 00	1.5226E 00	1.6427E 00	1.5658E 00	1.4039E 00	1.0380E 00	7.3538E-01 5.1611E-01
2.5823E-01	1.3469E-01	3.1924E-02	9.3878E-03	3.2334E-03	1.2546E-03	5.3422E-04 2.4510E-04
6.1406E-05	1.8360E-05	2.3754E-06	4.3206E-07	2.0217E-07	9.9416E-08	5.1034E-08 2.7200E-08
1.4987E-08	8.5046E-09	4.9557E-09	2.9575E-09	1.8037E-09	1.1219E-09	
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 6.0000E 00 SEC
3.1521E 00	4.5581E 00	4.9218E 00	4.6938E 00	4.2096E 00	3.1137E 00	2.2061E 00 1.5484E 00
7.7458E-01	4.0390E-01	9.5656E-02	2.8106E-02	9.6732E-03	3.7506E-03	1.5959E-03 7.3175E-04
1.8312E-04	5.4693E-05	7.0635E-06	1.2828E-06	5.9982E-07	2.9477E-07	1.5122E-07 8.0551E-08
4.4356E-08	2.5158E-08	1.4652E-08	8.7400E-09	5.3277E-09	3.3125E-09	
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.1000E 01 SEC
9.8662E 00	1.4301E 01	1.5463E 01	1.4758E 01	1.3242E 01	9.8002E 00	6.9452E 00 4.8745E 00
2.4380E 00	1.2708E 00	3.0060E-01	8.8215E-02	3.0325E-02	1.1745E-02	4.9925E-03 2.2869E-03
5.7127E-04	1.7036E-04	2.1940E-05	3.9751E-06	1.8568E-06	9.1154E-07	4.6719E-07 2.4864E-07
1.3680E-07	7.7525E-08	4.5116E-08	2.6891E-08	1.6380E-08	1.0177E-08	

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 11

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.9000E 01 SEC
2.770E 01	4.0150E 01	4.3506E 01	4.1579E 01	3.7341E 01	2.7660E 01	1.9009E 01	1.3764E 01	
6.8E 00	3.5849E 00	8.4639E-01	2.4790E-01	8.5055E-02	3.2884E-02	1.3955E-02	6.3823E-03	
1.5098E-03	4.7287E-04	6.0629E-05	1.0943E-05	5.1025E-06	2.5009E-06	1.2798E-06	6.8012E-07	
3.7367E-07	2.1149E-07	1.2292E-07	7.3176E-08	4.4522E-08	2.7631E-08			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 3.1000E 01 SEC
6.7908E 01	9.9446E 01	1.0813E 02	1.0357E 02	9.3140E 01	6.9100E 01	4.9019E 01	3.4413E 01	
1.7199E 01	8.9517E 00	2.1076E 00	6.1546E-01	2.1057E-01	8.1192E-02	3.4369E-02	1.5681E-02	
3.8891E-03	1.1523E-03	1.4674E-04	2.6330E-05	1.2245E-05	5.9866E-06	3.0564E-06	1.6206E-06	
8.8850E-07	5.0184E-07	2.9111E-07	1.7298E-07	1.0506E-07	6.5087E-08			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 5.5000E 01 SEC
2.2646E 02	3.3571E 02	3.6753E 02	3.5352E 02	3.1882E 02	2.3729E 02	1.6858E 02	1.1841E 02	
5.9154E 01	3.0746E 01	7.2039E 00	2.0927E 00	7.1234E-01	2.7334E-01	1.1518E-01	5.2327E-02	
1.2875E-02	3.7877E-03	4.7637E-04	8.4569E-05	3.9140E-05	1.9049E-05	9.6833E-06	5.1134E-06	
2.7926E-06	1.5714E-06	9.0831E-07	5.3789E-07	3.2560E-07	2.0109E-07			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 9.5000E 01 SEC
6.1949E 02	9.3974E 02	1.0424E 03	1.0110E 03	9.1693E 02	6.8698E 02	4.8964E 02	3.4441E 02	
1.7207E 02	8.9272E 01	2.0761E 01	5.9794E 00	2.0181E 00	7.6807E-01	3.2115E-01	1.4483E-01	
3.5157E-02	1.0216E-02	1.2575E-03	2.1913E-04	1.0057E-04	4.8559E-05	2.4500E-05	1.2846E-05	
6.9678E-06	3.8955E-06	2.2377E-06	1.3173E-06	7.9282E-07	4.8693E-07			

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 12

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.4300E 02 SEC
1.0758E 03	1.6878E 03	1.9089E 03	1.8747E 03	1.7148E 03	1.2983E 03	9.3049E 02	6.5638E 02	
3.2842E 02	1.7014E 02	3.9239E 01	1.1184E 01	3.7347E 00	1.4067E 00	5.8237E-01	2.6017E-01	
6.2050E-02	1.7744E-02	2.1230E-03	3.6099E-04	1.6384E-04	7.8278E-05	3.9101E-05	2.0307E-05	
1.0916E-05	6.0500E-06	3.4465E-06	2.0127E-06	1.2021E-06	7.3284E-07			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.9100E 02 SEC
24E 03	2.2060E 03	2.5524E 03	2.5442E 03	2.3513E 03	1.8032E 03	1.3017E 03	9.2201E 02	
75E 02	2.3963E 02	5.4878E 01	1.5487E 01	5.1175E 00	1.9077E 00	7.8182E-01	3.4590E-01	
8.1015E-02	2.2785E-02	2.6465E-03	4.3856E-04	1.9671E-04	9.2944E-05	4.5939E-05	2.3619E-05	
1.2575E-05	6.9054E-06	3.8992E-06	2.2578E-06	1.3375E-06	8.0895E-07			

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 13

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 3.0000E 00 SEC
4.4173E-03	2.1525E-02	5.5048E-02	1.0248E-01	1.5877E-01	2.7827E-01	3.8505E-01	4.6697E-01	
5.5382E-01	5.6418E-01	4.5132E-01	3.1459E-01	2.1163E-01	1.4189E-01	9.5943E-02	6.5707E-02	
3.2152E-02	1.6612E-02	5.0945E-03	1.8098E-03	1.1272E-03	7.1960E-04	4.6965E-04	3.1264E-04	
2.1187E-04	1.4592E-04	1.0199E-04	7.2250E-05	5.1821E-05	3.7597E-05			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 6.0000E 00 SEC
1.3203E-02	6.4438E-02	1.6493E-01	3.0721E-01	4.7609E-01	8.3472E-01	1.1551E 00	1.4009E 00	
1.6612E 00	1.6918E 00	1.3523E 00	9.4185E-01	6.3311E-01	4.2418E-01	2.8662E-01	1.9617E-01	
9.5879E-02	4.9485E-02	1.5149E-02	5.3733E-03	3.3442E-03	2.1336E-03	1.3916E-03	9.2585E-04	
6.2707E-04	4.3164E-04	3.0153E-04	2.1351E-04	1.5307E-04	1.1100E-04			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.1000E 01 SEC
4.1327E-02	2.0218E-01	5.1816E-01	9.6592E-01	1.4977E 00	2.6273E 00	3.6365E 00	4.4104E 00	
5.2287E 00	5.3230E 00	4.2496E 00	2.9561E 00	1.9847E 00	1.3283E 00	8.9662E-01	6.1307E-01	
2.9911E-01	1.5413E-01	4.7054E-02	1.6651E-02	1.0352E-02	6.5979E-03	4.2994E-03	2.8578E-03	
1.9339E-03	1.3301E-03	9.2846E-04	6.5693E-04	4.7062E-04	3.4104E-04			

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 14

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)							TIME = 1.9000E 01 SEC	
1.1557E-01	5.6761E-01	1.4579E 00	2.7213E 00	4.2231E 00	7.4152E 00	1.0267E 01	1.2453E 01	
1.4759E 01	1.5016E 01	1.1966E 01	8.3071E 00	5.5669E 00	3.7191E 00	2.5062E 00	1.7110E 00	
8.3240E-01	4.2784E-01	1.3003E-01	4.5837E-02	2.8448E-02	1.8102E-02	1.1778E-02	7.8173E-03	
5.2827E-03	3.6285E-03	2.5296E-03	1.7876E-03	1.2792E-03	9.2592E-04			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)							TIME = 3.1000E 01 SEC	
2.8445E-01	1.4059E 00	3.6236E 00	6.7784E 00	1.0534E 01	1.8525E 01	2.5667E 01	3.1136E 01	
3.6886E 01	3.7497E 01	2.9795E 01	2.0624E 01	1.3782E 01	9.1826E 00	6.1724E 00	4.2039E 00	
2.0367E 00	1.0425E 00	3.1470E-01	1.1029E-01	6.8268E-02	4.3332E-02	2.8127E-02	1.8627E-02	
1.2561E-02	8.6102E-03	5.9909E-03	4.2257E-03	3.0184E-03	2.1811E-03			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)							TIME = 5.5000E 01 SEC	
9.4861E-01	4.7459E 00	1.2316E 01	2.3138E 01	3.6058E 01	6.3615E 01	8.8268E 01	1.0713E 02	
1.2686E 02	1.2879E 02	1.0184E 02	7.0127E 01	4.6623E 01	3.0914E 01	2.0686E 01	1.4028E 01	
6.7415E 00	3.4270E 00	1.0216E 00	3.5424E-01	2.1821E-01	1.3788E-01	8.9113E-02	5.8774E-02	
3.9479E-02	2.6961E-02	1.8693E-02	1.3140E-02	9.3549E-03	6.7385E-03			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)							TIME = 9.5000E 01 SEC	
2.5949E 00	1.3285E 01	3.4932E 01	6.6173E 01	1.0370E 02	1.8417E 02	2.5637E 02	3.1161E 02	
3.6903E 02	3.7394E 02	2.9350E 02	2.0037E 02	1.3208E 02	8.6867E 01	5.7676E 01	3.8827E 01	
1.8408E 01	9.2434E 00	2.6968E 00	9.1791E-01	5.6070E-01	3.5148E-01	2.2547E-01	1.4765E-01	
9.8505E-02	6.6836E-02	4.6051E-02	3.2179E-02	2.2778E-02	1.6317E-02			

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 15

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)							TIME = 1.4300E 02 SEC	
4.5062E 00	2.3860E 01	6.3967E 01	1.2270E 02	1.9394E 02	3.4805E 02	4.8720E 02	5.9388E 02	
7.0434E 02	7.1269E 02	5.5473E 02	3.7478E 02	2.4443E 02	1.5910E 02	1.0459E 02	6.9746E 01	
3.2490E 01	1.6054E 01	4.5531E 00	1.5121E 00	9.1343E-01	5.6659E-01	3.5984E-01	2.3341E-01	
1.5432E-01	1.0380E-01	7.0928E-02	4.9168E-02	3.4537E-02	2.4558E-02			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)							TIME = 1.9100E 02 SEC	
5.6650E 00	3.1187E 01	8.5533E 01	1.6652E 02	2.6592E 02	4.8342E 02	6.8159E 02	8.3421E 02	
9.9244E 02	1.0038E 03	7.7581E 02	5.1898E 02	3.3494E 02	2.1575E 02	1.4041E 02	9.2730E 01	
4.2419E 01	2.0615E 01	5.6759E 00	1.8370E 00	1.0967E 00	6.7275E-01	4.2277E-01	2.7148E-01	
1.7777E-01	1.1848E-01	8.0244E-02	5.5155E-02	3.8427E-02	2.7108E-02			

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 16

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)							TIME = 2.7100E 02 SEC	
2.6549E 03	4.5742E 03	5.4668E 03	5.5673E 03	5.2234E 03	4.0846E 03	2.9822E 03	2.1267E 03	
1.0741E 03	5.5683E 02	1.2670E 02	3.5359E 01	1.1539E 01	4.2477E 00	1.7195E 00	7.5171E-01	
1.7213E-01	4.7410E-02	5.3052E-03	8.5093E-04	3.7603E-04	1.7518E-04	8.5434E-05	4.3369E-05	
2.2809E-05	1.2380E-05	6.9127E-06	3.9597E-06	2.3214E-06	1.3901E-06			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)							TIME = 3.6700E 02 SEC	
3.5109E 03	6.5136E 03	8.1370E 03	8.5357E 03	8.1795E 03	6.5758E 03	4.8821E 03	3.5186E 03	
1.7968E 03	9.3508E 02	2.1196E 02	5.8505E 01	1.8840E 01	6.8389E 00	2.7299E 00	1.1771E 00	
2.6254E-01	7.0554E-02	7.5515E-03	1.1646E-03	5.0543E-04	2.3147E-04	1.1106E-04	5.5503E-05	
2.8758E-05	1.5387E-05	8.4743E-06	4.7903E-06	2.7727E-06	1.6399E-06			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)							TIME = 4.6300E 02 SEC	
3.5795E 03	7.1691E 03	9.3798E 03	1.0152E 04	9.9509E 03	8.2456E 03	6.2385E 03	4.5526E 03	
2.3583E 03	1.2353E 03	2.8046E 02	7.6883E 01	2.4515E 01	8.8009E 00	3.4731E 00	1.4805E 00	
3.2292E-01	8.4954E-02	8.7447E-03	1.3023E-03	5.5615E-04	2.5080E-04	1.1858E-04	5.8432E-05	
2.9869E-05	1.5775E-05	8.5797E-06	4.7916E-06	2.7412E-06	1.6030E-06			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)							TIME = 6.5500E 02 SEC	
6.8095E 03	1.5080E 04	2.0998E 04	2.3729E 04	2.4011E 04	2.0790E 04	1.6189E 04	1.2053E 04	
6.4025E 03	3.4012E 03	7.8261E 02	2.1452E 02	6.8020E 01	2.4221E 01	9.4691E 00	3.9964E 00	
8.5392E-01	2.2013E-01	2.1800E-02	3.1336E-03	1.3162E-03	5.8419E-04	2.7201E-04	1.3209E-04	
6.6573E-05	3.4684E-05	1.8617E-05	1.0266E-05	5.8011E-06	3.3522E-06			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 8.4700E 02 SEC
6 1012E 03	1.5024E 04	2.2372E 04	2.6509E 04	2.7800E 04	2.5331E 04	2.0428E 04 1.5606E 04
8 14E 03	4.6686E 03	1.1091E 03	3.0860E 02	9.8558E 01	3.5201E 01	1.3769E 01 5.8051E 00
1 13E 00	3.1601E-01	3.0790E-02	4.3503E-03	1.8116E-03	7.9728E-04	3.6814E-04 1.7731E-04
8.8647E-05	4.5822E-05	2.4406E-05	1.3356E-05	7.4916E-06	4.2977E-06	
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.0000E 03 SEC
4.3977E 03	1.1585E 04	1.8041E 04	2.2094E 04	2.3777E 04	2.2523E 04	1.8689E 04 1.4598E 04
8.3047E 03	4.6248E 03	1.1440E 03	3.2669E 02	1.0630E 02	3.8512E 01	1.5236E 01 6.4839E 00
1.3989E 00	3.6208E-01	3.5829E-02	5.1158E-03	2.1391E-03	9.4474E-04	4.3757E-04 2.1132E-04
1.0590E-04	5.4856E-05	2.9273E-05	1.6047E-05	9.0143E-06	5.1782E-06	
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.0030E 03 SEC
8.1900E 01	2.2132E 02	3.5081E 02	4.3534E 02	4.7357E 02	4.5611E 02	3.8323E 02 3.0239E 02
1.7474E 02	9.8470E 01	2.4872E 01	7.2055E 00	2.3701E 00	8.6619E-01	3.4518E-01 1.4781E-01
3.2216E-02	8.4063E-03	8.4241E-04	1.2142E-04	5.0973E-05	2.2594E-05	1.0499E-05 5.0854E-06
2.5558E-06	1.3273E-06	7.0994E-07	3.9010E-07	2.1959E-07	1.2639E-07	
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.0060E 03 SEC
8.0049E 01	2.1770E 02	3.4640E 02	4.3113E 02	4.6993E 02	4.5389E 02	3.8212E 02 3.0193E 02
1.7477E 02	9.8587E 01	2.4934E 01	7.2257E 00	2.3766E 00	8.6833E-01	3.4589E-01 1.4806E-01
3.2240E-02	8.4047E-03	8.4064E-04	1.2095E-04	5.0732E-05	2.2469E-05	1.0433E-05 5.0495E-06
2.5358E-06	1.3160E-06	7.0345E-07	3.8622E-07	2.1729E-07	1.2499E-07	

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.0110E 03 SEC
1.2945E 02	3.5502E 02	5.6788E 02	7.0932E 02	7.7529E 02	7.5166E 02	6.3440E 02 5.0214E 02
2.9136E 02	1.6459E 02	4.1694E 01	1.2087E 01	3.9754E 00	1.4520E 00	5.7814E-01 2.4732E-01
5.3790E-02	1.4006E-02	1.3972E-03	2.0058E-04	8.4042E-05	3.7181E-05	1.7246E-05 8.3394E-06
4.1835E-06	2.1692E-06	1.1585E-06	6.3552E-07	3.5723E-07	2.0532E-07	
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.0190E 03 SEC
1 35E 02	5.4853E 02	8.8477E 02	1.1116E 03	1.2202E 03	1.1902E 03	1.0086E 03 8.0065E 02
4 31E 02	2.6402E 02	6.7056E 01	1.9455E 01	6.3979E 00	2.3356E 00	9.2926E-01 3.9720E-01
8.6225E-02	2.2406E-02	2.2269E-03	3.1849E-04	1.3321E-04	5.8834E-05	2.7246E-05 1.3154E-05
6.5893E-06	3.4114E-06	1.8193E-06	9.9666E-07	5.5948E-07	3.2115E-07	

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 2.7100E 02 SEC
1.1121E 01	6.4666E 01	1.8319E 02	3.6438E 02	5.9075E 02	1.0950E 03	1.5615E 03 1.9242E 03
2.3035E 03	2.3324E 03	1.7911E 03	1.1849E 03	7.5525E 02	4.8041E 02	3.0881E 02 2.0152E 02
9.0126E 01	4.2895E 01	1.1378E 01	3.5644E 00	2.0965E 00	1.2680E 00	7.8623E-01 4.9848E-01
3.2245E-01	2.1241E-01	1.4226E-01	9.6732E-02	6.6697E-02	4.6582E-02	
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 3.6700E 02 SEC
1.4706E 01	9.2083E 01	2.7267E 02	5.5866E 02	9.2508E 02	1.7629E 03	2.5562E 03 3.1836E 03
3.8536E 03	3.9169E 03	2.9966E 03	1.9605E 03	1.2331E 03	7.7346E 02	4.9027E 02 3.1556E 02
1.3746E 02	6.3836E 01	1.6195E 01	4.8782E 00	2.8179E 00	1.6754E 00	1.0220E 00 6.3796E-01
4.0656E-01	2.6401E-01	1.7440E-01	1.1702E-01	7.9662E-02	5.4953E-02	
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 4.6300E 02 SEC
1.4994E 01	1.0135E 02	3.1432E 02	6.6446E 02	1.1254E 03	2.2105E 03	3.2665E 03 4.1191E 03
5.0577E 03	5.1743E 03	3.9649E 03	2.5764E 03	1.6045E 03	9.9536E 02	6.2375E 02 3.9691E 02
1.6908E 02	7.6865E 01	1.8754E 01	5.4552E 00	3.1007E 00	1.8154E 00	1.0912E 00 6.7162E-01
4.2226E-01	2.7066E-01	1.7657E-01	1.1705E-01	7.8757E-02	5.3718E-02	
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 6.5500E 02 SEC
2.8524E 01	2.1318E 02	7.0366E 02	1.5531E 03	2.7156E 03	5.5735E 03	8.4763E 03 1.0905E 04
1.3731E 04	1.4247E 04	1.1064E 04	7.1885E 03	4.4519E 03	2.7393E 03	1.7006E 03 1.0714E 03
4.4711E 02	1.9917E 02	4.6754E 01	1.3126E 01	7.3381E 00	4.2285E 00	2.5032E 00 1.5182E 00
9.4115E-01	5.9509E-01	3.8314E-01	2.5079E-01	1.6667E-01	1.1233E-01	

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 8.4700E 02 SEC
2.5557E 01	2.1240E 02	7.4970E 02	1.7350E 03	3.1441E 03	6.7907E 03	1.0696E 04	1.4120E 04	
1.8419E 04	1.9556E 04	1.5680E 04	1.0341E 04	6.4506E 03	3.9812E 03	2.4728E 03	1.5562E 03	
6.4630E 02	2.8592E 02	6.6035E 01	1.8223E 01	1.0100E 01	5.7709E 00	3.3879E 00	2.0380E 00	
1.2532E 00	7.8618E-01	5.0227E-01	3.2628E-01	2.1524E-01	1.4402E-01			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0000E 03 SEC
1.8421E 01	1.6378E 02	6.0456E 02	1.4460E 03	2.6891E 03	6.0381E 03	9.7854E 03	1.3208E 04	
1.7811E 04	1.9372E 04	1.6173E 04	1.0948E 04	6.9574E 03	4.3556E 03	2.7363E 03	1.7382E 03	
7.3247E 02	3.2760E 02	7.6842E 01	2.1429E 01	1.1926E 01	6.8382E 00	4.0269E 00	2.4289E 00	
1.4971E 00	9.4118E-01	6.0242E-01	3.9201E-01	2.5899E-01	1.7352E-01			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0030E 03 SEC
3.4306E-01	3.1288E 00	1.1756E 01	2.8493E 01	5.3560E 01	1.2228E 02	2.0066E 02	2.7359E 02	
3.7475E 02	4.1247E 02	3.5161E 02	2.4146E 02	1.5513E 02	9.7964E 01	6.1992E 01	3.9625E 01	
1.6868E 01	7.6059E 00	1.8067E 00	5.0860E-01	2.8419E-01	1.6354E-01	9.6617E-02	5.8452E-02	
3.6131E-02	2.2772E-02	1.4610E-02	9.5298E-03	6.3089E-03	4.2355E-03			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0060E 03 SEC
3.3531E-01	3.0777E 00	1.1608E 01	2.8217E 01	5.3148E 01	1.2168E 02	2.0008E 02	2.7318E 02	
3.7482E 02	4.1296E 02	3.5250E 02	2.4213E 02	1.5555E 02	9.8206E 01	6.2119E 01	3.9692E 01	
1.6881E 01	7.6043E 00	1.8029E 00	5.0663E-01	2.8285E-01	1.6264E-01	9.6009E-02	5.8039E-02	
3.5849E-02	2.2578E-02	1.4477E-02	9.4349E-03	6.2428E-03	4.1886E-03			

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0110E 03 SEC
5.4225E-01	5.0190E 00	1.9030E 01	4.6425E 01	8.7683E 01	2.0151E 02	3.3217E 02	4.5432E 02	
6.2487E 02	6.8942E 02	5.8944E 02	4.0503E 02	2.6019E 02	1.6421E 02	1.0383E 02	6.6302E 01	
2.8165E 01	1.2672E 01	2.9965E 00	8.4020E-01	4.6856E-01	2.6912E-01	1.5871E-01	9.5854E-02	
5.9143E-02	3.7218E-02	2.3842E-02	1.5525E-02	1.0264E-02	6.8804E-03			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0190E 03 SEC
8.2665E-01	7.7547E 00	2.9649E 01	7.2752E 01	1.3800E 02	3.1908E 02	5.2810E 02	7.2441E 02	
1.0001E 03	1.1059E 03	9.4798E 02	6.5193E 02	4.1874E 02	2.6415E 02	1.6689E 02	1.0648E 02	
4.5147E 01	2.0272E 01	4.7759E 00	1.3341E 00	7.4269E-01	4.2585E-01	2.5074E-01	1.5119E-01	
9.3154E-02	5.8530E-02	3.7441E-02	2.4347E-02	1.6074E-02	1.0762E-02			

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.0310E 03 SEC
2.7520E 02	7.8038E 02	1.2746E 03	1.6155E 03	1.7849E 03	1.7570E 03	1.4981E 03	1.1944E 03	
6.9961E 02	3.9748E 02	1.0137E 02	2.9443E 01	9.6821E 00	3.5321E 00	1.4039E 00	5.9933E-01	
1.2975E-01	3.3620E-02	3.3222E-03	4.7261E-04	1.9717E-04	8.6871E-05	4.0133E-05	1.9331E-05	
9.6617E-06	4.9913E-06	2.6563E-06	1.4522E-06	8.1359E-07	4.6612E-07			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.0550E 03 SEC
4.8491E 02	1.4232E 03	2.3751E 03	3.0561E 03	3.4150E 03	3.4152E 03	2.9429E 03	2.3642E 03	
1.3988E 03	7.9960E 02	2.0543E 02	5.9805E 01	1.9669E 01	7.1681E 00	2.8445E 00	1.2120E 00	
2.6122E-01	6.7367E-02	6.5949E-03	9.2980E-04	3.8625E-04	1.6947E-04	7.7981E-05	3.7416E-05	
1.8631E-05	9.5902E-06	5.0859E-06	2.7710E-06	1.5473E-06	8.8362E-07			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.0950E 03 SEC
6.5273E 02	2.0280E 03	3.5081E 03	4.6288E 03	5.2707E 03	5.4128E 03	4.7486E 03	3.8643E 03	
2.3259E 03	1.3436E 03	3.4976E 02	1.0229E 02	3.3667E 01	1.2256E 01	4.8530E 00	2.0619E 00	
4.4149E-01	1.1304E-01	1.0907E-02	1.5164E-03	6.2572E-04	2.7276E-04	1.2473E-04	5.9481E-05	
2.9444E-05	1.5069E-05	7.9474E-06	4.3068E-06	2.3923E-06	1.3592E-06			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.1590E 03 SEC
7.5826E 02	2.5599E 03	4.6667E 03	6.3897E 03	7.4810E 03	7.9917E 03	7.2013E 03	5.9752E 03	
3.6915E 03	2.1679E 03	5.7645E 02	1.7000E 02	5.6097E 01	2.0413E 01	8.0661E 00	3.4164E 00	
7.2575E-01	1.8417E-01	1.7439E-02	2.3804E-03	9.7358E-04	4.2076E-04	1.9079E-04	9.0247E-05	
4.4321E-05	2.2509E-05	1.1783E-05	6.3387E-06	3.4960E-06	1.9726E-06			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.2550E 03 SEC
7.3047E 02	2.7548E 03	5.3883E 03	7.7546E 03	9.4271E 03	1.0626E 04	9.9346E 03	8.4684E 03	
4.4278E 03	3.2638E 03	8.9609E 02	2.6802E 02	8.8980E 01	3.2435E 01	1.2806E 01	5.4115E 00	
1.1411E 00	2.8692E-01	2.6620E-02	3.5589E-03	1.4408E-03	6.1650E-04	2.7683E-04	1.2970E-04	
6.3109E-05	3.1762E-05	1.6479E-05	8.7893E-06	4.8070E-06	2.6902E-06			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.3510E 03 SEC
4.5196E 02	1.9152E 03	4.0338E 03	6.1182E 03	7.7390E 03	9.2336E 03	8.9781E 03	7.8777E 03	
5.2547E 03	3.2434E 03	9.2382E 02	2.8124E 02	9.4207E 01	3.4485E 01	1.3634E 01	5.7588E 00	
1.2094E 00	3.0215E-01	2.7591E-02	3.6261E-03	1.4555E-03	6.1748E-04	2.7495E-04	1.2776E-04	
6.1662E-05	3.0787E-05	1.5849E-05	8.3890E-06	4.5538E-06	2.5298E-06			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.4470E 03 SEC
2.9432E 02	1.3785E 03	3.0947E 03	4.9123E 03	6.4322E 03	8.0664E 03	8.1194E 03	7.3097E 03	
5.0537E 03	3.1946E 03	9.4179E 02	2.9178E 02	9.8683E 01	3.6316E 01	1.4397E 01	6.0870E 00	
1.2770E 00	3.1792E-01	2.8739E-02	3.7325E-03	1.4890E-03	6.2787E-04	2.7787E-04	1.2834E-04	
6.1573E-05	3.0562E-05	1.5643E-05	8.2323E-06	4.4438E-06	2.4552E-06			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.5750E 03 SEC
2.5106E 02	1.2993E 03	3.1107E 03	5.1704E 03	7.0122E 03	9.2524E 03	9.6507E 03	8.9221E 03	
6.4030E 03	4.1502E 03	1.2693E 03	4.0090E 02	1.3709E 02	5.0776E 01	2.0203E 01	8.5578E 00	
1.7959E 00	4.4611E-01	3.9996E-02	5.1413E-03	2.0399E-03	8.5540E-04	3.7648E-04	1.7293E-04	
8.2509E-05	4.0732E-05	2.0737E-05	1.0856E-05	5.8295E-06	3.2043E-06			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.7670E 03 SEC
2.1282E 02	1.2464E 03	3.2317E 03	5.6877E 03	8.0584E 03	1.1328E 04	1.2352E 04	1.1805E 04	
8.8760E 03	5.9360E 03	1.9010E 03	6.1502E 02	2.1322E 02	7.9613E 01	3.1822E 01	1.3510E 01	
2.8363E 00	7.0253E-01	6.2335E-02	7.9096E-03	3.1169E-03	1.2980E-03	5.6732E-04	2.5879E-04	
1.2263E-04	6.0129E-05	3.0407E-05	1.5813E-05	8.4365E-06	4.6077E-06			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.9590E 03 SEC
1.1310E 02	7.5986E 02	2.1504E 03	4.0279E 03	5.9829E 03	9.0023E 03	1.0290E 04	1.0183E 04	
1.0377E 03	5.5508E 03	1.8614E 03	6.1623E 02	2.1630E 02	8.1293E 01	3.2592E 01	1.3848E 01	
2.9001E 00	7.1431E-01	6.2419E-02	7.7843E-03	3.0405E-03	1.2550E-03	5.4376E-04	2.4590E-04	
1.1553E-04	5.6176E-05	2.8174E-05	1.4534E-05	7.6927E-06	4.1688E-06			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0310E 03 SEC
1.1528E 00	1.1032E 01	4.2711E 01	1.0573E 02	2.0187E 02	4.7103E 02	7.8439E 02	1.0807E 03	
1.5004E 03	1.6650E 03	1.4330E 03	9.8665E 02	6.3369E 02	3.9947E 02	2.5213E 02	1.6067E 02	
6.7937E 01	3.0418E 01	7.1251E 00	1.9797E 00	1.0993E 00	6.2879E-01	3.6933E-01	2.2219E-01	
1.3659E-01	8.5637E-02	5.4666E-02	3.5477E-02	2.3375E-02	1.5620E-02			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0550E 03 SEC
2.0312E 00	2.0120E 01	7.9592E 01	2.0002E 02	3.8622E 02	9.1556E 02	1.5409E 03	2.1391E 03	
3.0000E 03	3.3493E 03	2.9041E 03	2.0041E 03	1.2873E 03	8.1069E 02	5.1085E 02	3.2491E 02	
1.3677E 02	6.0953E 01	1.4144E 01	3.8948E 00	2.1534E 00	1.2267E 00	7.1764E-01	4.3006E-01	
2.6340E-01	1.6454E-01	1.0467E-01	6.7693E-02	4.4455E-02	2.9611E-02			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0950E 03 SEC
2.7341E 00	2.8671E 01	1.1756E 02	3.0295E 02	5.9610E 02	1.4511E 03	2.4864E 03	3.4964E 03	
4.9882E 03	5.6282E 03	4.9446E 03	3.4277E 03	2.2035E 03	1.3861E 03	8.7156E 02	5.5276E 02	
2.3116E 02	1.0228E 02	2.3391E 01	6.3517E 00	3.4885E 00	1.9743E 00	1.1478E 00	6.8368E-01	
4.1625E-01	2.5855E-01	1.6355E-01	1.0521E-01	6.8732E-02	4.5547E-02			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.1590E 03 SEC
3.1762E 00	3.6190E 01	1.5638E 02	4.1820E 02	8.4607E 02	2.1424E 03	3.7706E 03	5.4063E 03	
7.9171E 03	9.0809E 03	8.1493E 03	5.6966E 03	3.6716E 03	2.3087E 03	1.4486E 03	9.1589E 02	
3.8000E 02	1.6663E 02	3.7402E 01	9.9711E 00	5.4280E 00	3.0455E 00	1.7558E 00	1.0373E 00	
6.2657E-01	3.8620E-01	2.4248E-01	1.5485E-01	1.0044E-01	6.6104E-02			

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 26

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 1.2550E 03 SEC	
3.0598E 00	3.8946E 01	1.8056E 02	5.0754E 02	1.0662E 03	2.8487E 03	5.2018E 03	7.6621E 03		
1.1641E 04	1.3672E 04	1.2668E 04	8.9814E 03	5.8237E 03	3.6683E 03	2.2999E 03	1.4507E 03		
5.9749E 02	2.5960E 02	5.7091E 01	1.4907E 01	8.0329E 00	4.4623E 00	2.5476E 00	1.4908E 00		
8.9219E-01	5.4495E-01	3.3914E-01	2.1471E-01	1.3811E-01	9.0148E-02				
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 1.3510E 03 SEC	
1.8932E 00	2.7076E 01	1.3517E 02	4.0043E 02	8.7526E 02	2.4754E 03	4.7009E 03	7.1275E 03		
1.1270E 04	1.3586E 04	1.3060E 04	9.4245E 03	6.1658E 03	3.9002E 03	2.4486E 03	1.5438E 03		
6.3325E 02	2.7337E 02	5.9174E 01	1.5189E 01	8.1146E 00	4.4695E 00	2.5303E 00	1.4685E 00		
8.7172E-01	5.2823E-01	3.2617E-01	2.0493E-01	1.3083E-01	8.4775E-02				
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 1.4470E 03 SEC	
1.2329E 00	1.9487E 01	1.0370E 02	3.2151E 02	7.2747E 02	2.1624E 03	4.2513E 03	6.6136E 03		
1.0839E 04	1.3381E 04	1.3314E 04	9.7776E 03	6.4588E 03	4.1072E 03	2.5856E 03	1.6318E 03		
6.6862E 02	2.8764E 02	6.1635E 01	1.5635E 01	8.3019E 00	4.5447E 00	2.5572E 00	1.4752E 00		
8.7046E-01	5.2436E-01	3.2192E-01	2.0111E-01	1.2767E-01	8.2273E-02				
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 1.5750E 03 SEC	
1.0516E 00	1.8369E 01	1.0424E 02	3.3840E 02	7.9306E 02	2.4804E 03	5.0531E 03	8.0725E 03		
1.3732E 04	1.7384E 04	1.7945E 04	1.3434E 04	8.9725E 03	5.7426E 03	3.6284E 03	2.2942E 03		
9.4034E 02	4.0363E 02	8.5778E 01	2.1536E 01	1.1373E 01	6.1916E 00	3.4646E 00	1.9876E 00		
1.1664E 00	6.9886E-01	4.2675E-01	2.6519E-01	1.6749E-01	1.0738E-01				

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 27

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 1.7670E 03 SEC	
8.9144E-01	1.7621E 01	1.0830E 02	3.7226E 02	9.1138E 02	3.0369E 03	6.4676E 03	1.0681E 04		
1.9036E 04	2.4865E 04	2.6875E 04	2.0610E 04	1.3955E 04	9.0040E 03	5.7150E 03	3.6219E 03		
1.4851E 03	6.3563E 02	1.3369E 02	3.3132E 01	1.7378E 01	9.3952E 00	5.2209E 00	2.9745E 00		
1.7336E 00	1.0316E 00	6.2576E-01	3.8630E-01	2.4239E-01	1.5440E-01				
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 1.9590E 03 SEC	
4.7373E-01	1.0742E 01	7.2060E 01	2.6362E 02	6.7665E 02	2.4134E 03	5.3878E 03	9.2138E 03		
1.7238E 04	2.3251E 04	2.6314E 04	2.0650E 04	1.4157E 04	9.1940E 03	5.8534E 03	3.7125E 03		
1.5185E 03	6.4629E 02	1.3387E 02	3.2607E 01	1.6952E 01	9.0843E 00	5.0041E 00	2.8264E 00		
1.6333E 00	9.6382E-01	5.7982E-01	3.5505E-01	2.2102E-01	1.3970E-01				

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 28

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 2.1510E 03 SEC	
6.3243E 01	4.8225E 02	1.4787E 03	2.9313E 03	4.5441E 03	7.2666E 03	8.6600E 03	8.8361E 03		
7.2710E 03	5.1580E 03	1.7940E 03	6.0373E 02	2.1345E 02	8.0413E 01	3.2225E 01	1.3662E 01		
2.8395E 00	6.9267E-01	5.9230E-02	7.2242E-03	2.7911E-03	1.1398E-03	4.8867E-04	2.1873E-04		
1.0174E-04	4.8989E-05	2.4336E-05	1.2438E-05	6.5235E-06	3.5039E-06				
		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 2.3430E 03 SEC	
3.6570E 01	3.1488E 02	1.0419E 03	2.1786E 03	3.5149E 03	5.9459E 03	7.3601E 03	7.7179E 03		
6.5863E 03	4.7787E 03	1.7098E 03	5.8126E 02	2.0596E 02	7.7449E 01	3.0909E 01	1.3032E 01		
2.6735E 00	6.4289E-01	5.3387E-02	6.3297E-03	2.4125E-03	9.7228E-04	4.1156E-04	1.8195E-04		
8.3621E-05	3.9797E-05	1.9547E-05	9.8807E-06	5.1272E-06	2.7254E-06				
		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 2.6630E 03 SEC	
3.1060E 01	3.1075E 02	1.1300E 03	2.5238E 03	4.2769E 03	7.7483E 03	1.0038E 04	1.0870E 04		
9.6687E 03	7.1876E 03	2.6403E 03	9.0191E 02	3.1823E 02	1.1864E 02	4.6833E 01	1.9509E 01		
3.9007E 00	9.1391E-01	7.2180E-02	8.1693E-03	3.0464E-03	1.2023E-03	4.9876E-04	2.1627E-04		
9.7556E-05	4.5600E-05	2.2011E-05	1.0941E-05	5.5855E-06	2.9225E-06				
		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 3.0470E 03 SEC	
1.5112E 01	1.8693E 02	7.7460E 02	1.8930E 03	3.4268E 03	6.7954E 03	9.3326E 03	1.0519E 04		
9.8281E 03	7.5005E 03	2.8141E 03	9.5572E 02	3.3176E 02	1.2112E 02	4.6723E 01	1.9004E 01		
3.6215E 00	8.0979E-01	5.8618E-02	6.1313E-03	2.2041E-03	8.3998E-04	3.3700E-04	1.4151E-04		
6.1899E-05	2.8088E-05	1.3177E-05	6.3717E-06	3.1675E-06	1.6152E-06				

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 3.4310E 03 SEC	
.1 E 00	9.0889E 01	4.3487E 02	1.1717E 03	2.2766E 03	4.9634E 03	7.2346E 03	8.4829E 03		
.1 E 03	6.4686E 03	2.4455E 03	8.1493E 02	2.7490E 02	9.7157E 01	3.6238E 01	1.4249E 01		
.5410E 00	5.3365E-01	3.4416E-02	3.2471E-03	1.1130E-03	4.0533E-04	1.5572E-04	6.2735E-05		
.6372E-05	1.1519E-05	5.2087E-06	2.4310E-06	1.1678E-06	5.7614E-07				
		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 3.8150E 03 SEC	
.2991E 00	4.5688E 01	2.5226E 02	7.4807E 02	1.5569E 03	3.7180E 03	5.7304E 03	6.9655E 03		
.0852E 03	5.6114E 03	2.1119E 03	6.8361E 02	2.2218E 02	7.5453E 01	2.7029E 01	1.0212E 01		
.6867E 00	3.2947E-01	1.8636E-02	1.5654E-03	5.0863E-04	1.7606E-04	6.4448E-05	2.4791E-05		
.9701E-06	4.1732E-06	1.8116E-06	8.1287E-07	3.7601E-07	1.7879E-07				
		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 4.1990E 03 SEC	
.3369E-01	2.3586E 01	1.5010E 02	4.8951E 02	1.0898E 03	2.8424E 03	4.6192E 03	5.8051E 03		
.1112E 03	4.8952E 03	1.8172E 03	5.6715E 02	1.7647E 02	5.7264E 01	1.9603E 01	7.0842E 00		
.0749E 00	1.9399E-01	9.5123E-03	7.0455E-04	2.1608E-04	7.0809E-05	2.4602E-05	9.0040E-06		
.4525E-06	1.3809E-06	5.7361E-07	2.4672E-07	1.0950E-07	5.0085E-08				
		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 4.5830E 03 SEC	
.8859E-01	1.2477E 01	9.1341E 01	3.2700E 02	7.7773E 02	2.2097E 03	3.7777E 03	4.8977E 03		
.3155E 03	4.2916E 03	1.5603E 03	4.6684E 02	1.3839E 02	4.2728E 01	1.3925E 01	4.7971E 00		
.6466E-01	1.1025E-01	4.6457E-03	3.0123E-04	8.6899E-05	2.6884E-05	8.8420E-06	3.0703E-06		
.1197E-06	4.2664E-07	1.6928E-07	6.9664E-08	2.9678E-08	1.2999E-08				

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 5.3510E 03 SEC	
.4287E-01	1.0436E 01	9.2343E 01	3.7565E 02	9.7886E 02	3.1316E 03	5.7403E 03	7.7626E 03		
.7579E 03	7.1170E 03	2.4840E 03	6.9319E 02	1.9032E 02	5.4415E 01	1.6458E 01	5.2781E 00		
.3998E-01	9.4041E-02	3.2076E-03	1.7385E-04	4.6318E-05	1.3292E-05	4.0747E-06	1.3260E-06		
.5469E-07	1.6349E-07	6.1418E-08	2.3998E-08	9.6962E-09	4.0686E-09				
		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 6.1190E 03 SEC	
.1 E-02	3.2005E 00	3.7458E 01	1.8261E 02	5.3986E 02	2.0276E 03	4.0728E 03	5.8097E 03		
.1 E 03	5.5867E 03	1.8202E 03	4.5689E 02	1.1185E 02	2.8515E 01	7.7129E 00	2.2212E 00		
.1999E-01	2.6838E-02	6.5726E-04	2.6707E-05	6.2318E-06	1.5817E-06	4.3066E-07	1.2526E-07		
.8668E-08	1.2510E-08	4.2937E-09	1.5107E-09	5.8927E-10	2.1782E-10				

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 2.1510E 03 SEC	
.6491E-01	6.8176E 00	4.9551E 01	1.9185E 02	5.1393E 02	1.9481E 03	4.5344E 03	7.9947E 03		
.5594E 04	2.1606E 04	2.5362E 04	2.0231E 04	1.3970E 04	9.0945E 03	5.7874E 03	3.6625E 03		
.4868E 03	6.2671E 02	1.2703E 02	3.0261E 01	1.5561E 01	8.2501E 00	4.4971E 00	2.5141E 00		
.4383E 00	8.4051E-01	5.0083E-01	3.0384E-01	1.8743E-01	1.1742E-01				
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 2.3430E 03 SEC	
.5319E-01	4.4514E 00	3.4914E 01	1.4259E 02	3.9752E 02	1.5940E 03	3.8538E 03	6.9830E 03		
.4125E 04	2.0017E 04	2.4171E 04	1.9478E 04	1.3480E 04	8.7593E 03	5.5511E 03	3.4937E 03		
.3998E 03	5.8167E 02	1.1450E 02	2.6514E 01	1.3450E 01	7.0376E 00	3.7875E 00	2.0913E 00		
.1822E 00	6.8280E-01	4.0227E-01	2.4138E-01	1.4731E-01	9.1328E-02				
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 2.6630E 03 SEC	
.3010E-01	4.3931E 00	3.7867E 01	1.6518E 02	4.8370E 02	2.0772E 03	5.2559E 03	9.8347E 03		
.0736E 04	3.0107E 04	3.7327E 04	3.0223E 04	2.0828E 04	1.3417E 04	8.4109E 03	5.2300E 03		
.0424E 03	8.2688E 02	1.5480E 02	3.4220E 01	1.6984E 01	8.7024E 00	4.5900E 00	2.4858E 00		
.3792E 00	7.8237E-01	4.5298E-01	2.6727E-01	1.6048E-01	9.7934E-02				
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 3.0470E 03 SEC	
.3300E-02	2.6426E 00	2.5957E 01	1.2389E 02	3.8756E 02	1.8217E 03	4.8865E 03	9.5174E 03		
.1078E 04	3.1418E 04	3.9783E 04	3.2027E 04	2.1714E 04	1.3698E 04	8.3911E 03	5.0945E 03		
.8962E 03	7.3268E 02	1.2572E 02	2.5683E 01	1.2289E 01	6.0800E 00	3.1013E 00	1.6265E 00		
.7508E-01	4.8192E-01	2.7118E-01	1.5565E-01	9.1006E-02	5.4126E-02				

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 3.4310E 03 SEC
.4280E-02	1.2849E 00	1.4573E 01	7.6691E 01	2.5747E 02	1.3306E 03	3.7880E 03	7.6752E 03	
.7793E 04	2.7096E 04	3.4573E 04	2.7309E 04	1.7992E 04	1.0988E 04	6.5082E 03	3.8199E 03	
1.3308E 03	4.8284E 02	7.3811E 01	1.3601E 01	6.2051E 00	2.9338E 00	1.4331E 00	7.2108E-01	
3.7282E-01	1.9763E-01	1.0719E-01	5.9386E-02	3.3553E-02	1.9307E-02			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 3.8150E 03 SEC
9.6306E-03	6.4590E-01	8.4532E 00	4.8961E 01	1.7608E 02	9.9673E 02	3.0004E 03	6.3023E 03	
1.5195E 04	2.3505E 04	2.9856E 04	2.2908E 04	1.4542E 04	8.5335E 03	4.8542E 03	2.7376E 03	
8.8317E 02	2.9810E 02	3.9968E 01	6.5571E 00	2.8358E 00	1.2744E 00	5.9310E-01	2.8494E-01	
1.4095E-01	7.1600E-02	3.7283E-02	1.9858E-02	1.0803E-02	5.9913E-03			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 4.1990E 03 SEC
3.9110E-03	3.3344E-01	5.0298E 00	3.2038E 01	1.2326E 02	7.6199E 02	2.4186E 03	5.2524E 03	
1.3106E 04	2.0505E 04	2.5690E 04	1.9005E 04	1.1550E 04	6.4764E 03	3.5205E 03	1.8992E 03	
5.6283E 02	1.7551E 02	2.0401E 01	2.9512E 00	1.2047E 00	5.1253E-01	2.2640E-01	1.0349E-01	
4.8808E-02	2.3692E-02	1.1805E-02	6.0270E-03	3.1459E-03	1.6784E-03			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 4.5830E 03 SEC
1.6277E-03	1.7639E-01	3.0609E 00	2.1402E 01	8.7959E 01	5.9237E 02	1.9780E 03	4.4313E 03	
1.1400E 04	1.7977E 04	2.2059E 04	1.5644E 04	9.0574E 03	4.8324E 03	2.5008E 03	1.2860E 03	
3.4802E 02	9.9748E 01	9.9636E 00	1.2618E 00	4.8448E-01	1.9459E-01	8.1371E-02	3.5290E-02	
1.5830E-02	7.3199E-03	3.4836E-03	1.7018E-03	8.5267E-04	4.3560E-04			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 5.3510E 03 SEC
1.0173E-03	1.4754E-01	3.0944E 00	2.4586E 01	1.1071E 02	8.3954E 02	3.0056E 03	7.0234E 03	
1.8783E 04	2.9812E 04	3.5116E 04	2.3229E 04	1.2456E 04	6.1542E 03	2.9558E 03	1.4150E 03	
3.3509E 02	8.5087E 01	6.8792E 00	7.2821E-01	2.5824E-01	9.6211E-02	3.7498E-02	1.5241E-02	
6.4280E-03	2.8051E-03	1.2639E-03	5.8625E-04	2.7858E-04	1.3634E-04			
SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 6.1190E 03 SEC
.8086E-04	4.5246E-02	1.2552E 00	1.1952E 01	6.1057E 01	5.4357E 02	2.1325E 03	5.2565E 03	
.4709E 04	2.3402E 04	2.5732E 04	1.5310E 04	7.3208E 03	3.2249E 03	1.3852E 03	5.9545E 02	
1.1519E 02	2.4282E 01	1.4096E 00	1.1187E-01	3.4744E-02	1.1448E-02	3.9632E-03	1.4398E-03	
5.4666E-04	2.1464E-04	8.8363E-05	3.6904E-05	1.6930E-05	7.2991E-06			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 6.8870E 03 SEC
1.0794E-02	1.0436E 00	1.5891E 01	9.2531E 01	3.0925E 02	1.3552E 03	2.9677E 03	4.4462E 03	
5.4525E 03	4.4253E 03	1.3302E 03	2.9766E 02	6.4498E 01	1.4568E 01	3.5043E 00	9.0166E-01	
7.2305E-02	7.2690E-03	1.2621E-04	3.8032E-06	7.6661E-07	1.7282E-07	4.2162E-08	1.0628E-08	
3.0001E-09	8.6276E-10	2.4045E-10	8.6324E-11	0.0	8.2195E-12			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 7.6550E 03 SEC
0.0	3.4788E-01	6.9441E 00	4.8337E 01	1.8224E 02	9.2715E 02	2.2047E 03	3.4576E 03	
4.3805E 03	3.5268E 03	9.6993E 02	1.9227E 02	3.6690E 01	7.3107E 00	1.5581E 00	3.5702E-01	
2.3053E-02	1.8997E-03	2.3200E-05	5.0709E-07	9.8917E-08	1.7501E-08	3.0116E-09	1.0122E-09	
0.0	4.3138E-10	3.4350E-11	0.0	0.0	4.1097E-12			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 8.4230E 03 SEC
5.3970E-03	1.1546E-01	3.2050E 00	2.5933E 01	1.0977E 02	6.4562E 02	1.6616E 03	2.7203E 03	
3.5453E 03	2.8222E 03	7.0579E 02	1.2340E 02	2.0664E 01	3.6218E 00	6.8239E-01	1.3889E-01	
7.1943E-03	4.8437E-04	4.1072E-06	6.7612E-08	2.4729E-08	2.1876E-09	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0			
SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 9.1910E 03 SEC
0.0	4.6384E-02	1.4689E 00	1.4117E 01	6.7247E 01	4.5566E 02	1.2659E 03	2.1587E 03	
2.8845E 03	2.2645E 03	5.1263E 02	7.8799E 01	1.1551E 01	1.7774E 00	2.9542E-01	5.3370E-02	
2.2076E-03	1.2180E-04	7.7703E-07	1.6903E-08	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0			

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 9.9590E 03 SEC	
0		2.3192E-C2	6.6770E-01	7.8260E 00	4.1763E 01	3.2500E 02	9.7225E 02	1.7241E 03	
2	56E C3	1.8201E 03	3.7172E 02	5.0130E 01	6.4225E 00	8.6624E-01	1.2692E-01	2.0297E-02	
6.7187E-04		2.9886E-C5	1.1100E-07	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.0727E 04 SEC	
0.0	0.0	3.3385E-01	4.4501E 00	2.6209E 01	2.3367E 02	7.5142E 02	1.3837E 03		
1.9289E 03	1.4646E C3	2.6917E 02	3.1788E 01	3.5552E 00	4.2024E-01	5.4008E-02	7.6940E-03		
2.0505E-04	7.3305E-C6	0.0	0.0	0.0	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.1495E 04 SEC	
0.0	0.0	1.3354E-01	2.4552E 00	1.6621E 01	1.6917E 02	5.8378E 02	1.1146E 03		
1.5825E 03	1.1794E 03	1.9468E 02	2.0112E 01	1.9626E 00	2.0310E-01	2.3223E-02	2.8996E-03		
6.1080E-05	2.2555E-C6	0.0	0.0	0.0	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.2263E 04 SEC	
0.0	0.0	6.6770E-02	1.3811E 00	1.0598E 01	1.2307E 02	4.5523E 02	9.0034E 02		
1.3000E 03	9.5000E 02	1.4067E 02	1.2711E 01	1.0806E 00	9.7891E-02	9.7214E-03	1.0909E-03		
1.7451E-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.3031E 04 SEC	
0.0	0.0	6.6770E-02	9.2070E-01	6.8048E 00	8.9969E 01	3.5610E 02	7.2886E 02		
1.0690E 03	7.6550E 02	1.0157E 02	8.0163E 00	5.9594E-01	4.7263E-02	4.3206E-03	4.3063E-04		
8.7256E-06	5.6388E-07	0.0	0.0	0.0	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		SETTLED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.4055E 04 SEC	
0	0.0	0.0	6.1380E-01	5.4896E 00	8.3872E 01	3.5825E 02	7.6220E 02		
1	59E 03	7.9458E C2	9.2887E 01	6.2916E 00	3.9956E-01	2.7216E-02	1.8903E-03	1.7225E-04	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 6.8870E 03 SEC	
4.5214E-05	1.4754E-02	5.3252E-01	6.0561E 00	3.4975E 01	3.6330E 02	1.5539E 03	4.0228E 03		
1.1694E 04	1.8537E 04	1.8805E 04	9.9747E 03	4.2214E 03	1.6476E 03	6.2935E 02	2.4172E 02		
3.7859E 01	6.5768E 00	2.7068E-01	1.5931E-02	4.2740E-03	1.2509E-03	3.8901E-04	1.2216E-04		
4.2413E-05	1.4803E-C5	4.9483E-06	2.1088E-C6	0.0	2.7544E-07				
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 7.6550E 03 SEC	
0.0	4.9180E-C3	2.3270E-01	3.1636E 00	2.0611E 01	2.4855E 02	1.1544E 03	3.1283E 03		
9.3946E 03	1.4773E C4	1.3712E 04	6.4431E 03	2.4013E 03	8.2682E 02	2.7983E 02	9.5712E 01		
1.2071E 01	1.7188E C0	4.9756E-02	2.1241E-03	5.5149E-04	1.2668E-04	2.7715E-05	1.1635E-05		
0.0	7.4013E-06	7.0690E-07	0.0	0.0	1.3772E-07				
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 8.4230E 03 SEC	
2.2607E-05	1.6393E-03	1.0740E-01	1.6973E 00	1.2415E 01	1.7308E 02	8.7002E 02	2.4613E 03		
7.6035E 03	1.1822E C4	9.9778E 03	4.1352E 03	1.3524E 03	4.0962E 02	1.2255E 02	3.7235E 01		
3.7669E 00	4.3825E-01	8.8085E-03	2.8321E-04	1.3787E-04	1.5835E-05	0.0	0.0		
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 9.1910E 03 SEC	
0.0	6.5573E-C4	4.9224E-02	9.2398E-01	7.6055E 00	1.2215E 02	6.6282E 02	1.9531E 03		
6.1802E 03	9.4854E C3	7.2471E 03	2.6406E 03	7.5601E 02	2.0102E 02	5.3056E 01	1.4308E 01		
1.1559E 00	1.1020E-01	1.6665E-03	7.0803E-05	0.0	0.0	0.0	0.0		
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)					TIME = 9.9590E 03 SEC	
0.0	3.2787E-04	2.2375E-02	5.1271E-01	4.7232E 00	8.7128E 01	5.0907E 02	1.5599E 03	
5.0519E 03	7.6242E 03	5.2551E 03	1.6799E 03	4.2035E 02	9.7969E 01	2.2794E 01	5.4413E 00	
3.5179E-01	2.7040E-02	2.3807E-04	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)					TIME = 1.0727E 04 SEC	
0.0	0.0	1.1187E-02	2.9126E-01	2.9642E 00	6.2642E 01	3.9344E 02	1.2519E 03	
4.1368E 03	6.1350E 03	3.8053E 03	1.0652E 03	2.3269E 02	4.7528E 01	9.6995E 00	2.0626E 00	
1.0737E-01	6.6324E-03	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)					TIME = 1.1495E 04 SEC	
0.0	0.0	4.4750E-03	1.6069E-01	1.8798E 00	4.5351E 01	3.0567E 02	1.0084E 03	
3.3939E 03	4.9402E 03	2.7522E 03	6.7396E 02	1.2845E 02	2.2970E 01	4.1708E 00	7.7733E-01	
3.1981E-02	2.0408E-03	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)					TIME = 1.2263E 04 SEC	
0.0	0.0	2.2375E-03	9.0390E-02	1.1986E 00	3.2994E 01	2.3836E 02	8.1461E 02	
2.7881E 03	3.9796E 03	1.9887E 03	4.2594E 02	7.0728E 01	1.1071E 01	1.7459E 00	2.9246E-01	
9.1375E-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)					TIME = 1.3031E 04 SEC	
0.0	0.0	2.2375E-03	6.0260E-02	7.6960E-01	2.4119E 01	1.8645E 02	6.5945E 02	
2.2926E 03	3.2065E 03	1.4359E 03	2.6863E 02	3.9004E 01	5.3453E 00	7.7596E-01	1.1545E-01	
4.5687E-03	5.1019E-04	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		SETTLED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)					TIME = 1.4055E 04 SEC	
0.0	0.0	0.0	4.0173E-02	6.2086E-01	2.2485E 01	1.8758E 02	6.8962E 02	
2.4382E 03	3.3283E 03	1.3132E 03	2.1083E 02	2.6151E 01	3.0781E 00	3.3948E-01	4.6178E-02	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)					TIME = 3.0000E 00 SEC	
7.5925E 02	3.2481E 02	1.4784E 02	7.2151E 01	3.7435E 01	1.1677E 01	4.2357E 00	1.7203E 00	
3.6313E-01	9.6972E-02	6.8103E-03	8.4487E-04	1.4899E-04	3.3455E-05	8.9709E-06	2.7573E-06	
3.5369E-07	6.1198E-08	3.3403E-09	3.1108E-10	1.0936E-10	4.1422E-11	1.6724E-11	7.1370E-12	
3.1971E-12	1.4949E-12	7.2624E-13	3.6512E-13	1.8933E-13	1.0097E-13			
		PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)					TIME = 6.0000E 00 SEC	
2.2694E 03	9.7235E 02	4.4294E 02	2.1628E 02	1.1225E 02	3.5027E 01	1.2707E 01	5.1610E 00	
1.0892E 00	2.9080E-01	2.0406E-02	2.5295E-03	4.4573E-04	1.0001E-04	2.6800E-05	8.2320E-06	
1.0547E-06	1.8231E-07	9.9328E-09	9.2359E-10	3.2446E-10	1.2282E-10	4.9556E-11	2.1135E-11	
9.4674E-12	4.4222E-12	2.1472E-12	1.0790E-12	5.5924E-13	2.9811E-13			
		PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)					TIME = 1.1000E 01 SEC	
7.1034E 03	3.0508E 03	1.3916E 03	6.8003E 02	3.5312E 02	1.1025E 02	4.0003E 01	1.6248E 01	
3.4283E 00	9.1493E-01	6.4126E-02	7.9391E-03	1.3973E-03	3.1319E-04	8.3837E-05	2.5727E-05	
3.2904E-06	5.6784E-07	3.0853E-08	2.8620E-09	1.0044E-09	3.7980E-10	1.5310E-10	6.5238E-11	
2.9183E-11	1.3627E-11	6.6116E-12	3.3198E-12	1.7194E-12	9.1594E-13			

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.9000E 01 SEC	
1.9864E-04	8.5650E-03	3.9154E-03	1.9159E-03	9.9572E-02	3.1117E-02	1.1295E-02	4.5878E-01
1.72E-00	2.5810E-00	1.8056E-01	2.2310E-02	3.9192E-03	8.7688E-04	2.3434E-04	7.1799E-05
1.68E-06	1.5762E-06	8.5258E-08	7.8787E-09	2.7601E-09	1.0420E-09	4.1941E-10	1.7845E-10
7.9715E-11	3.7174E-11	1.8013E-11	9.0339E-12	4.6734E-12	2.4867E-12		
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 3.1000E 01 SEC	
4.8892E-04	2.1214E-04	9.7316E-03	4.7722E-03	2.4836E-03	7.7735E-02	2.8234E-02	1.1470E-02
2.4186E-01	6.4450E-00	4.4961E-01	5.5390E-02	9.7027E-03	2.1651E-03	5.7714E-04	1.7641E-04
2.2401E-05	3.8408E-06	2.0634E-07	1.8957E-08	6.6236E-09	2.4944E-09	1.0016E-09	4.2522E-10
1.8954E-10	8.8212E-11	4.2661E-11	2.1355E-11	1.1028E-11	5.8577E-12		
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 5.5000E 01 SEC	
1.6305E-05	7.1614E-04	3.3077E-04	1.6290E-04	8.5017E-03	2.6695E-03	9.7099E-02	3.9468E-02
8.3182E-01	2.2136E-01	1.5368E-00	1.8834E-01	3.2824E-02	7.2889E-03	1.9342E-03	5.8866E-04
7.4160E-05	1.2625E-05	6.6987E-07	6.0888E-08	2.1172E-08	7.9368E-09	3.1733E-09	1.3417E-09
5.9573E-10	2.7622E-10	1.3311E-10	6.6405E-11	3.4178E-11	1.8097E-11		
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 9.5000E 01 SEC	
4.4602E-05	2.0047E-05	9.3814E-04	4.6587E-04	2.4451E-04	7.7282E-03	2.8202E-03	1.1480E-03
2.4197E-02	6.4274E-01	4.4289E-00	5.3813E-01	9.2990E-02	2.0481E-02	5.3929E-03	1.6293E-03
2.0250E-04	3.4053E-05	1.7683E-06	1.5777E-07	5.4401E-08	2.0233E-08	8.0289E-09	3.3705E-09
1.4864E-09	6.8474E-10	3.2793E-10	1.6262E-10	8.3221E-11	4.3823E-11		

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.4300E 02 SEC	
7.7453E-05	3.6004E-05	1.7179E-05	8.6385E-04	4.5727E-04	1.4605E-04	5.3594E-03	2.1878E-03
4.6182E-02	1.2250E-02	8.3707E-00	1.0065E-00	1.7209E-01	3.7512E-02	9.7795E-03	2.9268E-03
3.5740E-04	5.9145E-05	2.9854E-06	2.5991E-07	8.8624E-08	3.2615E-08	1.2814E-08	5.3283E-09
2.3286E-09	1.0635E-09	5.0508E-10	2.4847E-10	1.2618E-10	6.5954E-11		
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.9100E 02 SEC	
7.771E-05	4.7060E-05	2.2971E-05	1.1723E-05	6.2698E-04	2.0286E-04	7.4978E-03	3.0732E-03
1.72E-02	1.7253E-02	1.1707E-01	1.3938E-00	2.3581E-01	5.0869E-02	1.3129E-02	3.8913E-03
7.663E-04	7.5947E-05	3.7216E-06	3.1575E-07	1.0641E-07	3.8726E-08	1.5055E-08	6.1974E-09
2.6875E-09	1.2138E-09	5.7142E-10	2.7873E-10	1.4039E-10	7.2804E-11		

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 3.0000E 00 SEC	
3.1803E-00	4.5919E-00	4.9542E-00	4.7223E-00	4.2338E-00	3.1305E-00	2.2178E-00	1.5565E-00
7.7878E-01	4.0620E-01	9.6278E-02	2.8312E-02	9.7515E-03	3.7837E-03	1.6111E-03	7.3918E-04
1.8519E-04	5.5370E-05	7.1639E-06	1.3030E-06	6.0972E-07	2.9982E-07	1.5391E-07	8.2032E-08
4.5197E-08	2.5649E-08	1.4946E-08	8.9195E-09	5.4397E-09	3.3836E-09		
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 6.0000E 00 SEC	
9.5060E-00	1.3746E-01	1.4843E-01	1.4156E-01	1.2695E-01	9.3903E-00	6.6533E-00	4.6696E-00
2.3360E-00	1.2181E-00	2.8848E-01	8.4764E-02	2.9173E-02	1.1311E-02	4.8131E-03	2.2068E-03
5.5225E-04	1.6495E-04	2.1302E-05	3.8687E-06	1.8090E-06	8.8897E-07	4.5605E-07	2.4293E-07
1.3377E-07	7.5873E-08	4.4189E-08	2.6359E-08	1.6067E-08	9.9899E-09		
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 1.1000E 01 SEC	
2.9755E-01	4.3130E-01	4.6632E-01	4.4508E-01	3.9937E-01	2.9556E-01	2.0946E-01	1.4701E-01
7.3526E-00	3.8324E-00	9.0656E-01	2.6604E-01	9.1454E-02	3.5421E-02	1.5057E-02	6.8969E-03
1.7229E-03	5.1377E-04	6.6169E-05	1.1988E-05	5.5997E-06	2.7491E-06	1.4090E-06	7.4985E-07
4.1256E-07	2.3380E-07	1.3606E-07	8.1100E-08	4.9401E-08	3.0693E-08		

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 1.9000E 01 SEC	
8.3205E 01	1.2109E 02	1.3120E 02	1.2539E 02	1.1261E 02	8.3418E 01	5.9139E 01	4.1509E 01
.0754E 01	1.0811E 01	2.5526E 00	7.4761E-01	2.5651E-01	9.9173E-02	4.2086E-02	1.9248E-02
.7945E-03	1.4261E-03	1.8285E-04	3.3002E-05	1.5389E-05	7.5424E-06	3.8597E-06	2.0511E-06
1.1269E-06	6.3781E-07	3.7070E-07	2.2069E-07	1.3427E-07	8.3331E-08		
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 3.1000E 01 SEC	
2.0480E 02	2.9991E 02	3.2611E 02	3.1234E 02	2.8089E 02	2.0839E 02	1.4783E 02	1.0378E 02
5.1870E 01	2.6997E 01	6.3561E 00	1.8561E 00	6.3504E-01	2.4486E-01	1.0365E-01	4.7292E-02
1.1729E-02	3.4751E-03	4.4253E-04	7.9406E-05	3.6928E-05	1.8055E-05	9.2176E-06	4.8875E-06
2.6796E-06	1.5135E-06	8.7794E-07	5.2168E-07	3.1683E-07	1.9629E-07		
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 5.5000E 01 SEC	
6.8297E 02	1.0124E 03	1.1094E 03	1.0662E 03	9.6151E 02	7.1564E 02	5.0841E 02	3.5709E 02
1.7840E 02	9.2723E 01	2.1726E 01	6.3113E 00	2.1483E 00	8.2435E-01	3.4736E-01	1.5781E-01
3.8830E-02	1.1423E-02	1.4367E-03	2.5505E-04	1.1804E-04	5.7449E-05	2.9203E-05	1.5421E-05
8.4220E-06	4.7392E-06	2.7393E-06	1.6222E-06	9.8198E-07	6.0645E-07		
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 9.5000E 01 SEC	
1.8683E 03	2.8341E 03	3.1437E 03	3.0491E 03	2.7653E 03	2.0718E 03	1.4767E 03	1.0387E 03
5.1893E 02	2.6923E 02	6.2612E 01	1.8033E 01	6.0862E 00	2.3164E 00	9.6853E-01	4.3679E-01
1.0603E-01	3.0811E-02	3.7923E-03	6.6088E-04	3.0330E-04	1.4645E-04	7.3888E-05	3.8741E-05
2.1014E-05	1.1748E-05	6.7487E-06	3.9727E-06	2.3910E-06	1.4685E-06		

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 1.4300E 02 SEC	
3.2444E 03	5.0900E 03	5.7569E 03	5.6539E 03	5.1716E 03	3.9154E 03	2.8062E 03	1.9795E 03
9.9045E 02	5.1312E 02	1.1834E 02	3.3729E 01	1.1263E 01	4.2425E 00	1.7564E 00	7.8462E-01
1.8713E-01	5.3513E-02	6.4026E-03	1.0887E-03	4.9411E-04	2.3607E-04	1.1792E-04	6.1244E-05
3.2920E-05	1.8246E-05	1.0394E-05	6.0700E-06	3.6254E-06	2.2101E-06		
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 1.9100E 02 SEC	
4.0787E 03	6.6530E 03	7.6976E 03	7.6728E 03	7.0909E 03	5.4382E 03	3.9258E 03	2.7806E 03
.3956E 03	7.2270E 02	1.6550E 02	4.6707E 01	1.5434E 01	5.7532E 00	2.3579E 00	1.0432E 00
.4433E-01	6.8715E-02	7.9815E-03	1.3226E-03	5.9325E-04	2.8030E-04	1.3854E-04	7.1233E-05
3.7923E-05	2.0826E-05	1.1760E-05	6.8091E-06	4.0336E-06	2.4397E-06		

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 2.7100E 02 SEC	
1.9115E 06	9.7579E 05	4.9199E 05	2.5653E 05	1.3929E 05	4.5950E 04	1.7177E 04	7.0887E 03
1.5104E 03	4.0090E 02	2.7028E 01	3.1822E 00	5.3172E-01	1.1327E-01	2.8875E-02	8.4565E-03
9.9144E-04	1.5803E-04	7.4602E-06	6.1266E-07	2.0341E-07	7.2991E-08	2.7998E-08	1.1379E-08
4.8658E-09	2.1762E-09	1.0130E-09	4.8884E-10	2.4368E-10	1.2511E-10		
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 3.6700E 02 SEC	
2.5277E 06	1.3895E 06	7.3230E 05	3.9331E 05	2.1811E 05	7.3975E 04	2.8120E 04	1.1728E 04
2.5267E 03	6.7323E 02	4.5217E 01	5.2653E 00	8.6814E-01	1.8236E-01	4.5841E-02	1.3242E-02
1.5122E-03	2.3517E-04	1.0619E-05	8.3849E-07	2.7341E-07	9.6443E-08	3.6394E-08	1.4563E-08
6.1349E-09	2.7048E-09	1.2419E-09	5.9138E-10	2.9105E-10	1.4759E-10		
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 4.6300E 02 SEC	
2.5771E 06	1.5293E 06	8.4415E 05	4.6780E 05	2.6535E 05	9.2759E 04	3.5932E 04	1.5175E 04
3.3162E 03	8.8936E 02	5.9830E 01	6.9193E 00	1.1296E 00	2.3468E-01	5.8323E-02	1.6656E-02
1.8599E-03	2.8317E-04	1.2297E-05	9.3765E-07	3.0084E-07	1.0450E-07	3.8859E-08	1.5332E-08
6.3719E-09	2.7729E-09	1.2573E-09	5.9154E-10	2.8774E-10	1.4427E-10		
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 6.5500E 02 SEC	
4.9026E 06	3.2168E 06	1.8898E 06	1.0934E 06	6.4028E 05	2.3388E 05	9.3243E 04	4.0174E 04
9.0032E 03	2.4488E 03	1.6695E 02	1.9306E 01	3.1343E 00	6.4588E-01	1.5901E-01	4.4959E-02
4.9185E-03	7.3374E-04	3.0656E-05	2.2562E-06	7.1197E-07	2.4340E-07	8.9141E-08	3.4658E-08
1.4202E-08	6.0967E-09	2.7283E-09	1.2674E-09	6.0894E-10	3.0169E-10		

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 8.4700E 02 SEC
4.3027E 06	3.2050E 06	2.0134E 06	1.2215E 06	7.4131E 05	2.8496E 05	1.1766E 05 5.2018E 04
1.7E 04	3.3613E C3	2.3661E 02	2.7773E 01	4.5414E 00	9.3867E-01	2.3122E-01 6.5306E-02
7.7E-03	1.0533E-C3	4.3298E-05	3.1322E-06	9.7996E-07	3.3219E-07	1.2064E-07 4.6523E-08
1.8911E-08	8.0545E-C9	3.5766E-09	1.6489E-09	7.8639E-10	3.8679E-10	
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.0000E 03 SEC
3.1662E 06	2.4714E 06	1.6236E 06	1.0180E 06	6.3403E 05	2.5338E 05	1.0764E 05 4.8658E 04
1.1678E 04	3.3297E C3	2.4405E 02	2.9401E 01	4.8982E 00	1.0269E 00	2.5585E-01 7.2942E-02
8.0575E-03	1.2069E-C3	5.0384E-05	3.6833E-06	1.1571E-06	3.9363E-07	1.4340E-07 5.5446E-08
2.2591E-08	9.6424E-C9	4.2898E-09	1.9810E-09	9.4622E-10	4.6603E-10	
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.0030E 03 SEC
5.8966E 04	4.7213E 04	3.1572E 04	2.0060E 04	1.2628E 04	5.1311E 03	2.2073E 03 1.0079E 03
2.4572E 02	7.0896E 01	5.3058E 00	6.4848E-01	1.0921E-01	2.3098E-02	5.7964E-03 1.6628E-03
1.8556E-04	2.8020E-C5	1.1846E-06	8.7420E-C8	2.7573E-08	9.4139E-09	3.4405E-09 1.3343E-09
5.4522E-10	2.3330E-10	1.0404E-10	4.8159E-11	2.3050E-11	1.1375E-11	
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.0060E 03 SEC
5.7633E 04	4.6441E C4	3.1175E 04	1.9866E 04	1.2531E 04	5.1061E 03	2.2009E 03 1.0064E 03
2.4576E 02	7.0980E 01	5.3191E 00	6.5029E-01	1.0951E-01	2.3155E-02	5.8083E-03 1.6656E-03
1.8570E-04	2.8015E-C5	1.1821E-06	8.7082E-08	2.7443E-08	9.3619E-09	3.4189E-09 1.3249E-09
5.4095E-10	2.3132E-10	1.0309E-10	4.7680E-11	2.2808E-11	1.1249E-11	

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.0110E 03 SEC
9.3203E 04	7.5735E C4	5.1107E 04	3.2684E 04	2.0674E 04	8.4559E 03	3.6540E 03 1.6737E 03
4.0971E 02	1.1850E C2	8.8945E 00	1.0878E 00	1.8318E-01	3.8718E-02	9.7084E-03 2.7823E-03
3.0982E-04	4.6684E-05	1.9648E-06	1.4442E-07	4.5461E-08	1.5492E-08	5.6518E-09 2.1881E-09
8.9246E-10	3.8130E-10	1.6978E-10	7.8457E-11	3.7498E-11	1.8479E-11	
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 1.0190E 03 SEC
1.1113E 05	1.1702E 05	7.9626E 04	5.1219E 04	3.2537E 04	1.3389E 04	5.8094E 03 2.6687E 03
6.3E 02	1.9009E C2	1.4305E 01	1.7509E 00	2.9480E-01	6.2280E-02	1.5605E-02 4.4684E-03
4.7004E-04	7.4684E-05	3.1314E-06	2.2931E-07	7.2059E-08	2.4514E-08	8.9290E-09 3.4514E-09
1.4057E-09	5.9965E-10	2.6662E-10	1.2304E-10	5.8728E-11	2.8903E-11	

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 2.7100E 02 SEC
8.0067E 03	1.3795E 04	1.6487E 04	1.6790E 04	1.5753E 04	1.2318E 04	8.9937E 03 6.4137E 03
3.2392E 03	1.6793E C3	3.8210E 02	1.0664E 02	3.4801E 01	1.2810E 01	5.1857E 00 2.2670E 00
5.1911E-01	1.4298E-C1	1.6000E-02	2.5663E-03	1.1341E-03	5.2833E-04	2.5766E-04 1.3079E-04
6.8788E-05	3.7337E-05	2.0848E-05	1.1942E-05	7.0012E-06	4.1923E-06	
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 3.6700E 02 SEC
1.0588E 04	1.9644E 04	2.4540E 04	2.5742E 04	2.4668E 04	1.9831E 04	1.4723E 04 1.0612E 04
5.4190E 03	2.8200E 03	6.3925E 02	1.7644E 02	5.6820E 01	2.0625E 01	8.2329E 00 3.5500E 00
7.9178E-01	2.1278E-C1	2.2774E-02	3.5122E-03	1.5243E-03	6.9807E-04	3.3493E-04 1.6739E-04
8.6730E-05	4.6406E-C5	2.5557E-05	1.4447E-05	8.3620E-06	4.9457E-06	
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 4.6300E 02 SEC
1.0795E 04	2.1620E C4	2.8288E 04	3.0617E 04	3.0010E 04	2.4867E 04	1.8814E 04 1.3730E 04
7.1122E 03	3.7253E C3	8.4583E 02	2.3187E 02	7.3934E 01	2.6542E 01	1.0474E 01 4.4651E 00
9.7386E-01	2.5621E-C1	2.6373E-02	3.9276E-03	1.6773E-03	7.5639E-04	3.5761E-04 1.7622E-04
9.0080E-05	4.7576E-C5	2.5875E-05	1.4451E-05	8.2671E-06	4.8345E-06	
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 6.5500E 02 SEC
2.0536E 04	4.5477E C4	6.3327E 04	7.1563E 04	7.2413E 04	6.2700E 04	4.8822E 04 3.6349E 04
1.9309E 04	1.0257E C4	2.3602E 03	6.4694E 02	2.0514E 02	7.3047E 01	2.8557E 01 1.2053E 01
2.5753E 00	6.6388E-01	6.5746E-02	9.4505E-03	3.9694E-03	1.7618E-03	8.2034E-04 3.9836E-04
2.0077E-04	1.0460E-04	5.6147E-05	3.0961E-05	1.7495E-05	1.0110E-05	

PROGRAM HAA-3 - AERCSCL LCG-NORMAL - OUTPUT PAGE 50

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 8.4700E 02 SEC
1.8400E 04	4.5310E 04	6.7471E 04	7.9946E 04	8.3840E 04	7.6393E 04	6.1607E 04	4.7064E 04	
2.5901E 04	1.4080E 04	3.3450E 03	9.3068E 02	2.9724E 02	1.0616E 02	4.1525E 01	1.7507E 01	
3.7226E 00	9.5304E-01	9.2859E-02	1.3120E-02	5.4636E-03	2.4045E-03	1.1103E-03	5.3474E-04	
2.6735E-04	1.3819E-04	7.3605E-05	4.0281E-05	2.2594E-05	1.2961E-05			
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0000E 03 SEC
1.3262E 04	3.4938E 04	5.4408E 04	6.6631E 04	7.1707E 04	6.7926E 04	5.6362E 04	4.4025E 04	
2.5046E 04	1.3947E 04	3.4502E 03	9.8525E 02	3.2059E 02	1.1614E 02	4.5949E 01	1.9555E 01	
4.2189E 00	1.0920E 00	1.0806E-01	1.5429E-02	6.4513E-03	2.8492E-03	1.3197E-03	6.3730E-04	
3.1938E-04	1.6544E-04	8.8283E-05	4.8395E-05	2.7186E-05	1.5617E-05			
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0030E 03 SEC
2.4699E 02	6.6746E 02	1.0580E 03	1.3129E 03	1.4282E 03	1.3755E 03	1.1558E 03	9.1194E 02	
5.2698E 02	2.9697E 02	7.5009E 01	2.1731E 01	7.1480E 00	2.6123E 00	1.0410E 00	4.4577E-01	
9.7157E-02	2.5352E-02	2.5406E-03	3.6618E-04	1.5373E-04	6.8140E-05	3.1663E-05	1.5337E-05	
7.7078E-06	4.0028E-06	2.1411E-06	1.1765E-06	6.6224E-07	3.8119E-07			
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0060E 03 SEC
2.4141E 02	6.5654E 02	1.0447E 03	1.3002E 03	1.4172E 03	1.3688E 03	1.1524E 03	9.1056E 02	
5.2707E 02	2.9732E 02	7.5197E 01	2.1791E 01	7.1674E 00	2.6188E 00	1.0431E 00	4.4652E-01	
9.7231E-02	2.5347E-02	2.5352E-03	3.6477E-04	1.5300E-04	6.7764E-05	3.1463E-05	1.5228E-05	
7.6475E-06	3.9687E-06	2.1215E-06	1.1648E-06	6.5531E-07	3.7696E-07			

PROGRAM HAA-3 - AERCSCL LCG-NORMAL - OUTPUT PAGE 51

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0110E 03 SEC
3.9041E 02	1.0707E 03	1.7126E 03	2.1392E 03	2.3381E 03	2.2669E 03	1.9132E 03	1.5143E 03	
8.7869E 02	4.9637E 02	1.2574E 02	3.6452E 01	1.1989E 01	4.3789E 00	1.7436E 00	7.4588E-01	
1.6222E-01	4.2239E-02	4.2138E-03	6.0493E-04	2.5346E-04	1.1213E-04	5.2012E-05	2.5150E-05	
1.2617E-05	6.5421E-06	3.4939E-06	1.9166E-06	1.0774E-06	6.1922E-07			
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)								TIME = 1.0190E 03 SEC
5.9516E 02	1.6543E 03	2.6683E 03	3.3523E 03	3.6799E 03	3.5895E 03	3.0418E 03	2.4146E 03	
1.4063E 03	7.9623E 02	2.0223E 02	5.8612E 01	1.9295E 01	7.0437E 00	2.8025E 00	1.1979E 00	
2.6004E-01	6.7573E-02	6.7159E-03	9.6051E-04	4.0175E-04	1.7744E-04	8.2171E-05	3.9670E-05	
1.9872E-05	1.0288E-05	5.4869E-06	3.0058E-06	1.6873E-06	9.6855E-07			

PROGRAM HAA-3 - AERCSCL LCG-NORMAL - OUTPUT PAGE 52

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.0310E 03 SEC
1.9814E 05	1.6647E 05	1.1471E 05	7.4438E 04	4.7597E 04	1.9766E 04	8.6287E 03	3.9812E 03	
9.8380E 02	2.8618E 02	2.1624E 01	2.6498E 00	4.4614E-01	9.4186E-02	2.3575E-02	6.7423E-03	
7.4734E-04	1.1206E-04	4.6718E-06	3.4027E-07	1.0666E-07	3.6195E-08	1.3152E-08	5.0720E-09	
2.0611E-09	8.7735E-10	3.8927E-10	1.7928E-10	8.5402E-11	4.1950E-11			
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.0550E 03 SEC
3.4912E 05	3.0360E 05	2.1375E 05	1.4082E 05	9.1062E 04	3.8420E 04	1.6951E 04	7.8805E 03	
1.9670E 03	5.7569E 02	4.3823E 01	5.3823E 00	9.0630E-01	1.9114E-01	4.7766E-02	1.3634E-02	
1.5046E-03	2.2455E-04	9.2738E-06	6.6944E-07	2.0893E-07	7.0610E-08	2.5555E-08	9.8174E-09	
3.9746E-09	1.6857E-09	7.4532E-10	3.4209E-10	1.6242E-10	7.9524E-11			
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.0950E 03 SEC
4.6995E 05	4.3263E 05	3.1572E 05	2.1329E 05	1.4055E 05	6.0892E 04	2.7351E 04	1.2881E 04	
3.2706E 03	9.6739E 02	7.4613E 01	9.2057E 00	1.5513E 00	3.2682E-01	8.1494E-02	2.3196E-02	
2.5429E-03	3.7680E-04	1.5337E-05	1.0918E-06	3.3847E-07	1.1365E-07	4.0874E-08	1.5607E-08	
6.2812E-09	2.6489E-09	1.1647E-09	5.3169E-10	2.5111E-10	1.2233E-10			
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)								TIME = 1.1590E 03 SEC
5.4592E 05	5.4609E 05	4.1998E 05	2.9443E 05	1.9948E 05	8.9903E 04	4.1478E 04	1.9917E 04	
5.1911E 03	1.5608E 03	1.2297E 02	1.5299E 01	2.5849E 00	5.4434E-01	1.3545E-01	3.8434E-02	
4.1802E-03	6.1389E-04	2.4524E-05	1.7139E-06	5.2664E-07	1.7531E-07	6.2523E-08	2.3679E-08	
9.4549E-09	3.9566E-09	1.7267E-09	7.8253E-10	3.6698E-10	1.7753E-10			

PROGRAM HAA-3 - AEROSOL LOG-NORMAL - OUTPUT PAGE 53

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 1.2550E 03 SEC
5. 5E 05	5.8768E 05	4.8492E 05	3.5732E 05
7. 5E 03	2.3499E 03	1.9116E 02	2.4121E 01
5.5727E-03	9.5637E-04	3.7433E-05	2.5623E-06
1.3463E-08	5.5830E-09	2.4150E-09	1.0851E-09
			5.0459E-10
			2.4211E-10
	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 1.3510E 03 SEC
3.2540E 05	4.0857E 05	3.6303E 05	2.8191E 05
7.3892E 03	2.3352E 03	1.9707E 02	2.5311E 01
5.9661E-03	1.0071E-03	3.8799E-05	2.6108E-06
1.3154E-08	5.4117E-09	2.3227E-09	1.0357E-09
			4.17801E-10
			2.2768E-10
	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 1.4470E 03 SEC
2.1190E 05	2.9406E 05	2.7851E 05	2.2635E 05
7.1066E 03	2.3000E 03	2.0091E 02	2.6259E 01
7.3551E-03	1.0597E-03	4.0413E-05	2.6873E-06
1.3135E-08	5.3721E-09	2.2924E-09	1.0163E-09
			4.6646E-10
			2.2096E-10
	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 1.5750E 03 SEC
1.8076E 05	2.7718E 05	2.7996E 05	2.3824E 05
1.0039E 03	2.9880E 03	2.7078E 02	3.6080E 01
1.0344E-02	1.4870E-03	5.6243E-05	3.7016E-06
1.7601E-08	7.1598E-09	3.0389E-09	1.3402E-09
			6.1192E-10
			2.8838E-10

PROGRAM HAA-3 - AEROSOL LOG-NORMAL - OUTPUT PAGE 54

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 1.7670E 03 SEC
1.5322E 05	2.6589E 05	2.9084E 05	2.6208E 05
1.2481E 04	4.2738E 03	4.0553E 02	5.5350E 01
1.6337E-02	2.3417E-03	8.7656E-05	5.6948E-06
2.6160E-08	1.0569E-08	4.4560E-09	1.9522E-09
			8.8558E-10
			4.1468E-10
	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 1.9590E 03 SEC
3. 5E 04	1.6210E 05	1.9353E 05	1.8560E 05
1. 3E 04	3.9965E 03	3.9708E 02	5.5459E 01
1.6704E-02	2.3810E-03	8.7775E-05	5.6046E-06
2.4646E-08	9.8744E-09	4.1289E-09	1.7943E-09
			8.0750E-10
			3.7518E-10

PROGRAM HAA-3 - AEROSOL LOG-NORMAL - OUTPUT PAGE 55

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

	PLATED VOLUME	DISTRIBUTION, MICRONS**3/(CC*MICRON)	TIME = 1.0310E 03 SEC
1.2995E 02	2.3535E 03	3.8439E 03	4.8720E 03
1.1099E 03	1.1987E 03	3.0571E 02	8.8796E 01
1.9131E-01	1.0139E-01	1.0019E-02	1.4253E-03
1.9138E-05	1.5053E-05	8.0111E-06	4.3797E-06
			2.4537E-06
			1.4057E-06
	PLATED VOLUME	DISTRIBUTION, MICRONS**3/(CC*MICRON)	TIME = 1.0550E 03 SEC
1.4624E 03	4.2921E 03	7.1630E 03	9.2165E 03
1.2186E 03	2.4114E 03	6.1953E 02	1.8036E 02
1.8780E-01	2.0317E-01	1.9889E-02	2.8042E-03
1.6190E-05	2.8923E-05	1.5338E-05	8.3570E-06
			4.6665E-06
			2.6649E-06
	PLATED VOLUME	DISTRIBUTION, MICRONS**3/(CC*MICRON)	TIME = 1.0950E 03 SEC
1.9685E 03	6.1161E 03	3.10580E 04	1.3959E 04
1.0143E 03	4.0522E 03	1.0548E 03	3.0849E 02
1.3315E 00	3.4092E-01	3.2893E-02	4.5731E-03
1.8798E-05	4.5447E-05	2.3968E-05	1.2989E-05
			7.2147E-06
			4.0992E-06
	PLATED VOLUME	DISTRIBUTION, MICRONS**3/(CC*MICRON)	TIME = 1.1590E 03 SEC
1.2868E 03	7.7201E 03	1.4074E 04	1.9270E 04
1.1133E 04	6.5381E 03	1.7385E 03	5.1268E 02
1.1887E 00	5.5543E-01	5.2595E-02	7.1790E-03
1.3367E-04	6.7885E-05	3.5534E-05	1.9117E-05
			1.0544E-05
			5.9492E-06

PROGRAM HAA-3 - AEROSOL LOG-NORMAL - OUTPUT PAGE 56

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)				TIME = 1.2550E 03 SEC
2.2029E 03	8.3081E C3	1.6250E 04	2.3386E 04	2.8430E 04	3.2047E 04	2.9961E 04 2.5539E 04
1.6369E 04	9.8432E C3	2.7025E 03	8.0830E 02	2.6835E 02	9.7820E 01	3.8622E 01 1.6320E C1
3.4414E 00	8.6531E-01	8.0282E-02	1.0733E-02	4.3453E-03	1.8593E-03	8.3488E-04 3.9117E-04
1.9033E-04	9.5790E-05	4.9700E-05	2.6507E-05	1.4497E-05	8.1131E-06	
		PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)				TIME = 1.3510E 03 SEC
1.3630E 03	5.7760E C3	1.2165E 04	1.8451E 04	2.3339E 04	2.7847E 04	2.7076E 04 2.3758E C4
1.5847E 04	9.7816E C3	2.7861E 03	8.4818E 02	2.8411E 02	1.0400E 02	4.1119E 01 1.7368E 01
3.6474E 00	9.1123E-01	8.3212E-02	1.0936E-02	4.3895E-03	1.8622E-03	8.2921E-04 3.8531E-04
1.8596E-04	9.2850E-05	4.7800E-05	2.5300E-05	1.3734E-05	7.6296E-06	
		PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)				TIME = 1.4470E 03 SEC
8.8762E 02	4.1571E C3	9.3331E 03	1.4815E 04	1.9398E 04	2.4327E 04	2.4487E 04 2.2045E C4
1.5241E 04	9.6343E C3	2.8403E 03	8.7996E 02	2.9761E 02	1.0952E 02	4.3418E 01 1.8357E 01
3.8511E 00	9.5879E-01	8.6672E-02	1.1257E-02	4.4908E-03	1.8936E-03	8.3803E-04 3.8706E-04
1.8569E-04	9.2171E-05	4.7176E-05	2.4828E-05	1.3402E-05	7.4044E-06	
		PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)				TIME = 1.5750E 03 SEC
7.5715E 02	3.9186E C3	9.3814E 03	1.5593E 04	2.1147E 04	2.7903E 04	2.9105E 04 2.6908E 04
1.9310E 04	1.2516E C4	3.8281E 03	1.2091E 03	4.1344E 02	1.5313E 02	6.0930E 01 2.5809E 01
5.4162E 00	1.3454E C0	1.2062E-01	1.5505E-02	6.1521E-03	2.5798E-03	1.1354E-03 5.2153E-04
2.4883E-04	1.2284E-04	6.2539E-05	3.2739E-05	1.7581E-05	9.6636E-06	

PROGRAM HAA-3 - AEROSOL LOG-NORMAL - OUTPUT PAGE 57

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)				TIME = 1.7670E 03 SEC
6.4181E 02	3.7590E C3	9.7463E 03	1.7153E 04	2.4303E 04	3.4164E 04	3.7252E 04 3.5601E 04
2.6768E 04	1.7902E C4	5.7331E 03	1.8548E 03	6.4304E 02	2.4010E 02	9.5969E 01 4.0745E 01
8.5540E 00	2.1187E 00	1.8799E-01	2.3854E-02	9.4001E-03	3.9145E-03	1.7110E-03 7.8046E-04
3.6983E-04	1.8134E-04	9.1702E-05	4.7690E-05	2.5443E-05	1.3896E-05	
		PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)				TIME = 1.9590E 03 SEC
3.4107E 02	2.2916E C3	6.4852E 03	1.2147E 04	1.8043E 04	2.7149E 04	3.1033E 04 3.0711E 04
2.4240E 04	1.6740E C4	5.6136E 03	1.8585E 03	6.5232E 02	2.4516E 02	9.8293E 01 4.1764E 01
8.7461E 00	2.1542E C0	1.8825E-01	2.3476E-02	9.1697E-03	3.7850E-03	1.6399E-03 7.4160E-04
3.4843E-04	1.6942E-04	8.4970E-05	4.3833E-05	2.3200E-05	1.2573E-05	

PROGRAM HAA-3 - AEROSOL LOG-NORMAL - OUTPUT PAGE 58

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

		PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)				TIME = 2.1510E 03 SEC
4.5533E 04	1.0288E 05	1.3308E 05	1.3507E 05	1.2117E 05	8.1746E 04	4.9880E 04 2.9453E 04
1.0225E 04	3.7136E C3	3.8271E 02	5.4334E 01	9.8356E 00	2.1443E 00	5.4114E-01 1.5369E-01
1.6355E-02	2.3088E-03	8.3290E-05	5.2013E-06	1.5098E-06	4.7490E-07	1.6014E-07 5.7391E-08
2.1704E-08	8.6111E-09	3.5664E-09	1.5355E-09	6.8477E-10	3.1534E-10	
		PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)				TIME = 2.3430E 03 SEC
2.6330E 04	6.7171E C4	9.3765E 04	1.0038E 05	9.3726E 04	6.6889E 04	4.2393E 04 2.5726E 04
9.2616E 03	3.4406E C3	3.6474E 02	5.2312E 01	9.4905E 00	2.0653E 00	5.1904E-01 1.4661E-01
1.5399E-02	2.1429E-03	7.5073E-05	4.5573E-06	1.3050E-06	4.0511E-07	1.3487E-07 4.7740E-08
1.7839E-08	6.9954E-09	2.8646E-09	1.2198E-09	5.3820E-10	2.4528E-10	
		PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)				TIME = 2.6630E 03 SEC
2.2362E 04	6.6290E C4	1.0170E 05	1.1629E 05	1.1405E 05	8.7165E 04	5.7816E 04 3.6231E 04
1.3596E 04	5.1749E C3	5.6326E 02	8.1170E 01	1.4663E 01	3.1635E 00	7.8644E-01 2.1947E-01
2.2468E-02	3.0463E-03	1.0150E-04	5.8818E-06	1.6479E-06	5.0094E-07	1.6345E-07 5.6745E-08
2.0811E-08	8.0154E-09	3.2257E-09	1.3507E-09	5.8630E-10	2.6302E-10	
		PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)				TIME = 3.0470E 03 SEC
1.0880E 04	3.9876E C4	6.9711E 04	8.7224E 04	9.1377E 04	7.6446E 04	5.3754E 04 3.5062E 04
1.3820E 04	5.4002E C3	6.0032E 02	8.6012E 01	1.5287E 01	3.2296E 00	7.8459E-01 2.1378E-01
2.0860E-02	2.6992E-03	8.2430E-05	4.4145E-06	1.1923E-06	3.4998E-07	1.1044E-07 3.7131E-08
1.3205E-08	4.9373E-09	1.9310E-09	7.8661E-10	3.3249E-10	1.4537E-10	

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 3.4310E 03 SEC
. E 03	1.9389E 04	3.9137E 04	5.3992E 04
. E 04	4.6572E 03	5.2170E 02	7.3341E 01
.4639E-02	1.7788E-03	4.8397E-05	2.3378E-06
.6258E-09	2.0247E-09	7.6332E-10	3.0011E-10
			1.2259E-10
			5.1851E-11
	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 3.8150E 03 SEC
.6553E 03	9.7463E 03	2.2702E 04	3.4470E 04
.9631E 03	4.0401E 03	4.5052E 02	6.1523E 01
.7153E-03	1.0982E-03	2.6206E-05	1.1271E-06
.1269E-09	7.3355E-10	2.6549E-10	1.0035E-10
			3.9469E-11
			1.6091E-11
	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 4.1990E 03 SEC
.7223E 02	5.0315E 03	1.3508E 04	2.2556E 04
.5936E 03	3.5244E 03	3.8766E 02	5.1042E 01
.1914E-03	6.4660E-04	1.3376E-05	5.0727E-07
.3651E-10	2.4272E-10	8.4061E-11	3.0458E-11
			1.1494E-11
			4.5076E-12
	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 4.5830E 03 SEC
.7977E 02	2.6617E 03	8.2204E 03	1.5068E 04
.4747E 03	3.0899E 03	3.3286E 02	4.2014E 01
.8284E-03	3.6748E-04	6.5329E-06	2.1688E-07
.3887E-10	7.4993E-11	2.4807E-11	8.6003E-12
			3.1153E-12
			1.1699E-12

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 5.3510E 03 SEC
1.7486E 02	2.2263E 03	8.3105E 03	1.7309E 04
1.2315E 04	5.1741E 03	5.2990E 02	6.2385E 01
3.6862E-03	3.1346E-04	4.5105E-06	1.2517E-07
9.6997E-11	2.8738E-11	9.0006E-12	2.9627E-12
			1.0178E-12
			3.6617E-13
	PLATED NUMBER	DISTRIBUTION, PARTICLES/(CC*MICRON)	TIME = 6.1190E 03 SEC
3. E 01	6.8274E 02	3.3711E 03	8.4142E 03
1. E 03	4.0223E 03	3.8829E 02	4.1119E 01
1.2671E-03	8.9458E-05	9.2424E-07	1.9228E-08
3.2490E-12	2.1990E-12	6.2923E-13	1.8650E-13
			6.1855E-14
			1.9603E-14

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

	PLATED VOLUME	DISTRIBUTION, MICRONS**3/(CC*MICRON)	TIME = 2.1510E 03 SEC
1.9073E 02	1.4544E 03	4.4594E 03	8.8401E 03
2.1928E 04	1.5556E 04	5.4104E 03	1.8208E 03
3.5636E 00	2.0890E 00	1.7863E-01	2.1787E-02
3.0684E-04	1.4774E-04	7.3394E-05	3.7510E-05
			1.9674E-05
			1.0567E-05
	PLATED VOLUME	DISTRIBUTION, MICRONS**3/(CC*MICRON)	TIME = 2.3430E 03 SEC
1.1029E 02	9.4960E 02	3.1421E 03	6.5701E 03
1.9863E 04	1.4412E 04	5.1564E 03	1.7530E 03
9.0629E 00	1.9388E 00	1.6101E-01	1.9090E-02
2.5219E-04	1.2002E-04	5.8951E-05	2.9799E-05
			1.5463E-05
			8.2193E-06
	PLATED VOLUME	DISTRIBUTION, MICRONS**3/(CC*MICRON)	TIME = 2.6630E 03 SEC
9.3671E 01	9.3715E 02	3.4079E 03	7.6114E 03
2.9159E 04	2.1677E 04	7.9629E 03	2.7200E 03
1.1764E 01	2.7562E 00	2.1769E-01	2.4638E-02
2.9421E-04	1.3752E-04	6.6383E-05	3.2995E-05
			1.6845E-05
			8.8139E-06
	PLATED VOLUME	DISTRIBUTION, MICRONS**3/(CC*MICRON)	TIME = 3.0470E 03 SEC
4.5574E 01	5.6373E 02	2.3360E 03	5.7088E 03
2.9640E 04	2.2620E 04	8.4868E 03	2.8823E 03
1.0922E 01	2.4422E 00	1.7678E-01	1.8491E-02
1.8668E-04	8.4710E-05	3.9740E-05	1.9216E-05
			9.5529E-06
			4.8713E-06

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 3.4310E 03 SEC	
1.7481E 01	2.7410E 02	1.3115E 03	3.5338E 03	6.8657E 03	1.4969E 04	2.1818E 04	2.5583E 04
2.5020E 04	1.9508E 04	7.3754E 03	2.4577E 03	8.2904E 02	2.9301E 02	1.0929E 02	4.2973E 01
7.6652E 00	1.6094E 00	1.0379E-01	9.7927E-03	3.3565E-03	1.2224E-03	4.6963E-04	1.8920E-04
7.9533E-05	3.4739E-05	1.5709E-05	7.3315E-06	3.5220E-06	1.7376E-06		
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 3.8150E 03 SEC	
6.9337E 00	1.3779E 02	7.6076E 02	2.2560E 03	4.6952E 03	1.1213E 04	1.7282E 04	2.1007E 04
2.1368E 04	1.6923E 04	6.3690E 03	2.0617E 03	6.7006E 02	2.2755E 02	8.1515E 01	3.0797E 01
5.0869E 00	9.9363E-01	5.6203E-02	4.7210E-03	1.5340E-03	5.3099E-04	1.9436E-04	7.4765E-05
3.0068E-05	1.2586E-05	5.4637E-06	2.4515E-06	1.1340E-06	5.3920E-07		
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 4.1990E 03 SEC	
2.8158E 00	7.1131E 01	4.5267E 02	1.4763E 03	3.2867E 03	8.5721E 03	1.3931E 04	1.7507E 04
1.8430E 04	1.4763E 04	5.4804E 03	1.7104E 03	5.3220E 02	1.7270E 02	5.9119E 01	2.1365E 01
3.2418E 00	5.8503E-01	2.8688E-02	2.1248E-03	6.5168E-04	2.1355E-04	7.4195E-05	2.7155E-05
1.0412E-05	4.1645E-06	1.7299E-06	7.4406E-07	3.3023E-07	1.5105E-07		
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 4.5830E 03 SEC	
1.1719E 00	3.7629E 01	2.7547E 02	9.8618E 02	2.3455E 03	6.6640E 03	1.1393E 04	1.4771E 04
1.6031E 04	1.2943E 04	4.7057E 03	1.4079E 03	4.1735E 02	1.2886E 02	4.1995E 01	1.4467E 01
2.0045E 00	3.3248E-01	1.4011E-02	9.0847E-04	2.6207E-04	8.1078E-05	2.6666E-05	9.2596E-06
3.3769E-06	1.2867E-06	5.1051E-07	2.1010E-07	8.9504E-08	3.9203E-08		

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 5.3510E 03 SEC	
7.3244E-01	3.1474E 01	2.7849E 02	1.1329E 03	2.9521E 03	9.4445E 03	1.7312E 04	2.3410E 04
2.6412E 04	2.1464E 04	7.4913E 03	2.0905E 03	5.7397E 02	1.6411E 02	4.9635E 01	1.5918E 01
1.9301E 00	2.8361E-01	9.6736E-03	5.2430E-04	1.3969E-04	4.0087E-05	1.2289E-05	3.9990E-06
1.3713E-06	4.9307E-07	1.8523E-07	7.2375E-08	2.9242E-08	1.2270E-08		
PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)						TIME = 6.1190E 03 SEC	
1.3021E-01	9.6520E 00	1.1297E 02	5.5071E 02	1.6281E 03	6.1150E 03	1.2283E 04	1.7521E 04
2.0684E 04	1.6849E 04	5.4893E 03	1.3779E 03	3.3733E 02	8.5996E 01	2.3261E 01	6.6987E 00
6.6346E-01	8.0939E-02	1.9822E-03	8.0544E-05	1.8794E-05	4.7700E-06	1.2988E-06	3.7777E-07
1.1662E-07	3.7729E-08	1.2949E-08	4.5560E-09	1.7772E-09	6.5690E-10		

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 6.8870E 03 SEC	
7.7714E 00	2.2263E 02	1.4302E 03	4.2636E 03	8.2462E 03	1.5245E 04	1.7093E 04	1.4820E 04
7.6673E 03	3.1861E 03	2.8377E 02	2.6789E 01	2.9720E 00	3.8846E-01	5.8846E-02	1.0143E-02
4.1647E-04	2.4229E-05	1.7748E-07	2.7382E-09	4.1468E-10	7.2008E-11	1.3817E-11	2.7887E-12
6.4001E-13	1.5165E-13	3.5237E-14	1.0657E-14	0.0	7.3974E-16		
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 7.6550E 03 SEC	
0.0	7.4211E 01	6.2494E 02	2.2273E 03	4.8596E 03	1.0430E 04	1.2699E 04	1.1525E 04
6.1598E 03	2.5392E 03	2.0691E 02	1.7304E 01	1.6906E 00	1.9494E-01	2.6165E-02	4.0164E-03
1.3278E-04	6.3322E-06	3.2624E-08	3.6510E-10	5.3508E-11	7.2919E-12	9.8693E-13	2.6559E-13
0.0	7.5827E-14	5.0339E-15	0.0	0.0	3.6987E-16		
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 8.4230E 03 SEC	
3.8857E 00	2.4737E 01	2.8843E 02	1.1950E 03	2.9272E 03	7.2630E 03	9.5706E 03	9.0673E 03
4.9854E 03	2.0319E 03	1.5056E 02	1.1106E 01	9.5216E-01	9.6579E-02	1.1459E-02	1.5625E-03
4.1438E-05	1.6145E-06	5.7755E-09	4.8680E-11	1.3377E-11	9.1149E-13	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0		
PLATED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON)						TIME = 9.1910E 03 SEC	
0.0	9.8948E 00	1.3220E 02	6.5051E 02	1.7932E 03	5.1259E 03	7.2913E 03	7.1954E 03
4.0562E 03	1.6304E 03	1.0936E 02	7.0917E 00	5.3226E-01	4.7396E-02	4.9609E-03	6.0040E-04
1.2715E-05	4.0598E-07	1.0927E-09	1.2170E-11	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0		

PROGRAM HAA-3 - AEROSCL LOG-NORMAL - OUTPUT PAGE 66

PROGRAM HAA-3 - AEROSCL LCG-NORMAL - OUTPUT PAGE 67

		PLATED VOLUME	DISTRIBUTION,	MICRONS**3/(CC*MICRON)	TIME = 6.8870E 03 SEC		
3.2553E-02	3.1474E C0	4.7925E 01	2.7905E 02	9.3263E 02	4.0870E 03	8.9500E 03	1.3409E 04
1.6444E 04	1.3346E C4	4.0117E 03	8.9770E 02	1.9451E 02	4.3934E 01	1.0568E 01	2.7193E C0
2.1806E-01	2.1922E-02	3.8064E-04	1.1470E-05	2.3120E-06	5.2121E-07	1.2715E-07	3.2053E-08
9.0479E-09	2.6020E-C9	7.2516E-10	2.6034E-10	0.0	2.4789E-11		
		PLATED VOLUME	DISTRIBUTION,	MICRONS**3/(CC*MICRON)	TIME = 7.6550E 03 SEC		
0.0	1.0491E 00	2.0942E 01	1.4578E 02	5.4961E 02	2.7961E 03	6.6490E 03	1.0427E 04
1.3211E 04	1.C636E 04	2.9252E 03	5.7986E 02	1.1065E 02	2.2048E 01	4.6991E 00	1.0767E 00
6.9525E-02	5.7293E-C3	6.9967E-05	1.5293E-06	2.9832E-07	5.2781E-08	9.0825E-09	3.0527E-09
0.0	1.3010E-C9	1.0359E-10	0.0	0.0	1.2394E-11		
		PLATED VOLUME	DISTRIBUTION,	MICRONS**3/(CC*MICRON)	TIME = 8.4230E 03 SEC		
1.6276E-02	3.4971E-01	9.6655E 00	7.8209E 01	3.3105E 02	1.9471E 03	5.0111E 03	8.2039E 03
1.0692E 04	8.5114E 03	2.1285E 03	3.7216E 02	6.2319E 01	1.0923E 01	2.0580E 00	4.1888E-01
2.1697E-02	1.4608E-03	1.2387E-05	2.0391E-07	7.4580E-08	6.5976E-09	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0		
		PLATED VOLUME	DISTRIBUTION,	MICRONS**3/(CC*MICRON)	TIME = 9.1910E 03 SEC		
0.0	1.3988E-01	4.4300E 00	4.2576E 01	2.0281E 02	1.3742E 03	3.8177E 03	6.5102E 03
8.6991E 03	6.8293E 03	1.5460E 03	2.3764E 02	3.4836E 01	5.3604E 00	8.9095E-01	1.6096E-01
6.6577E-03	3.6733E-C4	2.3434E-06	5.0977E-08	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0		

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

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      PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)    TIME = 9.9590E 03 SEC
0.0      6.9942E-02 2.0137E 00 2.3602E 01 1.2595E 02 9.8015E 02 2.9321E 03 5.1995E 03
- .1040E 03 5.4892E C3 1.1211E 03 1.5118E 02 1.9369E 01 2.6124E 00 3.8277E-01 6.1213E-02
.0263E-03 9.0131E-05 3.3477E-07 0.0 0.0 0.0 0.0 0.0
0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
      PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)    TIME = 1.0727E 04 SEC
0.0      0.0      1.0068E 00 1.3421E 01 7.9041E 01 7.0470E 02 2.2662E 03 4.1729E 03
5.8171E 03 4.4171E C3 8.1177E 02 9.5867E 01 1.0722E 01 1.2674E 00 1.6288E-01 2.3204E-02
6.1841E-04 2.2108E-05 0.0 0.0 0.0 0.0 0.0 0.0
0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
      PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)    TIME = 1.1495E 04 SEC
0.0      0.0      4.0273E-01 7.4044E 00 5.0126E 01 5.1018E 02 1.7606E 03 3.3613E 03
4.7725E 03 3.5568E C3 5.8711E 02 6.0655E C1 5.9190E 00 6.1251E-01 7.0038E-02 8.7448E-03
1.8421E-04 6.8023E-06 0.0 0.0 0.0 0.0 0.0 0.0
0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
      PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)    TIME = 1.2263E 04 SEC
0.0      0.0      2.0137E-01 4.1650E 00 3.1961E 01 3.7117E 02 1.3729E 03 2.7153E 03
3.9207E 03 2.8652E C3 4.2424E 02 3.8333E 01 3.2590E 00 2.9522E-01 2.9318E-02 3.2901E-03
5.2630E-05 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0

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HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

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      PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)    TIME = 1.3031E 04 SEC
0.0      0.0      2.0137E-01 2.7767E 00 2.0522E 01 2.7133E 02 1.0739E 03 2.1981E 03
3.2239E 03 2.3086E C3 3.0632E 02 2.4176E 01 1.7973E 00 1.4254E-01 1.3030E-02 1.2987E-03
2.6315E-05 1.7006E-06 0.0 0.0 0.0 0.0 0.0 0.0
0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
      PLATED VOLUME DISTRIBUTION, MICRONS**3/(CC*MICRON)    TIME = 1.4055E 04 SEC
0.0      0.0      0.0      1.8511E 00 1.6556E 01 2.5294E 02 1.0804E 03 2.2987E 03
.4286E 03 2.3963E C3 2.8013E 02 1.8974E 01 1.2050E 00 8.2080E-02 5.7008E-03 5.1949E-04
.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0

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HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

EFFECTIVE RADIUS, MICRONS, FOR SUSPENDED MATERIAL

INDEX	TIME, SEC	RADIUS	INDEX	TIME, SEC	RADIUS	INDEX	TIME, SEC	RADIUS
2	3.000E 00	2.921E-01	3	6.000E 00	2.924E-01	4	1.100E 01	2.928E-01
5	1.900E 01	2.935E-01	6	3.100E 01	2.947E-01	7	5.500E 01	2.974E-01
8	9.500E 01	3.024E-01	9	1.430E 02	3.091E-01	10	1.910E 02	3.164E-01
11	2.710E 02	3.292E-01	12	3.670E 02	3.444E-01	13	4.630E 02	3.591E-01
14	6.550E 02	3.860E-01	15	8.470E 02	4.096E-01	16	1.000E 03	4.265E-01
17	1.003E 03	4.279E-01	18	1.006E 03	4.293E-01	19	1.011E 03	4.316E-01
20	1.019E 03	4.352E-01	21	1.031E 03	4.405E-01	22	1.055E 03	4.506E-01
23	1.095E 03	4.663E-01	24	1.159E 03	4.892E-01	25	1.255E 03	5.193E-01
26	1.351E 03	5.457E-01	27	1.447E 03	5.694E-01	28	1.575E 03	5.976E-01
29	1.767E 03	6.342E-01	30	1.959E 03	6.654E-01	31	2.151E 03	6.922E-01
32	2.343E 03	7.153E-01	33	2.663E 03	7.470E-01	34	3.047E 03	7.761E-01
35	3.431E 03	7.976E-01	36	3.815E 03	8.135E-01	37	4.199E 03	8.251E-01
38	4.583E 03	8.334E-01	39	5.351E 03	8.433E-01	40	6.119E 03	8.472E-01
41	6.887E 03	8.477E-01	42	7.655E 03	8.462E-01	43	8.423E 03	8.436E-01
44	9.191E 03	8.404E-01	45	9.959E 03	8.368E-01	46	1.073E 04	8.331E-01
47	1.149E 04	8.295E-01	48	1.226E 04	8.259E-01	49	1.303E 04	8.225E-01
50	1.405E 04	8.182E-01						

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

EFFECTIVE RADIUS, MICRONS, FOR SETTLED MATERIAL

INDEX	TIME, SEC	RADIUS	INDEX	TIME, SEC	RADIUS	INDEX	TIME, SEC	RADIUS
2	3.000E 00	7.171E-01	3	6.000E 00	7.169E-01	4	1.100E 01	7.166E-01
5	1.900E 01	7.161E-01	6	3.100E 01	7.156E-01	7	5.500E 01	7.149E-01
8	9.500E 01	7.148E-01	9	1.430E 02	7.163E-01	10	1.910E 02	7.195E-01
11	2.710E 02	7.261E-01	12	3.670E 02	7.373E-01	13	4.630E 02	7.515E-01
14	6.550E 02	7.762E-01	15	8.470E 02	8.119E-01	16	1.000E 03	8.476E-01
17	1.003E 03	8.652E-01	18	1.006E 03	8.669E-01	19	1.011E 03	8.691E-01
20	1.019E 03	8.726E-01	21	1.031E 03	8.779E-01	22	1.055E 03	8.872E-01
23	1.095E 03	9.030E-01	24	1.159E 03	9.270E-01	25	1.255E 03	9.609E-01
26	1.351E 03	9.978E-01	27	1.447E 03	1.031E 00	28	1.575E 03	1.066E 00
29	1.767E 03	1.109E 00	30	1.959E 03	1.151E 00	31	2.151E 03	1.184E 00
32	2.343E 03	1.209E 00	33	2.663E 03	1.232E 00	34	3.047E 03	1.249E 00
35	3.431E 03	1.253E 00	36	3.815E 03	1.248E 00	37	4.199E 03	1.238E 00
38	4.583E 03	1.225E 00	39	5.351E 03	1.202E 00	40	6.119E 03	1.170E 00
41	6.887E 03	1.139E 00	42	7.655E 03	1.111E 00	43	8.423E 03	1.086E 00
44	9.191E 03	1.063E 00	45	9.959E 03	1.042E 00	46	1.073E 04	1.024E 00
47	1.149E 04	1.007E 00	48	1.226E 04	9.924E-01	49	1.303E 04	9.790E-01
50	1.405E 04	9.652E-01						

HAA-3 CHECKOUT LTC-1 GEOMETRY NC LEAKAGE

EFFECTIVE RADIUS, MICRONS, FOR PLATED MATERIAL

INDEX	TIME, SEC	RADIUS	INDEX	TIME, SEC	RADIUS	INDEX	TIME, SEC	RADIUS
2	3.000E 00	1.510E-01	3	6.000E 00	1.513E-01	4	1.100E 01	1.517E-01
5	1.900E 01	1.524E-01	6	3.100E 01	1.535E-01	7	5.500E 01	1.556E-01
8	9.500E 01	1.595E-01	9	1.430E 02	1.653E-01	10	1.910E 02	1.721E-01
11	2.710E 02	1.815E-01	12	3.670E 02	1.944E-01	13	4.630E 02	2.078E-01
14	6.550E 02	2.260E-01	15	8.470E 02	2.464E-01	16	1.000E 03	2.612E-01
17	1.003E 03	2.674E-01	18	1.006E 03	2.686E-01	19	1.011E 03	2.702E-01
20	1.019E 03	2.728E-01	21	1.031E 03	2.767E-01	22	1.055E 03	2.834E-01
23	1.095E 03	2.945E-01	24	1.159E 03	3.111E-01	25	1.255E 03	3.337E-01
26	1.351E 03	3.579E-01	27	1.447E 03	3.793E-01	28	1.575E 03	4.013E-01
29	1.767E 03	4.290E-01	30	1.959E 03	4.587E-01	31	2.151E 03	4.850E-01
32	2.343E 03	5.086E-01	33	2.663E 03	5.358E-01	34	3.047E 03	5.686E-01
35	3.431E 03	5.988E-01	36	3.815E 03	6.237E-01	37	4.199E 03	6.444E-01
38	4.583E 03	6.614E-01	39	5.351E 03	6.809E-01	40	6.119E 03	7.009E-01
41	6.887E 03	7.149E-01	42	7.655E 03	7.247E-01	43	8.423E 03	7.317E-01
44	9.191E 03	7.367E-01	45	9.959E 03	7.403E-01	46	1.073E 04	7.428E-01
47	1.149E 04	7.445E-01	48	1.226E 04	7.459E-01	49	1.303E 04	7.466E-01
50	1.405E 04	7.471E-01						

END OF PROBLEM

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0001 0000

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0002 0000

AI-AEC-MEMO-12880

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0003 0000

AI-AEC-MEMO-12880

AI-AEC-MEMO-12880

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0005 0000

AI-AEC-MEMO-12880

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0006 0000

AI-AEC-MEMO-12880

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0007 0000

AI-AEC-MEMO-12880

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0008 0000

AI-AEC-MEMO-12880

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0010 0000

AI-AEC-MEMO-12880

AI-AEC-MEMO-12880

AI-AEC-MEMO-12880

AI-AEC-MEMO-12880

AI-AEC-MEMO-12880

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0028 0000

AI-AEC-MEMO-12880

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0029 0000

AI-AEC-MEMO-12880

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0030 0000

AI-AEC-MEMO-12880

HAA-3 CHECKOUT LTC-1 GEOMETRY NO LEAKAGE

7985-77
0031 0000

AI-AEC-MEMO-12880

APPENDIX C

PROGRAM LISTING

The main program, subroutines, and a block data subprogram for HAA-3 are listed. Subroutines RKADAM⁽⁸⁾ and AICRT-3 are omitted.

OPTION CARD FOLLOWS

\$OPT RLP

1

1

100

00000100

```

C   PROGRAM HAA-3 - HETEROGENEOUS AEROSOL AGGLOMERATION VERSION 3      00000100
C   (AEROSOL LOG-NORMAL ASSUMPTION)                                     00000200
C   THIS PROGRAM SOLVES THE AEROSOL DISTRIBUTION PROBLEM WITH TIME AND 00000300
C   SIZE DEPENDENCE. ASSUMPTIONS ARE                                     00000400
C   1. THE AIRBORNE DISTRIBUTION IS LOG-NORMAL                           00000500
C   2. THE EXPONENTIAL TERM IN THE CUNNINGHAM CORRECTION FACTOR MAY    00000600
C   BE NEGLECTED                                                         00000700
C   3. THE PARTICLES ARE SPHERICAL                                       00000800
C   SOLUTION IS BY THE NUMERICAL INTEGRATION OF THE SIZE INDEPENDENT, 00000900
C   FIRST THREE MOMENTS DIFFERENTIAL EQUATIONS. SUBROUTINE RKADAM IS 00001000
C   USED. OPTIONS TO INCLUDE ANY COMBINATION OF THE FOLLOWING ARE      00001100
C   AVAILABLE                                                             00001200
C   1. LOG-NORMAL SOURCE                                                 00001300
C   2. SETTLING DUE TO GRAVITY                                           00001400
C   3. WALL PLATING                                                      00001500
C   4. LEAKAGE OR VENTILATION                                             00001600
C   5. AGGLOMERATION DUE TO BROWNIAN MOTION                             00001700
C   6. AGGLOMERATION DUE TO GRAVITY                                       00001800
C   AGGLOMERATION DUE TO TURBULENCE IS NOT AVAILABLE.                   00001900
C                                                                           00002000
C   INPUT                                                                00002100
C                                                                           00002200
C   CARD NO. 1  FORMAT (12A4)                                           00002300
C   TITLE = 48 LITERALS FOR PRINTED OUTPUT AND CRT TITLES.            00002400
C                                                                           00002500
C   CARD NO. 2  FORMAT (6I12)                                           00002600
C   ISETL = 1-YES/0-NO , SETTLING TERM                                  00002700
C   IPLAT = 1-YES/0-NO , PLATING TERM                                    00002800
C   ILEAK = 1-YES/0-NO , LEAKAGE TERM                                    00002900
C   IAGGB = 1-YES/0-NO , BROWNIAN MOTION AGGLOMERATION TERM            00003000
C   IAGGG = 1-YES/0-NO , GRAVITY AGGLOMERATION TERM                    00003100
C   IAGGT = 1-YES/0-NO , TURBULENT AGGLOMERATION TERM (NOT USED)      00003200
C                                                                           00003300
C   CARD NO. 3  FORMAT (5I12)                                           00003400
C   ISJRS = 1-YES/0-NO , SOURCE TERM                                    00003500
C   INDIN = 2 , ADAMS MOULTON WITH FIXED INCREMENTING                  00003600
C   = 1 , RUNGE-KUTTA WITH FIXED INCREMENTING                          00003700
C   = 0 , ADAMS MOULTON WITH VARIABLE INCREMENTING                     00003800
C   KMAX = MAXIMUM NUMBER OF TIME STEPS (.LE. 1000)                   00003900
C   ISEQ = INCREMENT FOR TIME INDEX FOR OUTPUT                         00004000
C   IVOL = NUMBER OF DISCRETE RADII FOR DISTRIBUTION CALC.             00004100
C                                                                           00004200

C   CARD NO. 4  FORMAT (6E12.4)                                         00004300
C   SO = SOURCE RATE, PARTICLES/(CM**3*SEC)                            00004400
C   SIGSOR= SOURCE SIGMA (VOLUME)                                       00004500
C   VSOR = SOURCE 50 PERCENT VOLUME SIZE                               00004600
C   XIN(1)= INITIAL CONCENTRATION OF AEROSOL, PARTICLES/CM**3         00004700
C   SIGAIR= AEROSOL SIGMA (VOLUME)                                      00004800
C   VAIR = AEROSOL 50 PERCENT VOLUME SIZE                              00004900
C                                                                           00005000
C   CARD NO. 5  FORMAT (6E12.4)                                         00005100
C   TO = INITIAL TIME, SEC                                              00005200
C   TAUIN = SOURCE CUTOFF TIME, SEC                                     00005300
C   TMAXIN= MAXIMUM TIME, SEC                                           00005400
C   HIN = INITIAL TIME STEP, SEC                                       00005500
C   TOLIN = CONVERGENCE CRITERION                                       00005600
C   RVL = LEAKAGE RATE, PER SEC                                         00005700

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C CARD NO. 6 FORMAT (6E12.4) 00005800
C AFJV = AREA OF FLOOR/VOLUME OF CHAMBER, PER CM 00005900
C RHO = DENSITY OF AEROSOL MATERIAL, GM/CM**3 00006000
C VISC = VISCOSITY OF AIR, DYNE SEC/CM**2 00006100
C AWJV = AREA OF WALL/VOLUME OF CHAMBER, PER CM 00006200
C TEMP = TEMPERATURE, DEGREES K 00006300
C DELTA = CONSTANT IN PLATING EQUATION 00006400
C 00006500
C 00006600
C CARD NO. 7 FORMAT (6E12.4) OMIT IF IVOL = 0 00006700
C (VI(1),I=1,IVOL) = DISCRETE RADII, MICRONS, FOR 00006800
C DISTRIBUTION CALCULATION 00006900
C 00007000
C CARD NO. 8 FORMAT (2E12.4) 00007100
C EPSL = VOLUME/VOL. MAX SHUTOFF RATIO 00007200
C DELTA1= CONSTANT IN PLATING EQUATION AFTER TAUIN IS EXCEEDED 00007300
C 00007400
C OUTPUT 00007500
C 00007600
C BOTH PRINTED AND PLOTTED OUTPUT ARE PRODUCED. OUTPUT INCLUDES 00007700
C 1. CONSERVATION INTEGRALS 00007800
C 2. VOLUME RATIO DEPOSITED ON WALL VS. TIME 00007900
C 3. VOLUME RATIO SETTLED ON FLOOR VS. TIME 00008000
C 4. VOLUME RATIO SUSPENDED IN AIR VS. TIME 00008100
C 5. LOG-NORMAL DISTRIBUTION PARAMETERS VS. TIME FOR SUSPENDED 00008200
C MATERIAL 00008300
C 6. NUMBER AND VOLUME DISTRIBUTION VS. TIME FOR SETTLED MATERIAL 00008400
C
C 7. NUMBER AND VOLUME DISTRIBUTION VS. TIME FOR PLATED MATERIAL 00008500
C 7. EFFECTIVE RADII VS. TIME FOR AIRBORNE, SETTLED, AND PLATED 00008600
C MATERIALS 00008700
C 00008800
C COMMON/BLOK4/VINT(42,200),T(1000),X0(1000),X1(1000),X2(1000),VPLAT 00008900
C 1(200),VSET(200),VLEAK(200),PLATNO(200),SETNO(200),TIME(200) 00009000
C DIMENSION BLOC4(13600) 00009100
C EQUIVALENCE (VINT(1,1),BLOC4(1)),(T(1),BLOC4(8401)),(X0(1),BLOC4(90009200
C 1401)),(X1(1),BLOC4(10401)),(X2(1),BLOC4(11401)),(VPLAT(1),BLOC4(120009300
C 2401)),(VSET(1),BLOC4(12601)),(VLEAK(1),BLOC4(12801)),(PLATNO(1),BL 00009400
C 30C4(13001)),(SETNO(1),BLOC4(13201)),(TIME(1),BLOC4(13401)) 00009500
C 1 DO 2 I=1,13600 00009600
C 2 BLOC4(I)=0.0 00009700
C 3 CALL INPUT 00009800
C 4 CALL INITAL(N3) 00009900
C 5 CALL SOLVE(N3) 00010000
C 6 CALL OUTPUT(N3) 00010100
C 7 GO TO 1 00010200
C END 00010300

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INPUT CARD COUNT = 103

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OPTION CARD FOLLOWS
$OPT RLP 1 1 100 10000100

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SUBROUTINE INPUT 10000100
COMMON/BLOK2/ISORS,ILEAK,ISETL,IPLAT,IAGGB,IAGGG,IAGGT,INDIN,IND, 10000200
C 1ITIM,ITRK,IPAS,K,KMAX,NERR,ISEQ,MEM,IVOL,IFIN,L 10000300
COMMON/BLOK3/S0,S1,S2,XIN(50),TO,TAUIN,HIN,TOLIN,TMAXIN,SIGSOR,SIG 10000400
C 1AIR,VSOR,VAIR,TITLE(12),VI(42) 10000500
COMMON/INPUTS/AFOV,AWOV,RHO,VISC,TEMP,DELTA,RVL 10000600
COMMON/EXTRA/EP SL,DELTA1 10000700
DIMENSION W(16) 10000800
DATA W /'(1=YES/0=NO) AGGLOMERATION, ADAMS MOULTON WITH INCREM 10000900
C 1ENTING) '/ 10001000
1 READ (5,1000,END=999) TITLE 10001100

```

```

1000 FORMAT (12A4)
GO TO 2
999 WRITE (6,2000)
2000 FORMAT (1H0,3X,'END OF PROBLEM')
CALL EXIT
2 READ (5,1001) ISETL,IPLAT,ILEAK,IAGGB,IAGGG,IAGGT
1001 FORMAT (6I12)
READ (5,1001) ISORS,INDIN,KMAX,ISEQ,IVOL
IF (<KMAX .GT. 1000 .OR. KMAX .EQ. 0) KMAX=1000
KK=0
IF (MOD(KMAX,ISEQ) .NE. 0) KK=1
KK=KMAX/ISEQ+KK
IF (KK .LE. 200) GO TO 4
WRITE (6,2001) ISEQ,KMAX,TITLE
2001 FORMAT (1H1,3X,'ISEQ=',I4,' KMAX=',I5,' ISEQ IS TOO SMALL'/4X,'THIS CASE IS SKIPPED'/4X,'TITLE WAS'/4X,12A4)
11S CASE IS SKIPPED'/4X,'TITLE WAS'/4X,12A4)
6 KK=0
IF (MOD(IVOL,6) .NE. 0) KK=1
KK=IVOL/6+KK+4
DO 3 I=1,KK
3 READ (5,1000) TITLE
GO TO 1
4 IF (IVOL .LE. 42) GO TO 5
WRITE (6,2002) IVOL,TITLE
2002 FORMAT (1H1,3X,'IVOL=',I3,' IVOL EXCEEDS 42'/4X,'THIS CASE IS SKIPPED'/4X,'TITLE WAS'/4X,12A4)
1PED'/4X,'TITLE WAS'/4X,12A4)
GO TO 6
5 READ (5,1002) SO,SIGSOR,VSOR,XIN(1),SIGAIR,VAIR
1002 FORMAT (6E12,4)
READ (5,1002) TO,TAUIN,TMAXIN,HIN,TOLIN,RVL
READ (5,1002) AFIV,RHO,VISC,AWOV,TEMP,DELTA

IF (IVOL .EQ. 0) GO TO 9
READ (5,1002) (VI(I),I=1,IVOL)
9 CONTINUE
READ (5,1002) EPSL,DELTA1
IF (DELTA1 .LE. 0.0) DELTA1=DELTA
DO 10 I=2,50
10 XIN(I)=0.0
IPAGE=1
WRITE (6,3000) IPAGE,TITLE
3000 FORMAT (1H1//29X,'PROGRAM HAA-3 - AEROSOL LOG-NORMAL - INPUT PAGE',I2//26X,12A4/)
1',I2//26X,12A4/)
WRITE (6,3001) (W(I),I=1,3),ISETL,(W(I),I=1,3),IPLAT,(W(I),I=1,3),ILEAK,(W(I),I=4,7),(W(I),I=1,3),IAGGB,(W(I),I=4,7),(W(I),I=1,3),IAGGG,(W(I),I=4,7),(W(I),I=1,3),ISORS
2GGG,(W(I),I=4,7),(W(I),I=1,3),IAGGT,(W(I),I=1,3),ISORS
3001 FORMAT (25X,'SETTLING TERMS ',3A4,25X,'ISETL =',I5/25X,'PLATING TERMS ',3A4,25X,'ILEAK =',I5/25X,'BROWNIAN ',3A4,14X,'IAGGB =',I5/24X,4A4,'GRAVITY ',3A4,14X,'IAGGG =',I5/24X,4A4,'TURBULENCE ',3A4,14X,'IAGGT =',I5/24X,4A4,'SOURCE TERMS ',3A4,27X,'ISORS =',I5/)
WRITE (6,3002) INDIN,(W(I),I=8,16),(W(I),I=13,16),(W(I),I=8,16)
3002 FORMAT (25X,'METHOD OF INTEGRATION',31X,'INDIN =',I5/30X,'(2 =',I5A10006300
14,'FIXED',4A4/30X,'(1 = RUNGE-KUTTA WITH FIXED',4A4/30X,'(0 =',5A410006400
2,'VARIABLE',4A4/)
WRITE (6,3003) KMAX,ISEQ,IVOL
3003 FORMAT (25X,'MAXIMUM NUMBER OF TIME STEPS (.LE. 1000)',12X,'KMAX ',I5/25X,'INCREMENT FOR TIME INDEX FOR OUTPUT',17X,'ISEQ =',I5/210006800
25X,'NUMBER OF DISCRETE VOLUMES FOR DISTRIBUTION CALC. IVOL =',I10006900
35/)
WRITE (6,5000) SO,SIGSOR,VSOR,XIN(1),SIGAIR,VAIR
5000 FORMAT (25X,'SOURCE RATE, PARTICLES/(CM**3*SEC)',18X,'SO =',I10007200
1E10.3/25X,'SOURCE SIGMA (VOLUME)',31X,'SIGSOR=',I10007300
2CE 50 PERCENT VOLUME SIZE, MICRONS**3',11X,'VSOR =',I10007400
3' INITIAL CONCENTRATION OF AEROSOL, PARTICLES/CM**3',3X,'XIN(1) =',I10007500
4' AEROSOL SIGMA (VOLUME)',30X,'SIGAIR=',I10007600
5' AEROSOL 50 PERCENT VOLUME SIZE, MICRONS**3',10X,'VAIR =',I10007700
6)

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```

WRITE (6,3004) TO,TAUIN,TMAXIN,HIN,TCLIN,RVL
3004 FORMAT (25X,'INITIAL TIME, SEC',35X,'TO      =',1P1E10.3/25X,'SOURCE',10008000
1 CUTOFF TIME, SEC',29X,'TAUIN =',1P1E10.3/25X,'MAXIMUM TIME, SEC',10008100
235X,'TMAXIN=',1P1E10.3/25X,'TIME STEP, INITIAL, SEC',29X,'HIN  ='10008200
3,1P1E10.3/25X,'CONVERGENCE CRITERION',31X,'TOLIN =',1P1E10.3/25X,'10008300
4LEAKAGE RATE, PER SECOND',28X,'RVL      =',1P1E10.3) 10008400

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```

WRITE (6,3005) AFOV,RHO,VISC,AWOV,TEMP,DELTA 10008500
3005 FORMAT (25X,'AREA OF FLOOR/VOLUME , PER CM',23X,'AFOV  =',1P1E10.310008600
1/25X,'DENSITY OF AEROSOL MATERIAL, GM/CM**3',15X,'RHO  =',1P1E10.10008700
23/25X,'VISCOSITY OF AIR, DYNE SEC/CM**2',20X,'VISC  =',1P1E10.3/2510008800
3X,'AREA OF WALL/VOLUME , PER CM',24X,'AWCV  =',1P1E10.3/25X,'TEMP10008900
4RATURE, DEGREES K',30X,'TEMP  =',1P1E10.3/25X,'DELTA',47X,'DELTA =10009000
5',1P1E10.3) 10009100
WRITE (6,3007) EPSL,DELTA1 10009200
3007 FORMAT (25X,'VOLUME/VOL. MAX SHUTOFF RATIO',23X,'EPSL  =',1P1E10.310009300
1/25X,'DELTA AFTER SOURCE CUTOFF',27X,'DELTA1=',1P1E10.3) 10009400
IF (IVOL .EQ. 0) GO TO 30 10009500
IPAGE=2 10009600
WRITE (6,3000) IPAGE,TITLE 10009700
WRITE (6,3006) (I,VI(I),I=1,IVOL) 10009800
3006 FORMAT (25X,'DISCRETE RADII, MICRONS, FOR DISTRIBUTION CALC.'10009900
1/4X,'INDEX RADIUS',7X,'INDEX RADIUS',7X,'INDEX RADIUS',7X,'INDE10010000
2X RADIUS',7X,'INDEX RADIUS'/(5X,I2,1P1E13.3,I7,1P1E13.3,I7,1P1E110010100
33.3,I7,1P1E13.3,I7,1P1E13.3)) 10010200
30 IF (ISORS .EQ. 0) TAUIN=1.0E+20 10010300
IF (IVOL .EQ. 0) GO TO 50 10010400
DO 40 I=1,IVOL 10010500
40 VI(I)=VI(I)**3 10010600
50 IF (XIN(1) .NE. 0.0) VAIR=EXP(ALOG(VAIR)-(ALCG(SIGAIR))**2) 10010700
IF (S0 .NE. 0.0) VSOR=EXP(ALOG(VSOR)-(ALCG(SIGSOR))**2) 10010800
RETURN 10010900
END 10011000

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INPUT CARD COUNT = 110

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OPTION CARD FOLLOWS
$OPT RLP      1      1      100      20000100

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SUBROUTINE INITAL(N3) 20000100
COMMON/BLOK2/ISORS,I LEAK,I SETL,I PLAT,IAGGB,IAGGG,IAGGT,INDIN,IND,I20000200
1TIM,ITRK,IPAS,K,KMAX,NERR,I SEQ,MEM,IVOL,IFIN,L 20000300
COMMON/BLOK3/S0,S1,S2,XIN(50),TO,TAUIN,HIN,TOLIN,TMAXIN,SIGSOR,SIG20000400
1AIR,VSOR,VAIR,TITLE(12),VI(42) 20000500
COMMON/INPUTS/AFOV,AWOV,RHO,VISC,TEMP,DELTA,RVL 20000600
COMMON/DCALC/GR,PR,G1,B1,A,RVLD,VID(42) 20000700
DOUBLE PRECISION GR,PR,G1,B1,A,RVLD,VID 20000800
DATA BLANK/' ',BNO/' NO'/' 20000900
IF (XIN(1) .EQ. 0.0) GO TO 10 20001000
1 AU=(ALOG(SIGAIR))**2 20001100
AMU=ALOG(VAIR) 20001200
XIN(2)=XIN(1)*EXP(AMU+AU/2.0) 20001300
XIN(3)=XIN(1)*EXP(2.0*AMU+2.0*AU) 20001400
10 IF (S0 .EQ. 0) GO TO 20 20001500
11 SU=(ALOG(SIGSOR))**2 20001600
SMU=ALOG(VSOR) 20001700
S1=S0*EXP(SMU+SU/2.0) 20001800
S2=S0*EXP(2.0*SMU+2.0*SU) 20001900
20 N3=2*(IPLAT+ISETL)+ILEAK+IVOL+3 20002000
A=0.083D+00 20002100
IF (N3 .LE. 50) GO TO 30 20002200
WRITE (6,1000) N3 20002300
1000 FORMAT (1H1,3X,'N3 =',I3,' N3 CANNOT BE GREATER THAN 50') 20002400
CALL EXIT 20002500

```

30	GR=2.17778E-06*AFOV*RHO/VISC	20002600
	PR=7.32113E-14*AWOV*TEMP/(VISC*DELTA)	20002700
	RVLD=RVL	20002800
	G1=6.84169E-14*RHO/VISC	20002900
	B1=9.2E-17*TEMP/VISC	20003000
	IF (IVOL .EQ. 0) GO TO 32	20003100
	DO 31 I=1,IVOL	20003200
31	VID(I)=VI(I)	20003300
32	WRITE (6,3000) TITLE	20003400
3000	FORMAT (1H1///29X,'PROGRAM HAA-3 - AEROSCL LOG-NORMAL - INITIAL CO	20003500
	NDITIONS'//26X,12A4)	20003600
	ANO=BLANK	20003700
	IF (XIN(1) .EQ. 0.0) ANO=BNO	20003800
	WRITE (6,3001) ANO	20003900
3001	FORMAT (1H0,24X,A4,' SUSPENDED MATERIAL')	20004000
	IF (XIN(1) .EQ. 0.0) GO TO 40	20004100
	WRITE (6,3002) AU,AMU,XIN(1),XIN(2),XIN(3)	20004200
3002	FORMAT (48X,'U =',1P1E11.4/48X,'MU =',1P1E11.4/48X,'X0 =',1P1E11.4/48X,'X1 =',1P1E11.4/48X,'X2 =',1P1E11.4)	20004300
	ANO=BLANK	20004400
40	IF (ISORS .EQ. 0) ANO=BNO	20004500
	WRITE (6,3003) ANO	20004600
3003	FORMAT (1H0,24X,A4,' SOURCE')	20004700
	IF (ISORS .EQ. 0) GO TO 50	20004800
	WRITE (6,3004) SU,SMU,SO,S1,S2	20004900
3004	FORMAT (48X,'U =',1P1E11.4/48X,'MU =',1P1E11.4/48X,'SO =',1P1E11.4/48X,'S1 =',1P1E11.4/48X,'S2 =',1P1E11.4)	20005000
	50 WRITE (6,3005) N3,GR,PR,G1,B1	20005100
3005	FORMAT (1H0,24X,'NUMBER OF DIFFERENTIAL EQ. =',I3/25X,'SETTLING C	20005200
	ONSTANT,',7X,'GR =',1P1D11.4/25X,'PLATING CONSTANT,',8X,'PR =',1P120005300	
	2D11.4/25X,'GRAV. AGGLOM. CONST., G1 =',1P1D11.4/25X,'BROWNIAN A	20005400
	3GGLOM. CONST., B1 =',1P1D11.4)	20005500
	RETURN	20005600
	END	20005700
		20005800
		20005900

INPUT CARD COUNT = 59

OPTION CARD FOLLOWS

\$OPT RLP	1	1	100	30000100
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SUBROUTINE SOLVE(N3)	30000100
COMMON/BLOK1/TD,XD(50),HD,TOLD,XDS(50),TDS,TAUD,TMAXD	30000200
COMMON/BLOK2/ISORS,ILEAK,ISETL,IPLAT,IAGGB,IAGG,IAGGT,INDIN,IND,	30000300
IITIM,ITRK,IPAS,K,KMAX,NERR,ISEQ,MEM,IVOL,IFIN,L	30000400
COMMON/BLOK3/SO,S1,S2,XIN(50),TO,TAUIN,HIN,TOLIN,TMAXIN,SIGSOR,SIG	30000500
IAIR,VSOR,VAIR,TITLE(12),VI(42)	30000600
COMMON/BLOK4 /VINT(42,200),T(1000),X0(1000),X1(1000),X2(1000),VPL	30000700
IAT(200),VSET(200),VLEAK(200),PLATNO(200),SETNO(200),TIME(200)	30000800
COMMON/INPUTS/AFOV,AWOV,RHO,VISC,TEMP,DELTA,RVL	30000900
COMMON/EXTRA/EP SL,DELTA1	30001000
COMMON/EXTRA1/LOFF,LPLAT	30001100
COMMON/DCALC/GR,PR,G1,B1,A,RVLD,VID(42)	30001200
DOUBLE PRECISION GR,PR,G1,B1,A,RVLD,VID	30001300
DOUBLE PRECISION TD,XD,HD,TOLD,XDS,TDS,TAUD,TMAXD	30001400
IND=INDIN	30001500
LOFF=200	30001600
ITIM=1	30001700
ITRK=0	30001800
IPAS=0	30001900
K=1	30002000
MEM=0	30002100
L=1	30002200
IMAX=0	30002300

IF IN= 0	30002400
TAUD= TAUIN	30002500
HD=HIN	30002600
TOLD= TOL IN	30002700
TMAXD= TMAXIN	30002800
TD=TO	30002900
DO 2 I=1,N3	30003000
2 XD(I)=XIN(I)	30003100
CALL SAVE	30003200
1 K=K+1	30003300
IF (K .GT. KMAX)GO TO 100	30003400
IF (TD .GT. TMAXD) GO TO 100	30003500
IF (IMAX .EQ. 0 .AND. XO(1) .EQ. 0.0) GO TO 3	30003600
IMARK=1	30003700
IF (IMAX .NE. 0) IMARK=IMAX	30003800
IF (X1(K-1)/X1(IMARK) .LT. EPSL) GO TO 100	30003900
GO TO 3	30004000
100 K=K-1	30004100
IF IN= 1	30004200
CALL SAVE	30004300
120 RETURN	30004400
3 IF (TD .GE. TAUD .AND. IPAS .EQ. 0)GO TO 6	30004500
IF (ITRK .EQ. 1) GO TO 7	30004600
GO TO 8	30004700
7 IND=INDIN	30004800
ITIM= 1	30004900
ITRK= 0	30005000
ISORS=0	30005100
HD=HIN	30005200
IMAX=K-1	30005300
PR=PR*DELTA/DELTA1	30005400
LOFF=L	30005500
GO TO 8	30005600
6 IPAS= 1	30005700
ITRK= 1	30005800
K=K-1	30005900
IND= 2	30006000
ITIM= 1	30006100
MEM=1	30006200
DO 10 I=1,N3	30006300
10 XD(I)=XDS(I)	30006400
TD=TDS	30006500
HD=TAUD-TD	30006600
8 TDS=TD	30006700
DO 16 I=1,N3	30006800
16 XDS(I)=XD(I)	30006900
CALL RKADAM(N3,TD,XD,HD,IND,ITIM,TOLD,NERR)	30007000
IF (NERR .EQ. 1) GO TO 110	30007100
CALL SAVE	30007200
ITIM= 0	30007300
MEM=0	30007400
GO TO 1	30007500
110 K=K-1	30007600
WRITE (6,1000)	30007700
1000 FORMAT (1H0,3X,'ERROR IN RKADAM')	30007800
GO TO 120	30007900
END	30008000

INPUT CARD COUNT = 80

SUBROUTINE SAVE	40000100
COMMON/KKK/KK(200)	40000200
COMMON/BLOK1/TO,XD(50),HD,TOLD,XDS(50),TDS,TAUD,TMAXD	40000300
DOUBLE PRECISION TO,XD,HD,TOLD,XDS,TDS,TAUD,TMAXD	40000400
COMMON/BLOK2/ISORS,ILEAK,ISETL,IPLAT,IAGGB,IAGGG,IAGGT,INDIN,IND,	40000500
1 IITIM,ITRK,IPAS,K,KMAX,NERR,ISEQ,MEM,IVOL,IFIN,L	40000600
COMMON/BLOK4/VINT(42,200),T(1000),X0(1000),X1(1000),X2(1000),VPLAT	40000700
1(200),VSET(200),VLEAK(200),PLATNO(200),SETNO(200),TIME(200)	40000800
1 X0(K)=XD(1)	40000900
X1(K)=XD(2)	40001000
X2(K)=XD(3)	40001100
T(K)=TO	40001200
IF (K .EQ. 1) GO TO 103	40001300
IF (MOD(K,ISEQ)-1 .NE. 0 .AND. IFIN .EQ. 0) GO TO 2	40001400
GO TO 3	40001500
2 IF (MEM .EQ. 0) RETURN	40001600
3 L=L+1	40001700
I=4	40001800
IF (TIME(L-1) .GE. T(K)) L=L-1	40001900
IF (IPLAT .EQ. 0) GO TO 4	40002000
VPLAT(L)=XD(I)	40002100
I=I+1	40002200
4 IF (ISETL .EQ. 0) GO TO 5	40002300
VSET(L)=XD(I)	40002400
I=I+1	40002500
5 IF (ILEAK .EQ. 0) GO TO 10	40002600
VLEAK(L)=XD(I)	40002700
I=I+1	40002800
10 IF (IPLAT .EQ. 0) GO TO 11	40002900
PLATNO(L)=XD(I)	40003000
I=I+1	40003100
11 IF (ISETL .EQ. 0) GO TO 12	40003200
SETNO(L)=XD(I)	40003300
I=I+1	40003400
12 IF (IVOL .EQ. 0) GO TO 101	40003500
DO 100 J=1,IVOL	40003600
VINT(J,L)=XD(I)	40003700
100 I=I+1	40003800
101 TIME(L)=TO	40003900
KK(L)=K	40004000
102 RETURN	40004100
103 TIME(L)=TO	40004200
 KK(L)=K	40004300
GO TO 102	40004400
END	40004500

INPUT CARD COUNT = 45

OPTION CARD FOLLOWS

\$OPT RLP 1 1 100 50000100

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SUBROUTINE FUND (N,T,X,XP) 50000100
COMMON/BLOK1/TO,XD(50),HD,TOLD,XDS(50),TDS,TAUD,TMAXD 50000200
COMMON/BLOK2/ISORS,ILEAK,ISETL,IPLAT,IAGGB,IAGGG,IAGGT,INDIN,IND,I 50000300
1TIM,ITRK,IPAS,K,KMAX,NERR,ISEQ,MEM,IVCL,IFIN,L 50000400
COMMON/BLOK3/SO,S1,S2,XIN(50),TO,TAUIN,HIN,TCLIN,TMAXIN,SIGSOR, 50000500
1SIGAIR,VSOR,VAIR,TITLE(12),VI(42) 50000600
COMMON/INPUTS/AFOV,AHOV,RHO,VISC,TEMP,DELTA,RVL 50000700
DIMENSION X(50),XP(50),F(20),E(20) 50000800
COMMON/DCALC/GR,PR,G1,B1,A,RVLD,VID(42) 50000900
DOUBLE PRECISION X,XP,T,F,E,GR,PR,G1,B1,A,RVLD,STWOPI,VID 50001000
DOUBLE PRECISION TO,XD,HD,TOLD,XDS,TDS,TAUD,TMAXD 50001100
DATA STWOPI/2.5066282/ 50001200
IF (ISORS .EQ. 0) GO TO 1 50001300
C 50001400
C INCLUDE SOURCE TERM. 50001500
C 50001600
XP(1)=SO 50001700
XP(2)=S1 50001800
XP(3)=S2 50001900
GO TO 3 50002000
C 50002100
C NO SOURCE TERM. 50002200
C 50002300
1 DO 2 I=1,3 50002400
2 XP(I)=0.0 50002500
3 IF (X(1) .NE. 0.0) GO TO 5 50002600
C 50002700
C INITIAL CONDITIONS ARE ALL ZERO. 50002800
C 50002900
DO 4 I=4,N 50003000
4 XP(I)=0.0 50003100
GO TO 500 50003200
5 IF (X(1) .GT. 0.0 .AND. X(2) .GT. 0.0 .AND. X(3) .GT. 0.0) GO TO 6 50003300
C 50003400
C ERROR IF MOMENTS ARE LESS THAN OR EQUAL TO ZERO. 50003500
C 50003600
WRITE (6,1000) X(1),X(2),X(3),T 50003700
1000 FORMAT (1H1,3X,'ERROR IN SUBROUTINE FUND',4X,'X(1)=' ,1P1D13.5,' X( 50003800
12)=' ,1P1D13.5,' X(3)=' ,1P1D13.5,' T=' ,1P1D13.5) 50003900
X(1)=DABS(X(1)) 50004000
X(2)=DABS(X(2)) 50004100
X(3)=DABS(X(3)) 50004200

TMAXD=T/10.0D+00 50004300
C 50004400
C CALCULATE U AND MU FROM MOMENTS AND BASIC EXPONENTIALS. 50004500
C 50004600
6 F(1)=X(1)**2 50004700
F(2)=X(2)**2 50004800
F(3)=X(1)*X(3) 50004900
F(4)=DLOG(F(3)/F(2)) 50005000
F(5)=DSQRT(F(4)) 50005100
F(6)=0.5D+00*DLOG(F(2)**2/(F(1)*F(3))) 50005200
7 F(7)=DEXP(F(4)/18.0D+00) 50005300
F(8)=F(7)*F(7) 50005400
F(9)=F(8)*F(8) 50005500
F(10)=F(8)*F(9) 50005600
F(11)=F(10)*F(7) 50005700
F(12)=F(10)*F(10) 50005800
F(13)=F(12)*F(9) 50005900
F(14)=F(8)/F(11) 50006000

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8	F(15)=DEXP(F(6)/3.0D+00)	50006100
	F(16)=1.0D+00/F(15)	50006200
	F(17)=F(15)*F(15)	50006300
9	F(18)=1.0D+00/F(17)	50006400
	F(19)=1.0D+00/F(9)	50006500
C		50006600
C	CALCULATE REDUNDANT FACTORS.	50006700
C		50006800
	IF (IAGGG .EQ. 0) GO TO 15	50006900
10	E(1)=F(10)*DERF(0.6666666666666667*F(5))+2.0D+00*DERF(0.3333333333333333*F(5))	50007000
	E(2)=A*(DERF(0.5D+00*F(5))+F(19)*DERF(0.1666666666666667*F(5)))	50007100
15	IF (IAGGG+ISETL+IPLAT .EQ. 0) GO TO 16	50007200
	E(3)=F(15)*F(7)	50007300
	E(7)=F(15)*F(11)	50007400
16	IF (IAGGB+IPLAT .EQ. 0) GO TO 17	50007500
	E(4)=F(16)*F(7)	50007600
17	IF (IAGGB .EQ. 0) GO TO 18	50007700
	E(8)=1.0D+00+F(8)	50007800
	E(9)=1.0D+00+F(9)	50007900
18	IF (ISETL+IPLAT .EQ. 0) GO TO 19	50008000
	E(5)=F(17)*F(9)	50008100
	E(6)=F(17)*F(13)	50008200
	E(10)=X(2)*(E(6)+A*E(7))	50008300
		50008400
	E(11)=X(1)*(E(5)+A*E(3))	50008500
19	IF (ISETL .EQ. 0) GO TO 20	50008600
	E(13)=GR*E(11)	50008700
	E(15)=GR*E(10)	50008800
20	IF (IPLAT .EQ. 0) GO TO 21	50008900
	E(14)=PR*X(1)*(E(4)+A*F(18)*F(9))	50009000
	E(16)=PR*E(11)	50009100
21	IF (ILEAK .EQ. 1) E(17)=RVLD*X(2)	50009200
C		50009300
C	SET UP MOMENTS EQUATIONS -- AGGLOMERATION AND BROWNIAN TERMS.	50009400
C		50009500
	IF (IAGGG .EQ. 0) GO TO 22	50009600
	XP(1)=XP(1)-G1*X(1)*X(2)*(E(3)*E(1)+E(2))	50009700
	XP(3)=XP(3)+2.0D+00*G1*X(2)*X(3)*(E(7)*E(1)+E(2))	50009800
22	IF (IAGGB .EQ. 0) GO TO 23	50009900
	XP(1)=XP(1)-B1*F(1)*(E(8)+A*E(4)*E(9))	50010000
	XP(3)=XP(3)+2.0D+00*B1*F(2)*(E(8)+A*F(16)*F(14)*E(9))	50010100
C		50010200
C	SET UP PLATING TERMS IN MOMENTS EQUATIONS AND SET UP PLATED VOLUME EQUATION	50010300
C		50010400
23	I=4	50010500
	IF (IPLAT .EQ. 0) GO TO 24	50010600
	XP(1)=XP(1)-E(14)	50010700
	XP(2)=XP(2)-E(16)	50010800
	XP(3)=XP(3)-PR*E(10)	50010900
	XP(I)=E(16)	50011000
	I=I+1	50011100
C		50011200
C	SET UP SETTLING TERMS IN MOMENTS EQUATIONS AND SET UP SETTLED VOLUME EQUATION.	50011300
C		50011400
24	IF (ISETL .EQ. 0) GO TO 25	50011500
	XP(1)=XP(1)-E(13)	50011600
	XP(2)=XP(2)-E(15)	50011700
	XP(3)=XP(3)-GR*X(3)*F(12)*(E(6)+A*E(3))	50011800
	XP(I)=E(15)	50011900
	I=I+1	50012000
C		50012100
C	SET UP LEAKAGE TERMS IN MOMENTS EQUATIONS AND SET UP LEAKED VOLUME EQUATION.	50012200
C		50012300
C		50012400
		50012500
		50012600

25	IF (ILEAK .EQ. 0) GO TO 26	50012700
	XP(1)=XP(1)-RVLD*X(1)	50012800
	XP(2)=XP(2)-E(17)	50012900
	XP(3)=XP(3)-RVLD*X(3)	50013000
	XP(I)=E(17)	50013100
	I=I+1	50013200
C		50013300
C	SET UP PLATED NUMBER EQUATION.	50013400
C		50013500
26	IF (IPLAT .EQ. 0) GO TO 27	50013600
	XP(I)=E(14)	50013700
	I=I+1	50013800
C		50013900
C	SET UP SETTLED NUMBER EQUATION.	50014000
C		50014100
27	IF (ISETL .EQ. 0) GO TO 28	50014200
	XP(I)=E(13)	50014300
	I=I+1	50014400
C		50014500
C	CALCULATE TIME INTEGRAL OF SUSPENDED PARTICLES OF DISCRETE SIZE.	50014600
C		50014700
28	IF (IVOL .EQ. 0) GO TO 500	50014800
	XX=X(1)/(STWOPI*F(5))	50014900
	DO 40 J=1,IVOL	50015000
	XP(I)=XX*DEXP(-(DLOG(VID(J))-F(6))*2/(2.00+00*F(4)))/VID(J)	50015100
40	I=I+1	50015200
500	RETURN	50015300
	END	50015400

INPUT CARD COUNT = 154

OPTION CARD FOLLOWS			
\$OPT RLP	1	1	100
			60000100

SUBROUTINE OUTPUT	60000100
COMMON/BLOK2/ISORS,ILEAK,ISETL,IPLAT,IAGGB,IAGGG,IAGGT,INDIN,IND,	60000200
1ITIM,ITRK,IPAS,K,KMAX,NERR,ISEQ,MEM,IVOL,IFIN,L	60000300
COMMON/BLOK3/SO,S1,S2,XIN(50),TO,TAUIN,HIN,TOLIN,TMAXIN,SIGSOR,SIG	60000400
1AIR,VSOR,VAIR,TITLE(12),VI(42)	60000500
COMMON/BLOK4/VINT(42,200),T(1000),XO(1000),X1(1000),X2(1000),VPLAT	60000600
1(200),VSET(200),VLEAK(200),PLATNO(200),SETNO(200),TIME(200)	60000700
COMMON/KKK/KK(200)	60000800
DIMENSION VBAL(200),VREL(200),NCC(10),SYM(10),R(42),VCON(42)	60000900
COMMON/DCALC/GR,PR,G1,B1,A,RVLD,VID(42)	60001000
COMMON/EXTRA1/LOFF,LPLAT	60001100
DOUBLE PRECISION GR,PR,G1,B1,A,RVLD,VID	60001200
COMMON/BDATA/ABSX1(14),ORD1(14),ORD2(14),RAT1(5),RAT2(5),RAT3(5),R6	60001300
1AT4(5),ORD3(14),ORD4(14),ORD5(14),ORD6(14),ABSX2(14),ORD7(14),ORD8	60001400
2(14),ORD9(14),ORD10(14),ORD11(14),ORD12(14),CRD13(14),ORD14(14),OR	60001500
3D15(14)	60001600
INTEGER*4 \$	60001700
DATA SYM /' A B C D E F G H I J '/	60001800
DATA PI43/4.18879/,NCC(1)/17/,NCC(2)/18/,NCC(3)/19/,NCC(4)/20/,	60001900
1NCC(5)/21/,NCC(6)/22/,NCC(7)/23/,NCC(8)/24/,NCC(9)/25/,NCC(10)/33/	60002000
CALL SCOUTV	60002100
DO 10 I=1,L	60002200
KL=KK(I)	60002300
VBAL(I)=XI(KL)*PI43	60002400
10 VREL(I)=X1(1)*PI43	60002500
DO 20 I=1,L	60002600
IF (IPLAT .EQ. 1) VBAL(I)=VBAL(I)+VPLAT(I)*PI43	60002700
IF (ISETL .EQ. 1) VBAL(I)=VBAL(I)+VSET(I)*PI43	60002800
IF (ILEAK .EQ. 1) VBAL(I)=VBAL(I)+VLEAK(I)*PI43	60002900

20	CONTINUE	60003000
	IF (SO .EQ. 0.0) GO TO 30	60003100
	CON=VSOR*EXP(0.5*(ALOG(SIGSOR))**2)	60003200
	DO 25 I=1,L	60003300
	TIMEX=TIME(I)-TIME(1)	60003400
	IF (TIME(I) .GT. TAUIN) TIMEX=TAUIN-TIME(1)	60003500
25	VREL(I)=VREL(I)+SO*TIMEX*PI43*CON	60003600
30	CONTINUE	60003700
	YMAX=-1.0E+06	60003800
	YMIN=1.0E+60	60003900
	DO 35 I=1,L	60004000
	YMAX=AMAX1(YMAX,VBAL(I),VREL(I))	60004100
35	YMIN=AMIN1(YMIN,VBAL(I),VREL(I))	60004200
	NPAGE=0	60004300
	I1=1	60004400
	I2=L	60004500
	IF (I2.GT. 102) I2=102	60004600
36	NPAGE=NPAGE+1	60004700
	WRITE (6,1000) NPAGE,TITLE	60004800
1000	FORMAT (1H1/ 29X,'PROGRAM HAA-3 - AEROSOL LOG-NORMAL - OUTPUT PAGE	60004900
	1E',I3//26X,12A4/)	60005000
	WRITE (6,1002)	60005100
1002	FORMAT (40X,'VOLUME BALANCE, CUBIC MICRONS'/)	60005200
	WRITE (6,1001) (I,TIME(I),VBAL(I),I=I1,I2)	60005300
1001	FORMAT (1H,10X,'TIME',26X,'TIME',26X,'TIME',/4X,'INDEX SEC',8X	60005400
	1,'VOLUME',7X,'INDEX SEC',8X,'VOLUME',7X,'INDEX SEC',8X,'VOLUME'/	60005500
	23(17,2X,1P2E11.3))	60005600
	IF (I2 .EQ. L) GO TO 40	60005700
	I1=I2+1	60005800
	I2=L	60005900
	GO TO 36	60006000
40	I1=1	60006100
	I2=L	60006200
	IF (I2 .GT. 102) I2=102	60006300
41	NPAGE=NPAGE+1	60006400
	WRITE (6,1000) NPAGE,TITLE	60006500
	WRITE (6,1003)	60006600
1003	FORMAT (40X,'VOLUME RELEASED, CUBIC MICRONS'/)	60006700
	WRITE (6,1001) (I,TIME(I),VREL(I),I=I1,I2)	60006800
	IF (I2 .EQ. L) GO TO 50	60006900
	I1=I2+1	60007000
	I2=L	60007100
	GO TO 41	60007200
50	CALL AICRT3(0,0,TIME(1),VBAL(1),L,1,2,1,NCC(1),TITLE,ABSX1,ORD1,1,	60007300
	11,16.0,16.0,2,TIME(1),TIME(L),2,YMIN,YMAX)	60007400
	CALL AICRT3(0,0,TIME(1),VREL(1),L,1,2,1,NCC(2),TITLE,ABSX1,ORD1,2,	60007500
	11,16.0,16.0,2,TIME(1),TIME(L),2,YMIN,YMAX)	60007600
	WRITE (16,2000) SYM(1),SYM(2)	60007700
2000	FORMAT (1H4/1H4/1H4/1H4/1H4/75X,'SYMBCL DESCRIPTION'/75X,A4,5X,'	60007800
	1VOLUME BALANCE'/75X,A4,5X,'VOLUME RELEASED')	60007900
	ITRA=1	60008000
59	GO TO (60,70,80,90,150),ITRA	60008100
60	ITRA=2	60008200
	N=L	60008300
	M=0	60008400
	\$=1	60008500
	IF (IPLAT .EQ. 0) GO TO 70	60008600
	DO 63 I=1,L	60008700
63	VBAL(I)=PI43*VPLAT(I)/VREL(I)	60008800
	DO 64 I=1,5	60008900
64	ORD2(I+6)=RAT1(I)	60009000
	GO TO 100	60009100

155 IF (I2 .EQ. L) GO TO 156	60015700
I1=I2+1	60015800
I2=L	60015900
GO TO 153	60016000
156 ITRA=ITRA+1	60016100
IF (ITRA .EQ. 2) GO TO 152	60016200
N=L-5+1	60016300
CALL AICRT3 (0,0,TIME(\$),VBAL(\$),N,1,2,1,42,TITLE,ABSX1,ORD3,1,1,16.0,16.0,2,TIME(1),TIME(L),1,YMIN,YMAX)	60016400
CALL AICRT3 (0,0,TIME(\$),VREL(\$),N,1,2,1,42,TITLE,ABSX1,ORD4,1,1,16.0,16.0,2,TIME(1),TIME(L),1,YMIN,YMAX)	60016500
DO 160 I=\$,L	60016600
	60016700
	60016800
160 VBAL(I)=EXP(3.0*(ALOG(VBAL(I)))*2+ALOG(VREL(I)))	60016900
I1=\$	60017000
I2=L	60017100
IF (I2 .GT. 102) I2=102	60017200
161 NPAGE=NPAGE+1	60017300
WRITE (6,1000) NPAGE,TITLE	60017400
WRITE (6,1006) ORD5	60017500
WRITE (6,1009) (I,TIME(I),VBAL(I),I=I1,I2)	60017600
IF (I2 .EQ. L) GO TO 162	60017700
I1=I2+1	60017800
I2=L	60017900
GO TO 161	60018000
162 CALL AICRT3 (0,0,TIME(\$),VBAL(\$),N,1,2,1,42,TITLE,ABSX1,ORD5,1,1,16.0,16.0,2,TIME(1),TIME(L),1,YMIN,YMAX)	60018100
	60018200
1007 FORMAT (1H,10X,'TIME','26X','TIME','26X','TIME','/4X','INDEX SEC',8X,1,'RG',7X,'INDEX SEC',8X,'RG',7X,'INDEX SEC',8X,'RG',7X,'INDEX SEC',8X,'/60018300	60018300
23(17,2X,1P2E11.3))	60018400
	60018500
1008 FORMAT (1H,10X,'TIME','26X','TIME','26X','TIME','/4X','INDEX SEC',8X,1,'SIGMA',7X,'INDEX SEC',8X,'SIGMA',7X,'INDEX SEC',8X,'SIGMA',7X,'INDEX SEC',8X,'/60018600	60018600
23(17,2X,1P2E11.3))	60018700
	60018800
1009 FORMAT (1H,10X,'TIME','26X','TIME','26X','TIME','/4X','INDEX SEC',8X,1,'R50',7X,'INDEX SEC',8X,'R50',7X,'INDEX SEC',8X,'R50',7X,'INDEX SEC',8X,'/60018900	60018900
23(17,2X,1P2E11.3))	60019000
DO 170 I=1,L	60019100
KL=KK(I)	60019200
170 VBAL(I)=X0(KL)	60019300
I1=1	60019400
I2=L	60019500
IF (I2 .GT. 102) I2=102	60019600
171 NPAGE=NPAGE+1	60019700
WRITE (6,1000) NPAGE,TITLE	60019800
WRITE (6,1006) ORD6	60019900
WRITE (6,1010) (I,TIME(I),VBAL(I),I=I1,I2)	60020000
1010 FORMAT (1H,10X,'TIME','26X','TIME','26X','TIME','/4X','INDEX SEC',8X,1,'CONC.',7X,'INDEX SEC',8X,'CONC.',7X,'INDEX SEC',8X,'CONC.',7X,'INDEX SEC',8X,'/60020100	60020100
23(17,2X,1P2E11.3))	60020200
IF (I2 .EQ. L) GO TO 175	60020300
I1=I2+1	60020400
I2=L	60020500
GO TO 171	60020600
	60020700
	60020800
175 CALL AICRT3 (0,0,TIME(1),VBAL(1),L,1,2,1,42,TITLE,ABSX1,ORD6,1,1,16.0,16.0,2,TIME(1),TIME(L),1,YMIN,YMAX)	60020900
	60021000

```

        IF (IVOL .EQ. 0) GO TO 501                                60021100
        IF (ISETL .EQ. 0) GO TO 302                                60021200
        DO 176 J=1,IVOL                                           60021300
        R(J)=VI(J)**0.333333                                       60021400
176 VCON(J)=SNGL(GR)*(R(J)**2+SNGL(A)*R(J))*R(J)**2*3.0          60021500
C                                                                    60021600
C    CALCULATE SETTLED DISTRIBUTIONS                               60021700
C                                                                    60021800
        LPLAT=0                                                    60021900
        CALL PLOTD(NPAGE,ORD7 ,ORD8 ,NCC,SYM,ABSX2,PI43,VCON,R)    60022000
302 IF (IPLAT .EQ. 0) GO TO 501                                    60022100
        DO 301 J=1,IVOL                                           60022200
        R(J)=VI(J)**0.333333                                       60022300
301 VCON(J)=SNGL(PR)*(1.0/R(J)+SNGL(A)/R(J)**2)*R(J)**2*3.0      60022400
C                                                                    60022500
C    CALCULATE PLATED DISTRIBUTIONS                               60022600
C                                                                    60022700
        LPLAT=1                                                    60022800
        CALL PLOTD(NPAGE,ORD9 ,ORD10,NCC,SYM,ABSX2,PI43,VCON,R)    60022900
C                                                                    60023000
501 $=1                                                            60023100
        IF (X0(1) .LE. 0.0) $=2                                    60023200
        N=L-1                                                       60023300
        DO 510 I=$,L                                                60023400
        KL=KK(I)                                                    60023500
510 VBAL(I)=(X1(KL)/X0(KL))*0.333333                             60023600
        I1=$                                                         60023700
        I2=L                                                         60023800
        IF (I2 .GT. 102) I2=102                                     60023900
511 NPAGE=NPAGE+1                                                  60024000
        WRITE (6,1000) NPAGE,TITLE                                  60024100
        WRITE (6,1006) ORD11                                         60024200
        WRITE (6,1013) (I,TIME(I),VBAL(I),I=I1,I2)                60024300
1013 FORMAT (1H ,10X,'TIME',',26X,'TIME',',26X,'TIME','/4X,'INDEX SEC',8X,60024400
        1,'RADIUS',7X,'INDEX SEC',8X,'RADIUS',7X,'INDEX SEC',8X,'RADIUS'/60024500
        23(17,2X,1P2E11.3))                                         60024600
        IF (I2 .EQ. L) GO TO 520                                     60024700
        I1=I2+1                                                      60024800
        I2=L                                                         60024900
        GO TO 511                                                    60025000
520 CALL AICRT3(0,0,TIME($),VBAL($),N,1,2,1,42,TITLE,ABSX1,ORD11,1,1,160025100
        16.0,16.0,2,TIME(I),TIME(L),1,YMIN,YMAX)                  60025200

        $=2                                                         60025300
        N=L-1                                                         60025400
        IF (ISETL .EQ. 0) GO TO 545                                 60025500
        DO 530 I=$,L                                                60025600
530 VBAL(I)=((VSET(I)-VSET(I-1))/(SETNO(I)-SETNO(I-1)))*0.333333 60025700
        I1=$                                                         60025800
        I2=L                                                         60025900
        IF (I2 .GT. 102) I2=102                                     60026000
531 NPAGE=NPAGE+1                                                  60026100
        WRITE (6,1000) NPAGE,TITLE                                  60026200
        WRITE (6,1006) ORD12                                         60026300
        WRITE (6,1013) (I,TIME(I),VBAL(I),I=I1,I2)                60026400
        IF (I2 .EQ. L) GO TO 540                                     60026500
        I1=I2+1                                                      60026600
        I2=L                                                         60026700
        GO TO 531                                                    60026800
540 CALL AICRT3(0,0,TIME($),VBAL($),N,1,2,1,42,TITLE,ABSX1,ORD12,1,1,160026900
        16.0,16.0,2,TIME(I),TIME(L),1,YMIN,YMAX)                  60027000
545 IF (IPLAT .EQ. 0) GO TO 570                                    60027100
        DO 550 I=$,L                                                60027200
550 VBAL(I)=((VPLAT(I)-VPLAT(I-1))/(PLATNO(I)-PLATNO(I-1)))*0.333333 60027300
        I1=$                                                         60027400
        I2=L                                                         60027500
        IF (I2 .GT. 102) I2=102                                     60027600

```

551	NPAGE=NPAGE+1	60027700
	WRITE (6,1000) NPAGE,TITLE	60027800
	WRITE (6,1006) ORD13	60027900
	WRITE (6,1013) (1,TIME(1),VBAL(1),I=11,12)	60028000
	IF (12.EQ. 1) GO TO 560	60028100
	11=12+1	60028200
	12=L	60028300
	GO TO 551	60028400
560	CALL AICRT3(0,0,TIME(\$),VBAL(\$),N,1,2,1,42,TITLE,ABSX1,ORD13,1,1,160028500	16.0,16.0,2,TIME(1),TIME(L),1,YMIN,YMAX)
570	CONTINUE	60028600
	IF (IVOL.EQ. 0) GO TO 800	60028700
	IF (ILEAK.EQ. 0) GO TO 800	60028800
	DO 600 J=1,IVOL	60028900
	R(J)=VI(J)**0.333333	60029000
600	VCON(J)=SNGL(RVLD)*R(J)**2*3.0	60029100
C		60029200
C	CALCULATE LEAKED DISTRIBUTIONS	60029300
		60029400
C		60029500
	LPLAT=0	60029600
	CALL PLOTD(NPAGE,ORD14,ORD15,NCC,SYM,ABSX2,PI43,VCON,R)	60029700
800	RETURN	60029800
	END	60029900

INPUT CARD COUNT = 299

OPTION CARD FOLLOWS

\$OPT RLP	1	1	100	70000100
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	SUBROUTINE PLOTD (NPAGE,ORDA,ORDB,NCC,SYM,ABSX2,PI43,VCON,R)	70000100
	COMMON/BLOK2/ISORS,ILEAK,ISETL,IPLAT,IAGGB,IAGGG,IAGGT,INDIN,IND,	70000200
	1ITIM,ITRK,IPAS,K,KMAX,NERR,ISEQ,MEM,IVOL,IFIN,L	70000300
	COMMON/BLOK3/SO,S1,S2,XIN(50),TO,TAUIN,HIN,TCLIN,TMAXIN,SIGSOR,SIG70000400	
	1AIR,VSOR,VAIR,TITLE(12),VI(42)	70000500
	COMMON/BLOK4/VINT(42,200),T(1000),XO(1000),X1(1000),X2(1000),VPLAT70000600	
	1(200),VSET(200),VLEAK(200),PLATNO(200),SETNO(200),TIME(200)	70000700
	COMMON/EXTRA1/LOFF,LPLAT	70000800
	COMMON/EXTRA/EP SL,DELTA1	70000900
	COMMON/INPUTS/AFOV,AWOV,RHO,VISC,TEMP,DELTA,RVL	70001000
	DIMENSION ORDA(14),ORDB(14),NCC(10),SYM(10),ABSX2(14),VCON(42)	70001100
	INTEGER*4 \$	70001200
	DIMENSION DIST(42,10),R(42)	70001300
	IF (LPLAT.NE. 1) GO TO 10	70001400
	DO 5 J=1,IVOL	70001500
5	VCON(J)=VCON(J)*DELTA1/DELTA	70001600
10	CONTINUE	70001700
	DO 300 I=1,L,10	70001800
	\$=1	70001900
	IF (I.EQ. 1) \$=2	70002000
	YMAX=-1.0E+06	70002100
	YMIN=1.0E+50	70002200
	M1=10	70002300
	IF (L-I.LT. 9) M1=L-I+1	70002400
	DO 180 M=\$,M1	70002500
	IF (LPLAT.NE. 1) GO TO 50	70002600
	IF (I+M-2.NE. LOFF) GO TO 50	70002700
	LPLAT=0	70002800
	DO 40 J=1,IVOL	70002900
40	VCON(J)=VCON(J)*DELTA/DELTA1	70003000

50	CONTINUE	70003100
	DO 178 J=1,IVOL	70003200
	DIST(J,M)=VCON(J)*(VINT(J,I+M-1)-VINT(J,I+M-2))	70003300
	IF (DIST(J,M) .LE. 0.0) GO TO 178	70003400
	YMAX=AMAX1(YMAX,DIST(J,M))	70003500
	YMIN=AMIN1(YMIN,DIST(J,M))	70003600
178	CONTINUE	70003700
180	CONTINUE	70003800
	NFI=1	70003900
	DO 195 M=\$,M1	70004000
	IF (M .EQ. \$.OR. M .EQ. 5 .OR. M .EQ. 9) GC TO 181	70004100
	GO TO 182	70004200
181	NPAGE=NPAGE+1	70004300
	WRITE (6,1000) NPAGE,TITLE	70004400
1000	FORMAT (1H1/ 29X,'PROGRAM HAA-3 - AEROSCL LCG-NORMAL - OUTPUT PAG	70004500
	1E',13//26X,12A4//)	70004600
182	WRITE (6,1011) ORDA,TIME(I+M-1),(DIST(J,M),J=1,IVOL)	70004700
1011	FORMAT (20X,14A4,'TIME =',1P1E12.4,' SEC'/(1P8E12.4))	70004800
	IF (IVOL .EQ. 1) GO TO 195	70004900
	IF (DIST(1,M) .LE. 0.0) GO TO 195	70005000
	DO 185 J=2,IVOL	70005100
	IF (DIST(J,M) .LE. 0.0) GO TO 195	70005200
	IVOX=J-1	70005300
	IF (DIST(J,M)/YMAX .LT. 1.0E-09 .AND. DIST(J,M) .LE. DIST(J-1,M))	70005400
	1GO TO 186	70005500
185	CONTINUE	70005600
	IVOX=IVOL	70005700
186	IF (IVOX .LE. 1) GO TO 195	70005800
	CALL AICRT3 (1,1,R(1),DIST(1,M),IVOX,1,2,1,ACC(M),TITLE,ABSX2,ORDA	70005900
	1,NFI,1,16.0,16.0,2,R(1),R(IVOL),2,YMIN,YMAX)	70006000
	NFI=2	70006100
195	CONTINUE	70006200
	WRITE (16,1012) (SYM(M),TIME(I+M-1),M=\$,M1)	70006300
1012	FORMAT (1H4/1H4/1H4/1H4/1H4/1H4/30X,'SYMBOL TIME, SEC'/(30X,A4,	70006400
	1X,1P1E10.3))	70006500
C		70006600
C	CALCULATE VOLUME DISTRIBUTION FOR EACH TIME.	70006700
C		70006800
	YMAX=-1.0E+06	70006900
	YMIN=1.0E+50	70007000
	NFI=1	70007100
	DO 200 M=\$,M1	70007200
	DO 199 J=1,IVOL	70007300
	DIST(J,M)=DIST(J,M)*PI43*VI(J)	70007400
	IF (DIST(J,M) .LE. 0.0) GO TO 199	70007500
	YMAX=AMAX1(YMAX,DIST(J,M))	70007600
	YMIN=AMIN1(YMIN,DIST(J,M))	70007700
199	CONTINUE	70007800
200	CONTINUE	70007900
	DO 210 M=\$,M1	70008000
	IF (M .EQ. \$.OR. M .EQ. 5 .OR. M .EQ. 9) GC TO 201	70008100
	GO TO 202	70008200
201	NPAGE=NPAGE+1	70008300
	WRITE (6,1000) NPAGE, TITLE	70008400


```

202 WRITE (6,1011) ORDB,TIME(I+M-1),(DIST(J,M),J=1,IVCL) 70008500
    IF (IVOL .EQ. 1) GO TO 210 70008600
    IF (DIST(1,M) .LE. 0.0) GO TO 210 70008700
    DO 205 J=2,IVOL 70008800
    IF (DIST(J,M) .LE. 0.0) GO TO 210 70008900
    IVOX=J-1 70009000
    IF (DIST(J,M)/YMAX .LT. 1.0E-09 .AND. DIST(J,M) .LE. DIST(J-1,M)) 70009100
    GO TO 206 70009200
205 CONTINUE 70009300
    IVOX=IVOL 70009400
206 IF (IVOX .LE. 1) GO TO 210 70009500
    CALL AICRT3 (1,1,R(1),DIST(1,M),IVOX,1,2,1,NCC(M),TITLE,ABSX2,ORDB70009600
    1,NFI,1,16.0,16.0,2,R(1),R(IVOL),2,YMIN,YMAX) 70009700
    NFI=2 70009800
210 CONTINUE 70009900
    WRITE (16,1012) (SYM(M),TIME(I+M-1),P=1,M1) 70010000
300 CONTINUE 70010100
    RETURN 70010200
    END 70010300

```

INPUT CARD COUNT = 103

OPTION CARD FOLLOWS

\$OPT RLP 1 1 100 80000100

```

BLOCK DATA 80000100
COMMON/BDATA/ABSX1(14),ORD1(14),ORD2(14),RAT1(5),RAT2(5),RAT3(5),R80000200
1AT4(5),ORD3(14),ORD4(14),ORD5(14),ORD6(14),ABSX2(14),ORD7(14),ORD8000300
2(14),ORD9(14),ORD10(14),ORD11(14),ORD12(14),ORD13(14),ORD14(14),OR80000400
3D15(14) 80000500
DATA ABSX1 '/' TIME, SEC 80000600
1 '/'ORD1 '/' CONSERVATION INTEGRALS, VOLUME (CUBIC MICRON80000700
2) '/'ORD2 '/' VOLUME RATIO 80000800
3 '/'RAT1 '/' PLATED ON WALL '/'RAT2 '/' SETTLED ON F80000900
4LOOR '/'RAT3 '/' SUSPENDED IN AIR '/'RAT4 '/' LEAKED FROM CH80001000
5AMBER '/'ORD3 '/' SIGMA, SUSPENDED MATERIAL 80001100
6 '/' 80001200
DATA ORD4 '/' RG, MICRONS, SUSPENDED MATERIAL 80001300
1 '/'ORD5 '/' R50, MICRONS, SUSPENDED MATERIAL 80001400
2 '/'ORD6 '/' CONCENTRATION OF SUSPENDED MATERIAL, P80001500
3ART/CC '/'ABSX2 '/' RADIUS, MICRONS 80001600
4 '/'ORD7 '/' SETTLED NUMBER DISTRIBUTION, PARTICL80001700
5ES/(CC*MICRON) '/'ORD8 '/' SETTLED VOLUME DISTRIBUTION, MICRO80001800
6NS**3/(CC*MICRON) '/'ORD9 '/' PLATED NUMBER DISTRIBUTION, PAR80001900
7TICLES/(CC*MICRON) '/'ORD10 '/' PLATED VOLUME DISTRIBUTION, 80002000
8MICRONS**3/(CC*MICRON) '/' 80002100
DATA ORD11 '/' EFFECTIVE RADIUS, MICRONS, FOR SUSPENDED MATERIA80002200
1L '/'ORD12 '/' EFFECTIVE RADIUS, MICRONS, FOR SETTLED MATER80002300
2IAL '/'ORD13 '/' EFFECTIVE RADIUS, MICRONS, FOR PLATED MAT80002400
3ERIAL '/' 80002500
DATA ORD14 '/' LEAKED NUMBER DISTRIBUTION, PARTICLES/(CC*MICRON80002600
1) '/'ORD15 '/' LEAKED VOLUME DISTRIBUTION, MICRONS**3/(CC*M180002700
2CRON) '/' 80002800
END 80002900

```

INPUT CARD COUNT = 29

APPENDIX D

PROGRAMMING NOTES

In order to program Equations 8 through 16, the following steps were used in subroutine FUND.

<u>Equation</u>	<u>Description</u>
$F(1) = X_o^2$	
$F(2) = X_1^2$	
$F(3) = X_o X_2$	
$F(4) = \ln [F(3)/F(2)]$	u
$F(5) = \sqrt{F(4)}$	$\sqrt{u}$
$F(6) = \frac{1}{2} \ln \left[\frac{F^2(2)}{F(1) F(3)} \right]$	μ
$F(7) = \exp \left[\frac{1}{18} F(4) \right]$	$e^{1/18 u}$
$F(8) = F(7) F(7)$	$e^{1/9 u}$
$F(9) = F(8) F(8)$	$e^{2/9 u}$
$F(10) = F(8) F(9)$	$e^{1/3 u}$
$F(11) = F(10) F(7)$	$e^{7/18 u}$
$F(12) = F(10) F(10)$	$e^{2/3 u}$
$F(13) = F(12) F(9)$	$e^{8/9 u}$
$F(14) = F(8)/F(11)$	$e^{-5/18 u}$

<u>Equation</u>	<u>Description</u>
$F(15) = \exp \left[\frac{1}{3} F(6) \right]$	$e^{1/3 \mu}$
$F(16) = 1/F(15)$	$e^{-1/3 \mu}$
$F(17) = F(15) F(15)$	$e^{2/3 \mu}$
$F(18) = 1/F(17)$	$e^{-2/3 \mu}$
$F(19) = 1/F(9)$	$e^{-2/9 u}$
$E(1) = F(10) \operatorname{erf} \left[\frac{2F(5)}{3} \right] + 2 \operatorname{erf} \left[\frac{F(5)}{3} \right]$	$e^{1/3 u} \operatorname{erf} \left[\frac{2 \sqrt{u}}{3} \right] + 2 \operatorname{erf} \left[\frac{\sqrt{u}}{3} \right]$
$E(2) = A \left\{ \operatorname{erf} \left[\frac{F(5)}{2} \right] + F(19) \operatorname{erf} \left[\frac{F(5)}{6} \right] \right\}$	$A \left\{ \operatorname{erf} \left[\frac{\sqrt{u}}{2} \right] + e^{-2/9 u} \operatorname{erf} \left[\frac{\sqrt{u}}{6} \right] \right\}$
$E(3) = F(15) F(7)$	$e^{1/3 \mu + 1/18 u}$
$E(4) = F(16) F(7)$	$e^{-1/3 \mu + 1/18 u}$
$E(5) = F(17) F(9)$	$e^{2/3 \mu + 2/9 u}$
$E(6) = F(17) F(13)$	$e^{2/3 \mu + 8/9 u}$
$E(7) = F(15) F(11)$	$e^{1/3 \mu + 7/18 u}$
$E(8) = 1.0 + F(8)$	$1.0 + e^{1/9 u}$
$E(9) = 1.0 + F(9)$	$1.0 + e^{2/9 u}$
$E(10) = X_1 [E(6) + AE(7)]$	$X_1 [e^{2/3 \mu + 8/9 u} + Ae^{1/3 \mu + 7/18 u}]$
$E(11) = X_0 [E(5) + AE(3)]$	$X_0 [e^{2/3 \mu + 2/9 u} + Ae^{1/3 \mu + 1/18 u}]$

<u>Equation</u>	<u>Description</u>
$E(13) = G_R E(11)$	
$E(14) = P_R X_O [E(4) + AF(18) F(9)]$	$P_R X_O [e^{-1/3\mu + 1/18 u}$ $+ A e^{-2/3\mu + 2/9 u}]$
$E(15) = G_R E(10)$	
$E(16) = P_R E(11)$	
$E(17) = R_L X_1$	

By using the above quantities, Equations 8 through 16 become:

$$\begin{aligned} \frac{dX_O}{dt} = S_O - G_1 X_O X_1 [E(3)E(1) + E(2)] - B_1 F(1)[E(8) + AE(4)E(9)] \\ - E(13) - E(14) - R_L X_O \quad \dots (8') \end{aligned}$$

$$\frac{dX_1}{dt} = S_1 - E(15) - E(16) - E(17) \quad \dots (9')$$

$$\begin{aligned} \frac{dX_2}{dt} = S_2 + 2G_1 X_1 X_2 [E(7)E(1) + E(2)] + 2B_1 F(2)[E(8) + AF(16)F(14)E(9)] \\ - G_R X_2 F(12)[E(6) + AE(3)] - P_R E(10) - R_L X_2 \quad \dots (10') \end{aligned}$$

$$\frac{dV_P}{dt} = E(16) \quad \dots (11')$$

$$\frac{dV_S}{dt} = E(15) \quad \dots (12')$$

$$\frac{dV_L}{dt} = E(17) \quad \dots (13')$$

$$\frac{dN_P}{dt} = E(14) \quad \dots (14')$$

$$\frac{dN_S}{dt} = E(13) \quad \dots (15')$$

$$\frac{dN_T(v_i)}{dt} = \frac{X_o}{\sqrt{2\pi} F(5)} \exp \left\{ \frac{-[\ln v_i - F(6)]^2}{2 F(4)} \right\} \frac{1}{v_i} \quad \dots (16')$$