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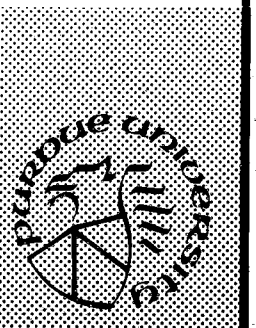

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TR-EE 88-13
January 1, 1987 to December 31, 1987

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Supported by Delco Electronics

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CHAPTER 1

Introduction

The purpose of this report is to summarize the progress to date on the development of a 2D computer model for bipolar junction transistors. The goals of this project, which ends December 31, 1988, can be broken into two main categories and are listed below:

Code Modifications

1. Modify existing 2D solar cell simulation code to handle bipolar junction transistors.
2. Incorporate energy balance equations into the computer model.
3. Incorporate transient and small signal *ac* analyses.

Code Applications

1. Assess performance differences between Delco small and large thin epi devices.
2. Evaluate a polysilicon modification of the thin epi process.
3. Provide general analytic support.
4. Investigate extraction of SPICE parameters from simulation results.
5. Provide version of the code to Delco Electronics.

The solar cell code, SCAP2D (Solar Cell Analysis Program in 2 Dimensions), has been successfully modified to handle bipolar junction transistors. This code has been named DAP2D (Device Analysis Program in 2 Dimensions). The major weakness of the code at the present time is its inability to model the Delco thin epi device adequately. The structure of this device is sufficiently complicated that computaional restrictions in the present version of DAP2D require that simplifying assumptions be made when modeling this device. This problem is being addressed by the installation of a software package which will reduce the restrictions on device structure complexity (Chapter 3).

Some simulation results are presented in Chapter 2. The most significant modeling result to date is the prediction that a factor of about 3 improvement in β can be expected with the addition of a polysilicon emitter contact. This result was obtained by assuming that the polysilicon contact can be modeled by an effective contact recombination velocity.

Several appendices are also included in this report. Appendix A contains an overview of the numerical methods used to solve the semiconductor equations which are used to model device behavior. A user's manual for DAP2D is presented in Appendix B. An example simulation is presented in Appendices C and D.

CHAPTER 2

Modeling of the Polysilicon Emitter Contact

Polysilicon presents many challenges to the solid state physicist as well as anyone attempting to model transport in this material. There are many parameters and new phenomena which must be taken into account in order to model this material accurately, but which at the present time, are not well enough understood. For instance, a new phenomena is the possible splitting of the current vector at a grain boundary (GB). Current incident on a GB can split such that some of the current passes through the boundary while some of the current flows down the GB. This phenomenon is thought to be a function of the doping, and angle of incidence of the current. This is not as much of a problem for a one-dimensional code since then the current is constrained to flow only in one direction. This effect is currently a topic of research in heterostructures grown by MBE, but the situation in poly-material is even more complex due to the random nature of the GB walls.

Current through the poly crystalline material might be further complicated by quantum size effects. Lifshitz et. al.[1] have proposed the large work function differences between phosphorus and arsenic doped polysilicon as due to the very small grain sizes of the arsenic doped material at the Si/SiO_2 boundary. The conduction band density of states in lightly doped single crystalline material is inversely proportional to the volume of the sample. For heavily doped material the dopants form an impurity band which is believed to be centered around the discrete impurity energy level in lightly doped material. The conduction band edge is also shifted down in energy due to many body effects. The Fermi level is determined by both the filling of the conduction band states and the impurity band states. In large grains the Fermi level is determined mainly by the filling of the conduction band states since there are so many more of them. However, for small grained material the Fermi level is determined mainly by the filling of the impurity states. This shift in the Fermi level between the two differently doped materials manifests itself in a difference in the work functions and is solely due to quantum size effects.

The present understanding of semiconductor GB's is based on the models developed for metallic boundaries, eg. the Structural Unit Model (SUM) [2]. The boundaries are described as arrays of dislocations, and the atomic structure is modeled so as to minimize the density of dangling bonds and bond bending and stretching [3]. Hornstra [4] has proposed models for the structure of GB's in the diamond lattice. These models contain five- and seven-membered rings and units containing dangling bonds. Hornstra's model is particularly appealing because it predicts two possible preferential sites for segregation of solute atoms which would explain some of the segregated arsenic being ionized while some is not [5]: a) the seven-

membered rings provide sites for interstitial segregation and b) units containing dangling bonds provide substitutional sites, at the dangling bond site for p-type dopants, and at a neighboring Si atom site in the case of n-type dopants. The approximate density of these sites is estimated to be 10-30%. The experimentally determined segregation values of As to silicon GB's of 10-15at.% are compatible with the range of segregation predicted by Hornstra's model if the preferred substitutional sites are filled [5].

The segregation to the GB's is expected to affect the characteristics of poly transport in two ways: a) since it is known that doped poly resistivity never decreases to the level of single crystal material even for highly doped material, it's been suggested that the reason is due to the increased majority carrier scattering at the GB because of segregation, and b) the segregation leads to a degenerate layer at the GB and a subsequent potential barrier to minority carriers [6]. This latter effect may explain the beta enhancement of poly contacted emitter transistors, however the effects of the "native oxide" must also be considered in minority carrier transport. Devices believed to not possess any significant "native oxide" should then be dominated by the characteristics of the GB.

If the model for segregation in heavily doped polysilicon samples of Wong et. al. [6] is correct then majority carrier transport can be modeled by a reduced mobility than that in single crystalline material because of the enhanced scattering at the GB's, while minority carrier transport could possibly be modeled as thermionic emission over the potential barrier created by the ionized dopants at the GB. Due to the degree of segregation being a strong function of processing temperature and time [5-6], the potential barrier will also be very sensitive to these parameters.

Finally, the current through the oxide layer (if it exists) between the single crystalline material and the poly is again a function of the oxide thickness as well as how many "holes" there are in the oxide. The "native oxide" probably presents little barrier to majority carrier transport but for minority carriers it is very likely a significant impediment. Patton [7] has shown that indeed the base current is significantly effected by the presence of a "native oxide". However, all of his samples were exposed to atmosphere and also exposed to oxygen during pumpdown before the poly deposition. In the case of in-situ cleaning and deposition of the poly, where the "native oxide" is arguably non-existent, the presence of carbon is inevitable and with the deposition of Si, the creation of SiC at the interface is the result [7].

Another possible effect of dopant segregation to the GB's is boundary reconstruction. It is impossible to predict whether such a reconstruction would enhance or reduce the density of interface states that lie deep in the band gap, or the interface charge. The results of such a change could either retard or enhance the resistive and recombination efficiencies of the GB [6].

Until some of these quantities can be better quantified the only resource is to model the poly contact with an effective surface recombination velocity. Reasonable agreement between theory and experiment is obtained for the beta vs. emitter base voltage. The code predicts that the peak beta can be increased by a factor of three over the metal contacted device by assuming a zero minority carrier recombination velocity. This increase in beta is of course also a function of emitter depth and base width, the maximum increase found so far has been a factor of three. Even though it may be felt that zero velocity is not realistic, there is not much change in the beta curve until one reaches a recombination velocity of 10^4 cm/sec (see Fig. 1).

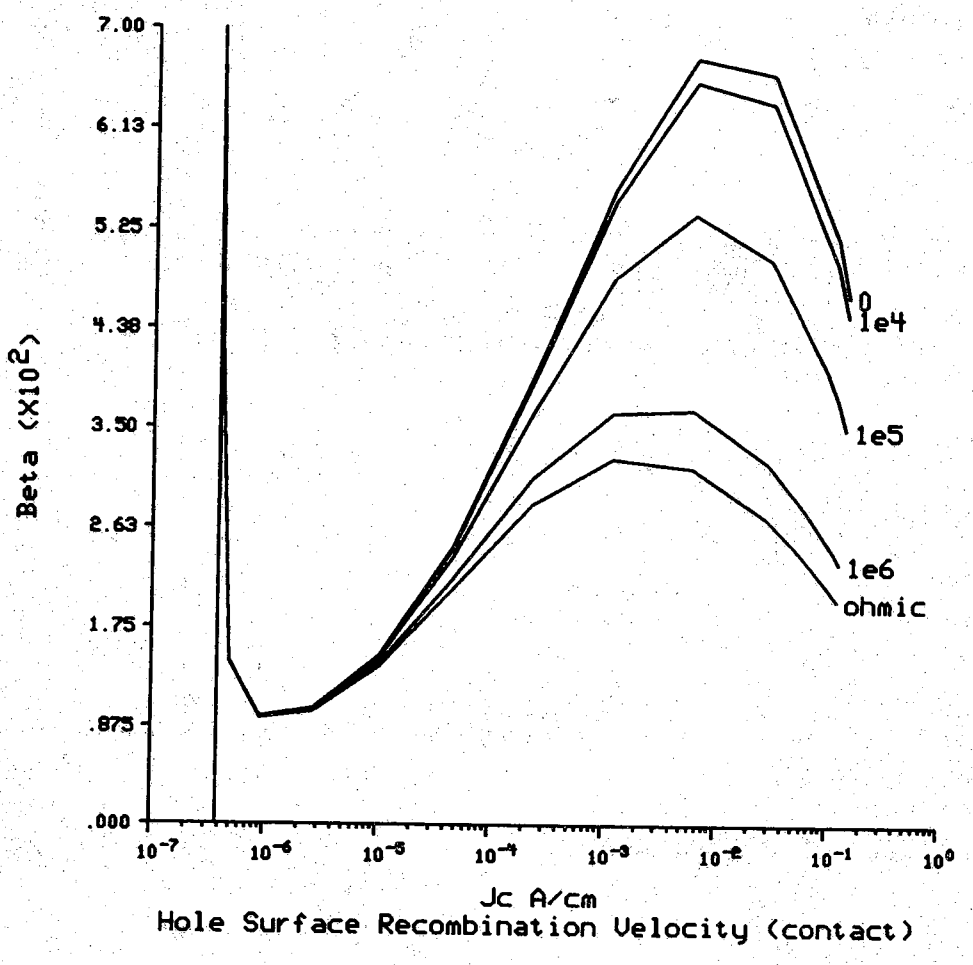

Figure 1. Beta vs. collector current for an npn transistor with minority carrier recombination velocity under the contact as a parameter. For ohmic the recombination velocity is essentially infinite.

Beta versus Temperature

A study was made of the temperature dependence of beta for a model transistor. The collector contact was placed on the bottom to mimic the effect of having a buried layer. The hole recombination velocity at the poly emitter contact was selected to be 10^4 cm/sec. This value was selected because this was a typical value quoted by Burke et. al. in their SRC report. The base width was 0.215 microns. The temperature range was typical of outdoor temperature (-22 to 104 degrees Fahrenheit). Peak beta is seen to vary by a factor of three over this temperature range. The increase in beta with temperature is dominated by band-gap-narrowing. This is the dominating effect for thin heavily doped emitters. If band-gap-narrowing was not included beta would decrease with temperature, or approximately stay the same. If the emitter can be considered to be transparent then:

$$\beta \simeq \left\{ \frac{D_B N_E W_E}{D_E N_B W_B} \right\} \exp((\Delta E_G(\text{base}) - \Delta E_G(\text{emitter}))/k\,T)$$

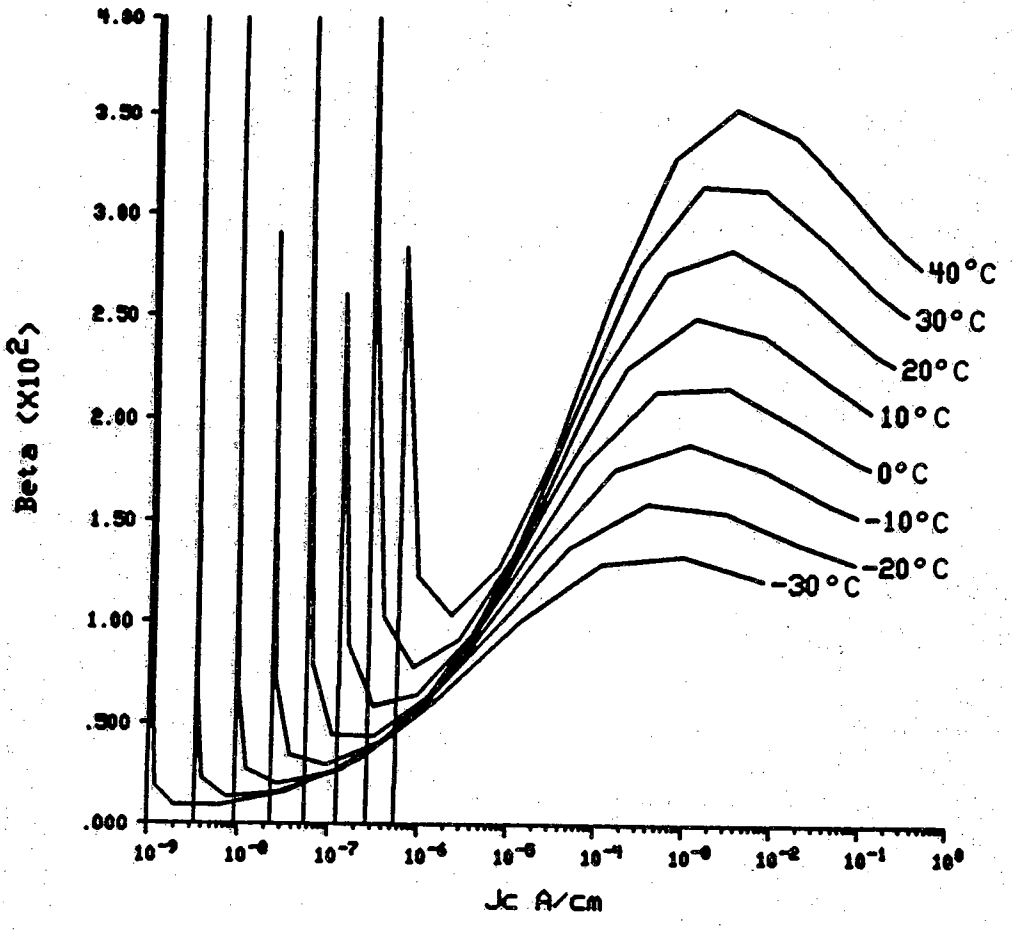

Figure 2a. Beta vs. collector current with temperature as a parameter $V_{ce} = 2.7V$

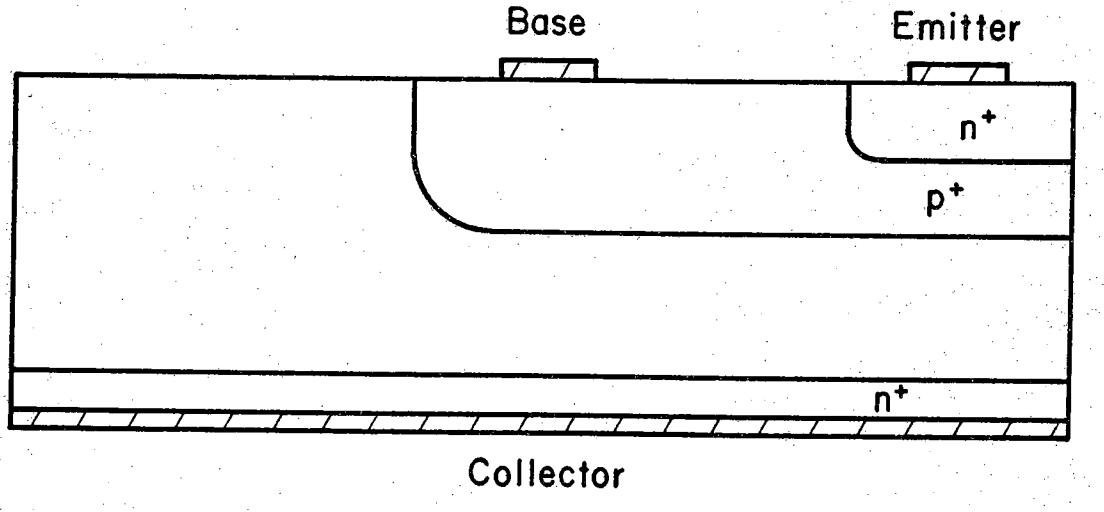

Figure 2b. Device which was simulated for the beta vs. collector current plot

Effect of Domain Boundaries

A study was also made of the effects of domain boundaries on the solution. The minority carrier recombination velocity was set to zero in this case. Fig. 4 is a sketch of the device with the domain of simulation going out past the collector and emitter contacts. Fig. 5 is the domain for a different run cut at the midpoint of the contacts. Fig. 5 of course saves on the number of nodes necessary to simulate the device. We were interested in what effect this had on the simulation. The doping densities, lifetimes, etc. are exactly the same, the only difference being the domain of simulation. Fig. 3 shows the results. The net effect is to shift the beta vs. collector current plot but has little effect on the overall shape of the curve.

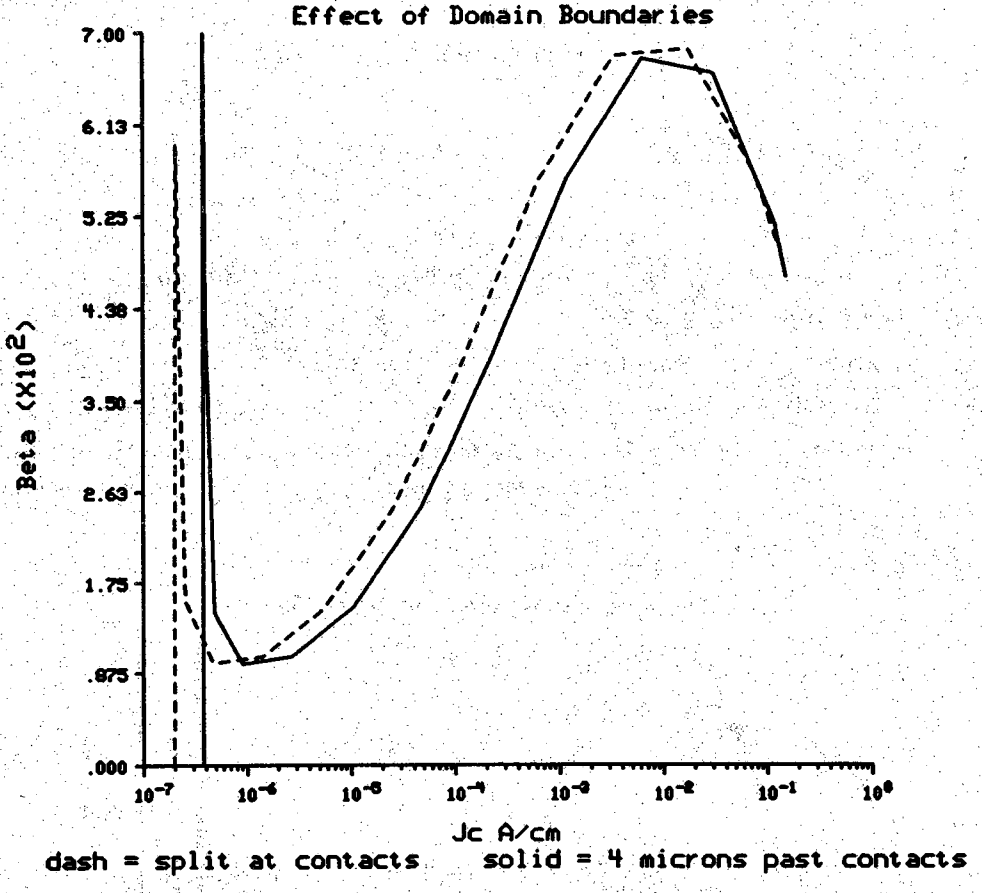

Figure 3. Effect of extending domain of simulation out beyond the contacts

This suggests that the majority of the current is collected by the inside half of the contacts where the fields would be the largest.

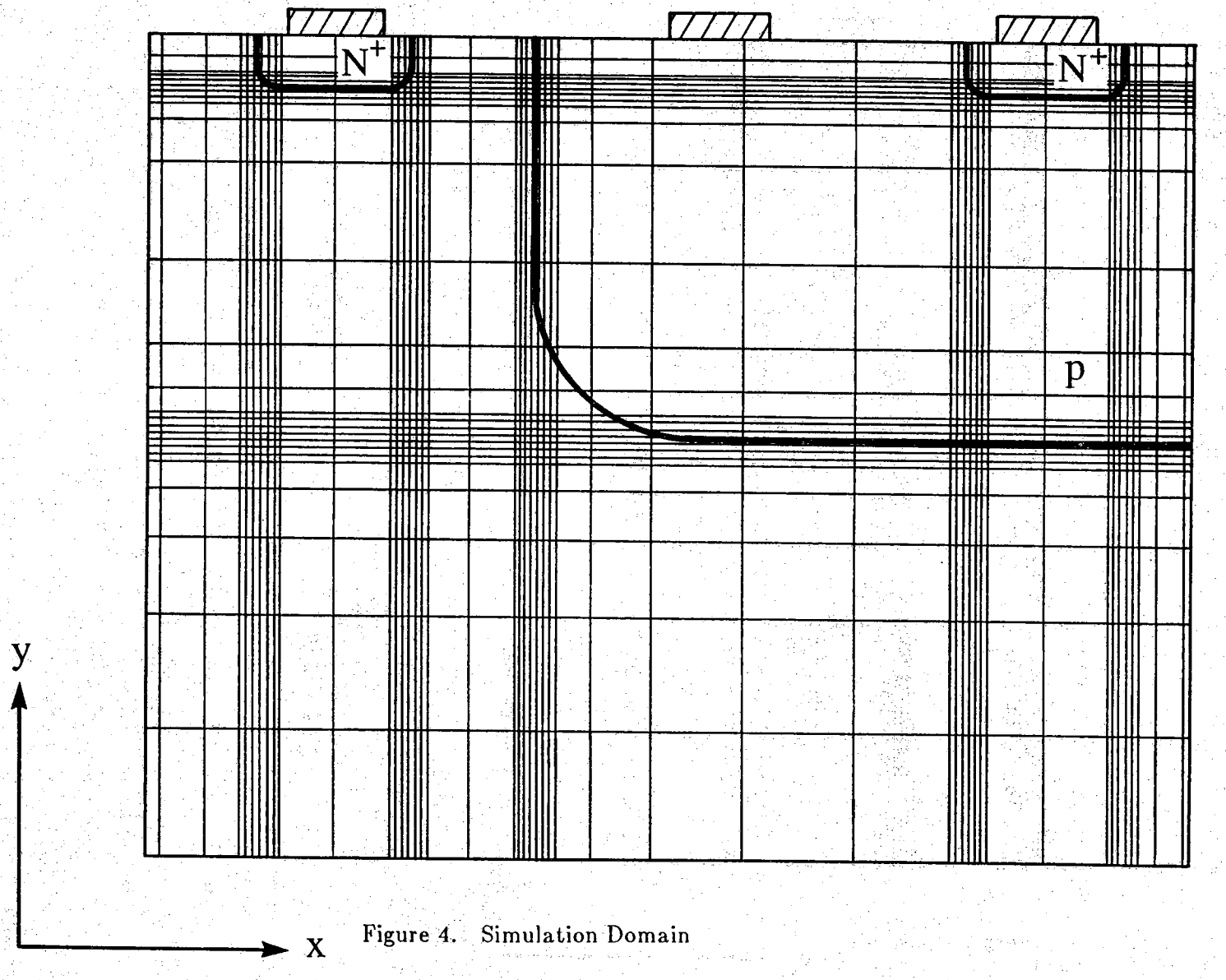

Figure 4. Simulation Domain

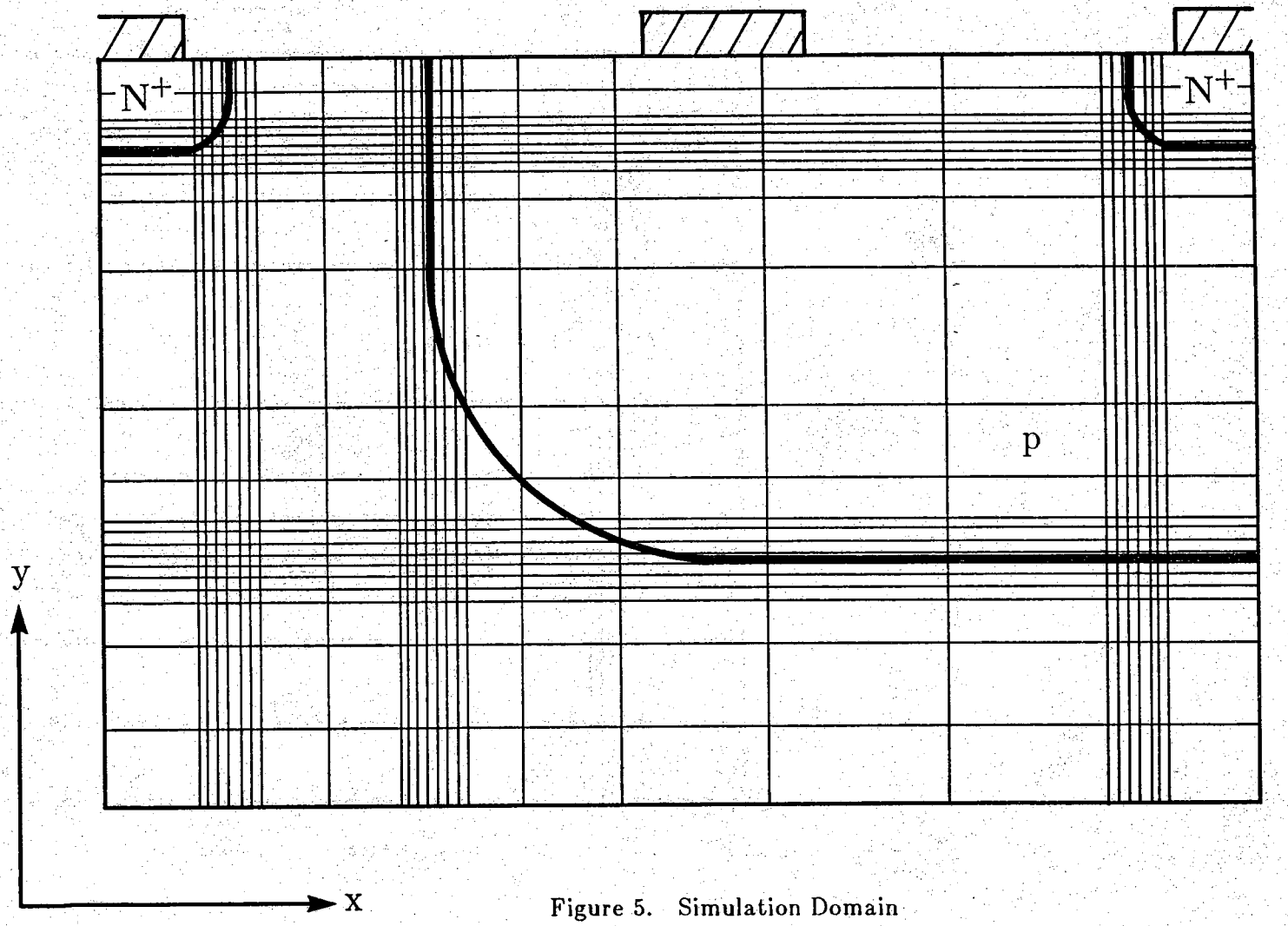

Figure 5. Simulation Domain

Next we studied the effect of putting the collector contact all the way across the bottom of the device (see Fig. 2b). This is meant to mimic a buried layer. The device to which we are comparing had no buried layer and the collector contact was on top (see Fig. 4). The net result is a much more rapid drop off in beta due to the increased series resistance.

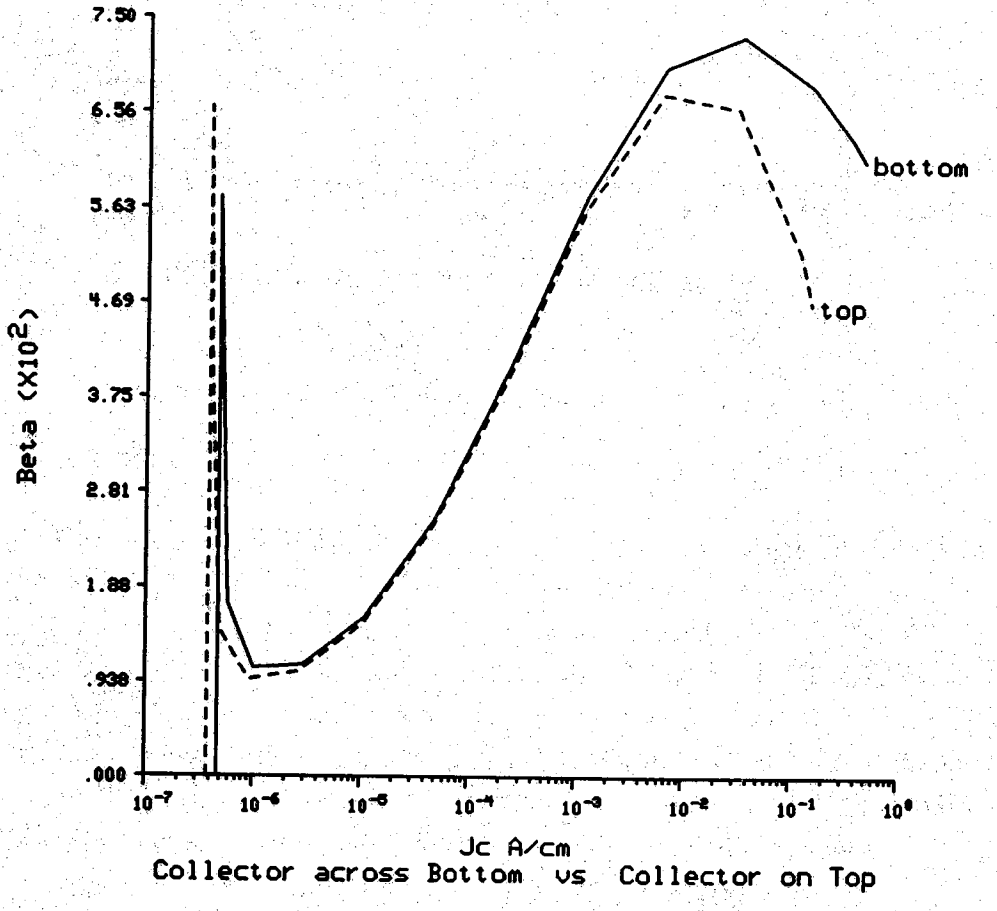

Figure 6. Effect of placing collector contact all the way across the bottom.

Finally the effect of extending the domain in the y-direction was looked into. Most of the action of the device happens near the top, in this case the top 1/2 micron. Therefore to model the device much further down than 6 microns is thought to be a waste of nodes. This indeed is pretty much the case as is seen on the plot. The result of extending the domain down to 24 microns is again a net decrease in the overall series resistance and hence a less rapid dropoff in beta. To sufficiently model devices with buried layers it would only be necessary to extend the domain down to the buried layer since current beyond here would be negligible.

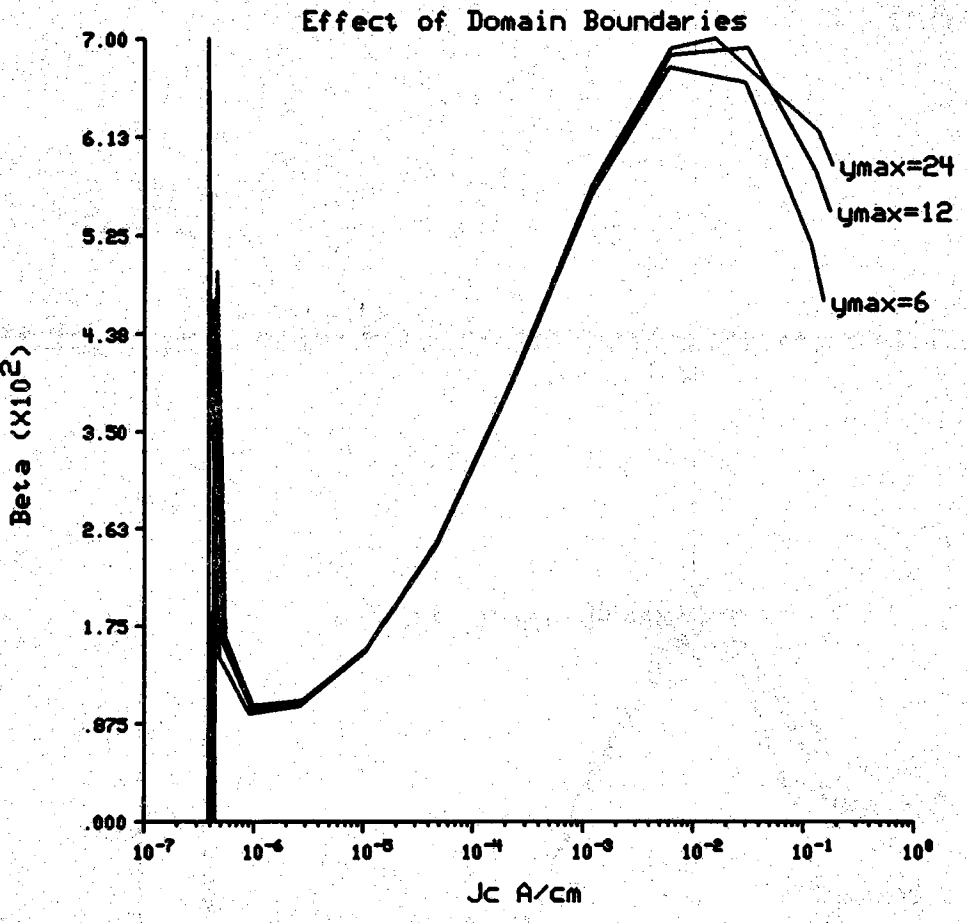

Figure 7. Effect of extending simulation domain in the y-direction.

Effect of Surface Recombination under the Oxide

A study was also made of the effect on beta of the hole surface recombination velocity under the oxide of an npn transistor exactly the same as the one above. This was a question which had arisen in previous work by Tim Whalen. He was using a one-dimensional program (PUPHS) to model some of Delco's transistors and the beta predictions were not very near the experimental values for the small devices. It was believed that at least part of the problem was caused by the inherent 2D nature of the small devices, ie. that because the code was one-dimensional all surface recombination effects were ignored. The device modeled in this study is on the order of 78 microns in width (see Fig. 3) depending on where one decides to call the end of the device.

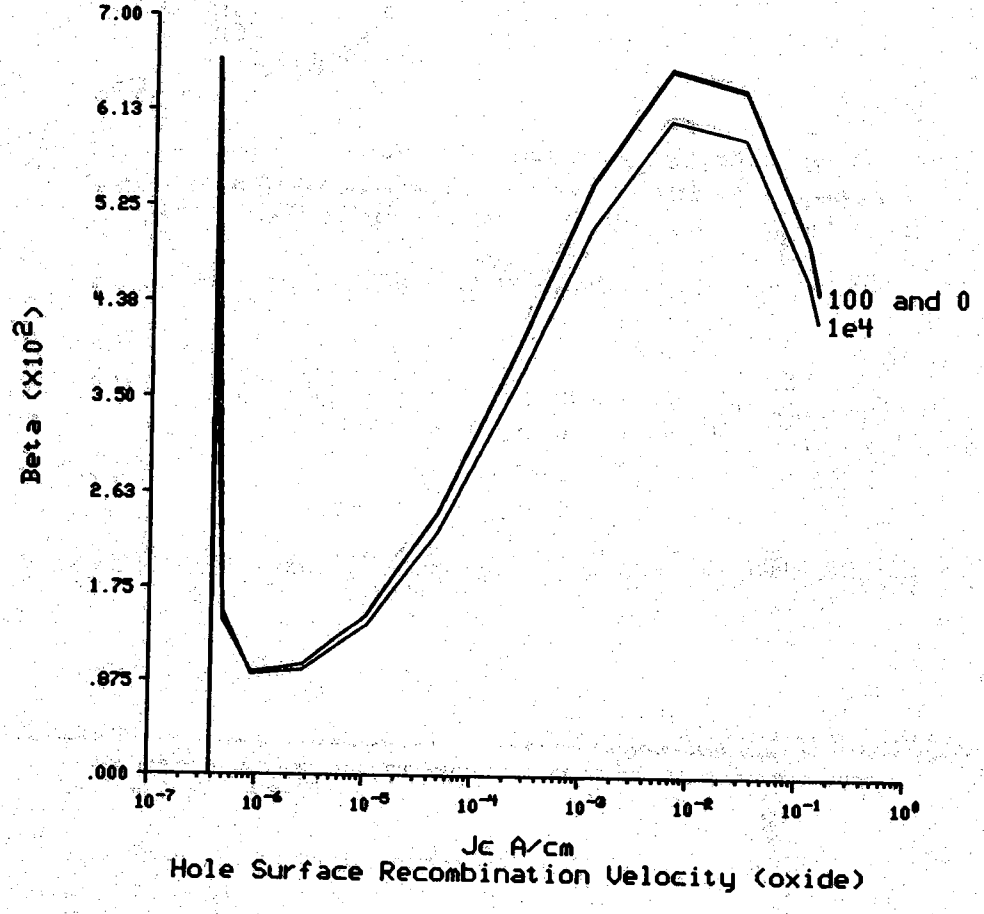

Figure 8. Plot of beta vs. collector current with surface recombination velocity under the oxide as a parameter

As the plot shows there is little effect on beta until the surface recombination velocity

is at least 10^4 cm/sec for a device of this size. A review of the literature is being conducted to determine if this is a reasonable value of surface recombination velocity. There is reason to believe that recombination may be enhanced at the surface when the surface is highly doped as is the case here. This is certainly not a complete study, studies are planned to shrink the device until the effect on beta is very large. This study will be aided with the installation of PCGPAK. Then we will not be limited by the number of nodal points, also Delco's thin epi process will be able to be modeled in all of its detail.

CHAPTER 3

Installation of PCGPAK

The ideal for every modeler is for the modeling program to predict exactly all measurable quantities, eg. currents, betas, cutoff frequencies etc.. However, ideality must be balanced by practicality (ie. computer resources, cpu time, etc.). The semiconductor equations themselves that the program is based on inevitably have inherent approximations.

DAP2D (Device Analysis Program in 2 Dimensions) is based on the drift-diffusion equations. For large devices these are an excellent approximation when all other relevant effects have been included in the drift-diffusion atmosphere (ie. band-gap-narrowing, carrier-carrier scattering etc.). An effect which drift-diffusion implicitly ignores is hot electrons. This effect can be ignored in large devices because the areas in which it can occur are such a small percentage of the overall device dimensions that it has negligible effect on the measurable characteristics.

One of the most severe constraints faced by all modelers is computer memory. All solution methods involve solving a matrix equation $Ax=b$. The order of A (the number of diagonal elements) for the drift-diffusion model is three times the number of nodal points. As would be expected the error in the solution is indirectly proportional to the number of nodal points. The more nodal points the better the solution, but the more nodal points the larger the order of A. There is a bright spot in this dismal picture. The structure of A is such that most of its elements are zero and the non-zero elements occur in bands running parallel with the diagonal. This is a common occurrence in computer simulation and hence there are many direct solvers which take advantage of this structure and require only that the elements between the bands be stored. Even with this storage scheme most of the elements are still zero (for the drift-diffusion equations). However, after LU decomposition most of these elements become non-zero, and hence cannot just be disregarded, at least for direct solvers. Iterative solvers are attractive because they require storing only the non-zero elements. Although iterative methods have been around a long time, most of the original methods required symmetric positive definite matrices to insure convergence. Not until recently have there been algorithms developed for non-symmetric systems.

DAP2D has until recently been using a direct solver. This has limited the maximum number of nodal points to 4000 in order that the matrix and the solver could fit completely in the Cyber memory. If the matrix does not fit completely into memory, the computer has to swap sections in and out of disk. This is a very slow process compared to the speed of the cpu and is not considered as a practical alternative. The cost of large page faults on the cyber is sufficient that if the matrix doesn't fit entirely into memory and it has to be swapped, 90% of the cost is for page swapping.

Several weeks were spent over the summer developing code to implement the iterative algorithm generally referred to as Orthomin. This is one of the iterative methods developed which work with non-symmetric systems. A preconditioning subroutine was also developed which helps speed convergence. The results were encouraging, but the development of one particular algorithm and one preconditioning technique proved very time consuming. There are many algorithms and preconditioning techniques each better suited for a particular type of problem. For this reason it was decided to purchase software called PCGPAK which was available from Scientific Computing Associates and includes all of the known algorithms applicable to our problem. It also includes many preconditioning techniques and control over the level of fill in in the incomplete factorizations. With this package it will be possible to increase the maximum number of nodal points to 20000. This is certainly enough to solve any 2-dimensional problem regardless of the complexity. It also will enable us to experiment with the different algorithms to determine how they work under differing circumstances.

Conversion of the code to use PCGPAK's solvers has just been completed and testing has begun. There are many permutations of the different combinations between method of solution, preconditioning technique, level of fill-in necessary for a particular problem, orientation of the preconditioning matrix, etc. etc. At the moment we are at the low end of the learning curve as to which combinations are particularly appropriate for a given problem.

Delco's thin epi process in all of its complexity will be able to be modeled sufficiently now. Results of modeling using PCGPAK will have to await the following report.

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APPENDIX A

2D Silicon Bipolar Device Modeling

In the early stages of semiconductor device modeling highly simplified one-dimensional models readily accessible to direct analytic treatment were used to understand device behavior and to improve design. With the advent of VLSI and miniaturization these simplified models have been rendered obsolete in most cases. Instead, the emphasis has shifted towards numerical simulation techniques, i.e. the solution of the semiconductor equations by use of discretization techniques and solution of the discretized equations by computer. This method was suggested by Gummel for the bipolar transistor [1], and by DeMari for the p-n junction diode [2,3]. As early as the late sixties some were applying two-dimensional discretizations [4-6].

The question of whether a particular device to be modeled requires higher dimensional discretizations to be modeled accurately depends on the geometry of the device and the desires of the engineer. If one desires only global quantities such as current-voltage characteristics, a one-dimensional model may be sufficient since most of the physical quantities can be treated in a heuristic manner. However, the main power of higher-dimensional device models lies in their capability to provide insight into the functioning of a device by means of the distributions of the various physical parameters inside the device. For some miniaturized devices, higher-dimensional models are often the only imaginable tool for the accurate prediction of device performance.

Modeling is becoming more and more relevant during the development phase of a particular device because of the possible decrease of the number of trial and error steps through this development. It has been estimated that the average savings in development effort can be on the order of forty percent [7]. It is expected that applications of device modeling will increase with the decreasing cost of computer resources compared to the skyrocketing cost of experimental investigations. Trial and error is still very much required because the uncertainties of several of the physical parameters in the models are still too large.

DAP2D is a modification of a two-dimensional simulation code developed for silicon solar cells [8]. Some of the modifications included handling several diffusions, multiple contacts (as opposed to just two for solar cells), and an accurate method for extracting the terminal currents from the simulation results.

In the following pages a brief derivation of the discretized equations necessary in two-dimensional simulation is made. The method that DAP2D uses to solve the subsequent set of equations is presented. Finally, the system developed for extracting terminal currents is explained and some results are presented.

The Semiconductor Equations

Three equations must be solved self-consistently to characterize the operating characteristics of a semiconductor device under steady-state conditions. These are, Poisson's equation,

$$\nabla^2 V = \frac{q}{\epsilon_s}(n - p - dop)$$

and the hole and electron continuity equations

$$\nabla \cdot \vec{J}_p = q(G - R)$$
$$\nabla \cdot \vec{J}_n = -q(G - R)$$

where ϵ_s is the semiconductor dielectric constant, assumed uniform, and dop is the net impurity density. DAP2D assumes that all dopants are ionized. G is the generation rate, and R is the sum of Shockley-Read-Hall and Auger recombination processes [9],

$$R = (pn - n_{ie}^2)\left[A_n n + A_p p + \frac{1}{\tau_n(p + p_1) + \tau_p(n + n_1)}\right],$$

where a single trap energy level has been assumed. Doping dependence of the SRH term is included by letting [10],

$$\tau_n = \frac{\tau_{n0}}{1 + \frac{N_D + N_A}{N_C}}$$

and

$$\tau_p = \frac{\tau_{p0}}{1 + \frac{N_D + N_A}{N_C}}.$$

n_{ie}^2 is the effective intrinsic carrier concentration which may differ from n_i^2 in an undoped substrate due to bandgap narrowing effects. Bandgap narrowing and effects due to Fermi-Dirac statistics are included in the transport equations by the addition of a "quasi-electric field" term in the drift term [8,11],

$$\vec{J}_p = -\mu_p p \nabla V_p - \mu_p \nabla p$$
$$\vec{J}_n = -\mu_n n \nabla V_n + \mu_n \nabla n$$

where V_p and V_n are effective potentials.

$$V_p = V - (1-\gamma)\frac{\Delta_g}{q}$$

$$V_n = V + \gamma\frac{\Delta_g}{q}$$

where Δ_g is the effective bandgap shrinkage and γ is the asymmetry factor (i.e. how much of the shrinkage occurs in the conduction band and how much in the valence). It is generally taken to be 1/2. For a more detailed discussion of these parameters and their effects on the transport equations the reader is referred to the references [8,11].

Solution of a Non-Linear Equation by Newton's Method

In general the roots of a nonlinear equation $f(x)=0$ cannot be expressed in closed form. Consequently, one must resort to some approximation method, which generally involves some type of iterative scheme, which means an initial guess is made, say x_0, then improvements on the guess are made iteratively. This generates a sequence of estimates to the actual root, x_0, x_1, x_2, x_3..., which presumably converge to the desired root.

There are many methods for calculating the improvement during each subinterval of the iteration, each having different rates of convergence and requirements for the initial guess [13]. Here we will explore general features of Newton's method.

If α is one of the roots of f(x), and we are at the n^{th} iteration in our sequence then we obtain the $(n+1)^{th}$ approximation to α (i.e. x_{n+1}) in the following way. The curve f(x) is approximated by its tangent at the point $(x_n, f(x_n))$, and x_{n+1} is taken as the intersection of this tangent line with the x-axis. Thus for determining x_{n+1}, we have the following equation,

$$f(x_n) + f'(x_n)(x_{n+1} - x_n) = 0$$

solving for x_{n+1},

$$x_{n+1} = x_n - \frac{f(x_n)}{\left.\frac{df}{dx}\right|_{x=x_n}}.$$

Newton's method is a quadratically convergent method. The proof of this is straightforward. Let α be a simple root of f, then $f'(\alpha)\neq 0$, nor is the derivative zero for a certain neighborhood of α, and expand f in a Taylor series about x_n,

$$f(\alpha) = 0 = f(x_n) + f'(x_n)(\alpha - x_n) + \frac{f''(\eta)}{2}(\alpha - x_n)^2$$

where η is contained in the interval $\eta \leqq |x_n - \alpha|$. Then dividing by $f'(x_n)$ and

rewriting

$$\frac{f(x_n)}{f'(x_n)} + (\alpha - x_n) + \frac{f''(\eta)}{2f'(x_n)} (\alpha - x_n)^2 = 0$$

from before,

$$\frac{f(x_n)}{f'(x_n)} = x_n - x_{n+1} ,$$

then,

$$-(x_{n+1} - \alpha) + \frac{f''(\eta)}{2f'(x_n)} (\alpha - x_n)^2 = 0$$

The error for the n^{th} iteration is defined by

$$\epsilon_n = x_n - \alpha,$$

then we have

$$\epsilon_{n+1} = \frac{1}{2} \epsilon_n^2 \frac{f''(\eta)}{f'(x_n)}$$

Thus we see that the error for the $(n+1)^{th}$ iteration depends on the square of the error for the n^{th} iteration, consequently Newton's method is said to be quadratically convergent [13].

Extension of Newton's Method to a Function of Several Variables

Newton's method can be extended to functions of several variables. Newton's method for a function of one variable was essentially derived from a Taylor expansion of f, keeping only linear terms. Analogously, Taylor's formula for n variables gives,

$$\mathbf{f}(\vec{x}) = \mathbf{f}(\vec{x}^{(k)}) + \mathbf{f}'(\vec{x}^{(k)})(\vec{x} - \vec{x}^{(k)}) + \mathbf{0}(||\vec{x} - \vec{x}^{(k)}||^2),$$

where $\mathbf{f}'(x)$ is an n x n matrix consisting of all the partial derivatives,

$$f'_{ij}(\vec{x}) = \frac{\partial f_i}{\partial x_j} (\vec{x}) \qquad 1 \leqq i,j \leqq n.$$

This leads to an iterative scheme which is now a matrix equation,

$$\mathbf{f}'(\vec{x}^{(k)})(\vec{x}^{(k+1)} - \vec{x}^{(k)}) = -\mathbf{f}(\vec{x}^{(k)})$$

$\mathbf{f}'(\vec{x}^{(k)})$ is called the Jacobian (to be denoted by **J** here). If we let $(\vec{x}^{(k+1)} - \vec{x}^{(k)}) = \Delta\vec{x}^{(k)}$, then this equation takes a form which is obviously a matrix equation,

$$\mathbf{J}\Delta\vec{x} = \vec{y}$$

where $\vec{y} = -\mathbf{f}(\vec{x}^{(k)})$. $\Delta\vec{x}$ is a vector of the corrections to be added to the previous

iteration's solution vector $\vec{x}$ once the matrix equation is solved. This can be done by whatever means desired.

Discretization of the Equations

The numerical solution of boundary value problems of elliptic partial differential equations usually takes the following three steps [14]:

i) The continuous problem is replaced by a set of non-linear equations whose approximate solution are to be found at a finite number of points. This is called discretization of the problem.

ii) Since the set of equations cannot generally be solved exactly, some type of iteration scheme is set up.

iii) At each iteration step a large, sparse, linear set of equations needs to be solved.

DAP2D uses a classical finite difference discretization of the boundary value problem, by dividing up the domain into a fine rectangular grid (cf. Fig. 9). Differentials in the equations are approximated by difference quotients at the nodal points. In this way a large set of linear equations are generated. Newton's method is used to find the "solution vector". Assuming that the iteration converges, then this vector contains the hole and electron densities and the potentials at the grid points.

The second partials of the potential appearing in Poisson's equation on a two-dimensional grid are approximated in the following manner. First, we take a centered difference quotient about the nodes $(i+1/2,j)$, $(i-1/2,j)$, $(i,j+1/2)$, $(i,j-1/2)$ (cf. Fig. 10):

$$\left.\frac{\partial V}{\partial x}\right|_{i+1/2,j} \simeq \frac{V_{i+1,j}-V_{i,j}}{x_{i+1}-x_i}$$

$$\left.\frac{\partial V}{\partial x}\right|_{i-1/2,j} \simeq \frac{V_{i,j}-V_{i-1,j}}{x_i-x_{i-1}}$$

$$\left.\frac{\partial V}{\partial y}\right|_{i,j+1/2} \simeq \frac{V_{i,j+1}-V_{i,j}}{y_{j+1}-y_j}$$

$$\left.\frac{\partial V}{\partial y}\right|_{i,j-1/2} \simeq \frac{V_{i,j}-V_{i,j-1}}{y_j-y_{j-1}}$$

Second, we take centered-difference quotients of the first partials to obtain the Laplacian at (i,j):

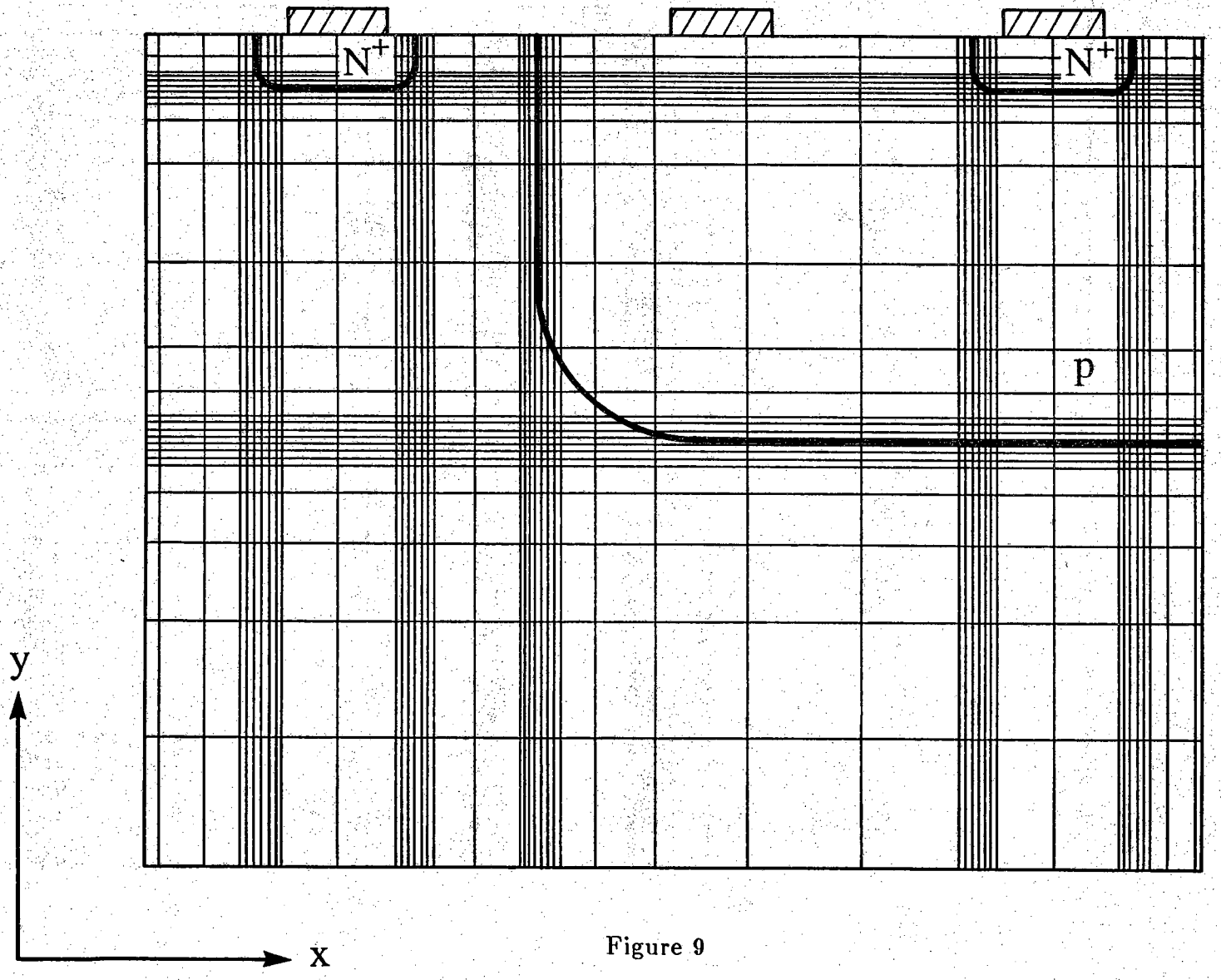

Figure 9

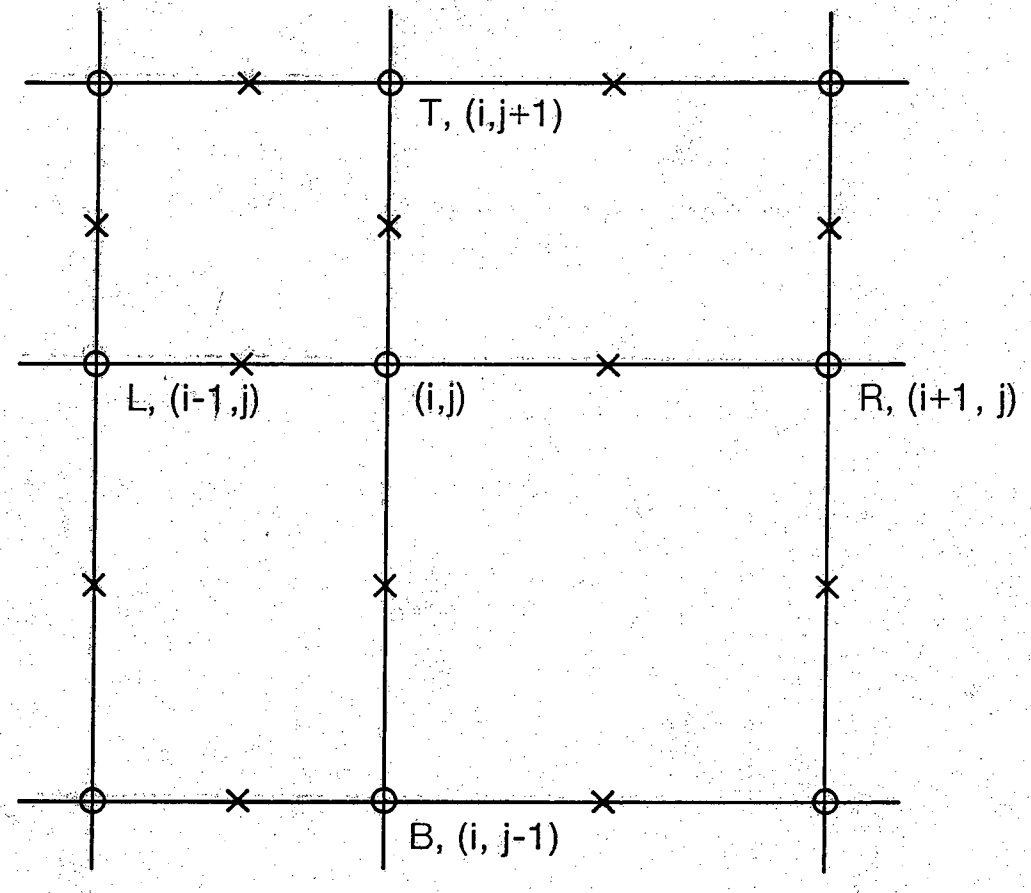

Figure 10

$$\left.\frac{\partial^2 V}{\partial x^2}\right|_{i,j} \simeq \frac{\left.\frac{\partial V}{\partial x}\right|_{i+1/2,j} - \left.\frac{\partial V}{\partial x}\right|_{i-1/2,j}}{1/2(x_{i+1}-x_i)+1/2(x_i-x_{i-1})}$$

$$= 2\,\frac{V_R}{h_R(h_L+h_R)} - 2\,\frac{V_{i,j}}{h_L h_R} + 2\,\frac{V_L}{h_L(h_L+h_R)}$$

where

$$V_R = V_{i+1,j} \qquad h_L = x_i - x_{i-1}$$
$$V_L = V_{i-1,j} \qquad h_R = x_{i+1} - x_i$$

Similarly in the y-direction,

$$\left.\frac{\partial^2 V}{\partial y^2}\right|_{i,j} \simeq 2\,\frac{V_T}{h_T(h_B+h_T)} - 2\,\frac{V_{ij}}{h_B h_T} + 2\,\frac{V_B}{h_B(h_B+h_T)}$$

the subscripts have a similar interpretation but now they refer to top and bottom in the y-direction (cf. Fig. 10).

Combining these, the following discretized form of Poisson's equation is obtained at node (i,j),

$$f_{v,ij} = \frac{2V_B}{h_B(h_B+h_T)} + \frac{2V_R}{h_L(h_L+h_R)} - 2\left(\frac{1}{h_B h_T} + \frac{1}{h_L h_R}\right)V_{ij}$$

$$+ \frac{2V_R}{h_R(h_L+h_R)} + \frac{2V_T}{h_T(h_B+h_T)} - q(n_{ij} - p_{ij} - dop_{ij}) = 0$$

A similar sequence is performed on the continuity equations and the following set of discretizations are obtained,

$$f_{p,ij} = \frac{2(J_{pR}-J_{pL})}{h_L+h_R} + \frac{2(J_{pT}-J_{pB})}{h_B+h_T} - q(G_{ij}-R_{ij}) = 0$$

$$f_{n,ij} = \frac{2(J_{nR}-J_{nL})}{h_L+h_R} + \frac{2(J_n-J_{nB})}{h_B+h_T} + q(G_{ij}-R_{ij}) = 0$$

with similar interpretations for the subscripts, except that now the right (R), left (L), top (T), and bottom (B) refer to the halfway points between the nodes (the x's in Fig. 10). This is necessary because the continuity equations involve only first partials of the current densities.

The $f_{v,ij}$, $f_{p,ij}$, $f_{n,ij}$ are the "vector functions" $\mathbf{f}(\vec{x})$ previously mentioned in the extension of Newton's method to functions of several variables. We see that we don't

have one function of several variables but several functions each with several variables. There is one set $\{f_{v,ij}, f_{p,ij}, f_{n,ij}\}$ for each nodal point. In a loose sense the f's can be thought of as the variables of a bigger function, say F.

Problems with Current Calculations

We see that the discretization of the continuity equations requires knowledge of the currents at the half-way points. The currents can be written in terms of the independent variables p, n, and V by simple drift-diffusion. If, for example, we discretize the hole current equation at the top (T) node in the conventional manner, we obtain,

$$J_{pT} = -\frac{\mu_{pT}}{h_T}\left\{\frac{(p_{ij}+p_T)}{2}(V_{pT}-V_{pij}) + (p_T - p_{ij})\right\}.$$

However, it is well known to device modelers that this discretization approximates the continuous equation reasonably only if the change in the quasi-potential between mesh points is less than $2kT/q$ [15]. In a two-dimensional simulation, where nodes are scarce, it is very difficult to be sure that this criterion has been met. This difficulty can be avoided by using the discretization scheme of Scharfetter-Gummel [15]. The hole current equation in normalized form [8] is written,

$$J_p = -\mu_p\left\{p\frac{dV_p}{dx} + \frac{dp}{dx}\right\}$$

$$= -\mu_p e^{-V_p}\frac{d}{dx}(pe^{V_p})$$

then

$$-\frac{J_p}{\mu_p}e^{V_p} = \frac{d}{dx}(pe^{V_p})$$

Assuming that the mobility, current, and quasi-electric field $(-\nabla V_p)$ are constant between the mesh points x_j to x_{j+1} then V_p can be written,

$$V_p(x) = V_{pj} + \frac{V_{p,j+1}-V_{pj}}{h_{j+1}}(x-x_j).$$

Then if we integrate

$$\int_{x_j}^{x_{j+1}} \frac{J_p e^{V_p(x)}}{\mu_p}dx = \int_{x_j}^{x_j+1}\frac{d}{dx}(pe^{V_p(x)})dx$$

we obtain

$$-\frac{J_{pR}}{\mu_{pR}}\frac{h_R}{\Delta V_{pj}}\left[e^{\Delta V_{pj}}-1\right]=p_R\,e^{\Delta V_{pj}}-p_j$$

where $\Delta V_{pj}=V_{p,j+1}-V_{pj}$ and the R's have the same meaning as before. Then the current density reads,

$$J_{pR}=-\frac{\mu_{pR}\,\Delta V_{pj}}{h_R}\left\{\frac{p_R\,e^{\Delta V_{pj}}-p_j}{e^{\Delta V_{pj}}-1}\right\}$$

The range of validity of the discretization is greater [14]. This allows for the use of fewer mesh points.

There is yet another problem from the standpoint of numerical error. It is well known that subtraction is not a benign operation on the computer. In fact, the relative error in the calculation $y=x_1-x_2$ is [13],

$$\left|\frac{\Delta y}{y}\right|\leqq\frac{|\Delta x_1|+|\Delta x_2|}{|x_1-x_2|}$$

which can be substantial for $x_1\approx x_2$. If one uses either the conventional or the Scharfetter-Gummel discretization to calculate majority-carrier currents the results can be off by orders of magnitude, because in these regions $p_R\simeq p_j$ and $\Delta V_{pj}\approx 0$.

There is a method developed by Lundstrom, whereby the currents into or out of the contacts are computed without calculating majority carrier current densities. The method is quite general, but it will be developed here for the special case of a transistor.

1) The domain is divided into as many subdomains as there are contacts.
2) The continuity equations

$$\nabla\cdot\vec{J}_p=(G-R)\qquad\text{(normalized)}$$
$$\nabla\cdot\vec{J}_p=-(G-R)\qquad\text{(normalized)}$$

are integrated over the regions where the current densities are minority carrier current densities near the contacts. For instance, in region I (cf. Fig. 11), since there is an N+ diffusion under that contact we will integrate $\nabla\cdot\vec{J}_p=(G-R)$ there.

$$\int_I \nabla\cdot\vec{J}_p\,d\Omega=\int_I (G-R)\,d\Omega$$

where $d\Omega$ is a differential area.

Using the divergence theorem, the left hand side becomes an integral over the surface

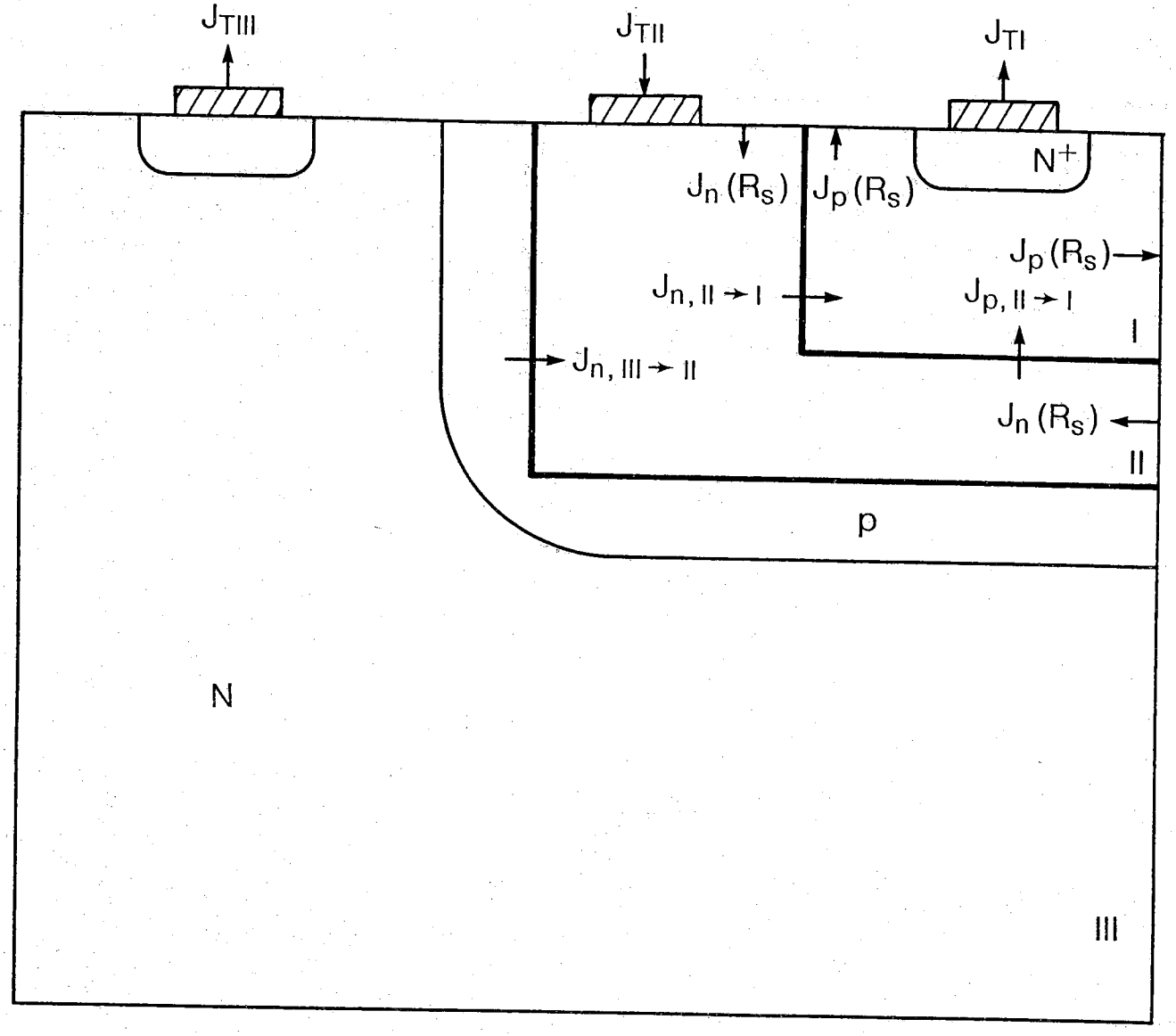
J_{TIII}
J_{TII}
J_{TI}
$J_n(R_s)$
$J_p(R_s)$
N^+
$J_p(R_s)$
$J_{n,II \to I}$
$J_{p,II \to I}$
I
$J_{n,III \to II}$
$J_n(R_s)$
II
p
N
III

Figure 11

$$\int_I \nabla \cdot \vec{J}_p \, d\Omega = \int_{S_I} \vec{J}_p \cdot \hat{n} \, ds$$

where S_I means the integral is to be performed on the surface defining region I. When integrating on a physical surface where there is no contact this is a surface recombination current. For region I then we have,

$$\int_{S_I} \vec{J}_p \cdot \hat{n} ds = \int_{\substack{\text{physical} \\ \text{surface}}} J_p(R_s) ds + \int_{\text{contact}} J_p ds$$

$$+ J_{p,II \to I} = \int_I (G - R) \, d\Omega$$

and for region II,

$$\int_{S_{II}} \vec{J}_n \cdot \hat{n} ds = - \int_{\substack{\text{physical} \\ \text{surface}}} J_n(R_s) ds + J_{n,II \to I} - J_{n,III \to II}$$

$$- \int_{\text{contact}} J_n ds = \int_{II} (G - R) d\Omega$$

where $J_{p,II \to I}$ is the total hole current flowing from region II into I. We see that this method is really just doing bookkeeping on the particle flux into a region. For instance, the total hole current flowing from region II into I ($J_{p,II \to I}$) has to either flow out the contact, recombine at the surface, recombine in the bulk, or be added to by generation (G). Thus we could immediately write,

$$J_{p,II \to I} = \int_{\text{contact}} J_p ds + \int_{\substack{\text{physical} \\ \text{surface}}} J_p(R_s) ds - \int_I (G - R) d\Omega,$$

and if we bear in mind that electron particle flow is opposite to the current flow,

$$J_{n,II \to I} - J_{n,III \to II} = \int_{\substack{\text{physical} \\ \text{surface}}} J_n(R_s) ds + \int_{\text{contact}} J_n ds - \int_{II} (G - R) d\Omega$$

We also know from Kirchoff's current law that the total current flowing into region I has to flow out the contact

$$J_{TI} = J_{p,II \rightarrow I} + J_{n,II \rightarrow I}$$

$$J_{TI} = \int_{\substack{\text{contact} \\ \text{in N+}}} J_p ds + \int_{\substack{\text{physical} \\ \text{surface in I}}} J_p(R_s) ds + J_{n,III \rightarrow II}$$

$$+ \int_{\substack{\text{physical} \\ \text{surface in II}}} J_n(R_s) ds + \int_{\substack{\text{contact} \\ \text{in p}}} J_n ds - \int_{I \& II} (G - R) d\Omega$$

We notice that there has been an assumption of current direction throughout. DAP2D defines as positive current, that which is flowing from the outside world into a contact over a p-diffusion. If it is actually the opposite way the current will come out negative. This then gives the current out of contact I, a similar equation gives the current out of III, and the sum has to be equal to the current going into contact II (cf. Fig. 11).

Note that majority carrier current densities are not computed anywhere in the algorithm. The boundary lines for regions I and II are user supplied. The program prints the defining boundaries on a doping density plot of the device. The one source of possible numerical instability is the $J_{n,III \rightarrow II}$ term. In order to insure numerical stability the user should check that the defining boundary for II remains in the p-diffusion. Of course, if the device were p-n-p, then the relevant current would be $J_{p,II \rightarrow III}$ and the boundary should remain in the n-diffusion. The program automatically selects the minority carrier current.

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APPENDIX B

Introduction

The running of DAP2D (Device Analysis Program in 2 Dimensions) is accomplished by first finding a solution at all of the nodal points by assuming the semiconductor is in equilibrium. Essentially this means that there are no applied voltages on any of the contacts and there is no source of light generating any excess carriers. This initial solution serves as an "initial guess" to the non-equilibrium part of the program (i.e. when we begin to apply voltages to the contacts and/or allow light to generate carriers). It also serves as the time to design and refine the mesh.

Since devices are different, we need to have a way of telling the program where the contacts are located, doping densities at all of the nodal points, how much output we want, what we wish the program to calculate, eg. I-V curve for a p-n junction or a solar cell, or perhaps we wish to simulate a transistor. These and other options are communicated to the program through the use of namelists. Fortran allows for the input and/or output of variables without associated format declarations through the use of namelist statements.

As an example consider the statement

READ(M,N)

where M is the device number to be read from, N is the *name* of a *list* of simple variable names and/or array names. The list of variables does not appear as part of the READ statement, instead they are defined as belonging to a particular namelist by the NAMELIST declaration statement, eg.

NAMELIST/TABLES/xline,yline,vees

declares the variables xline, yline, vees to belong to the namelist TABLES.

All of the arrays and variables in all of the namelists are prescribed default values by means of a BLOCK DATA subprogram. They will retain these values unless we specifically override the defaults by including the desired value(s) for the variable (array) in the input deck.

Input Deck

The actual executable programs, EQDAP77 to compute the equilibrium solution, and DAP77 for the non-equilibrium part, are stored as executable files on disk. We need to create a file that will run these programs with the desired data describing our particular device as input. Appendix C contains an example input deck. It is suggested that the reader refer to this as we describe the input deck.

The job control cards at the top of the file are particular to the Cyber 205 at Purdue. The actual input deck which would be common to all files regardless of machine begins after the first #eor. This #eor (end of record) tells the Cyber that the above are job control statements and the following is the input data for the program which is run first (ie. the equilibrium run). The second #eor tells the machine that the next set of statements are meant for the second program to run (ie. the non-equilibrium run). A final #eor at the end of the file is optional.

The lines in between the #eor statements are either comment lines or input data using namelists. The first line after the first #eor is a comment line. It can be used to describe the device being modeled and any other relevant information can be included. It can be 80 characters long or one full line. This is the first thing read in by the program and must be the first line in the input deck. When the equilibrium part of the program has run it prints an execution summary and this comment line is printed there to aid in identifying the output at a later date.

The lines from the comment line to the next #eor are input statements using namelists. It should be noted that the namelist input statement begins in column 2 with an &. Column 1 of each card must not be used (except for the comment lines). The first letter must be an & in column 2, followed immediately, with no intervening blanks, by the namelist name. The namelist must end with the characters & END (no intervening blanks). Between these delimiters, *any* or *all* of the variables in the list may be assigned values, in *any* order, by punching the name of the variable, an equal sign, and a constant, in sequence (an assignment statement). It is noted in passing that at least on the Cyber, even if one desires all of the default values in a particular namelist, that namelist still must appear in the input deck with an assignment statement for one of the variables or the program will bomb. The simplest remedy is to assign the default value to one of the variables in the namelist in this situation.

One other note, even though the variables within a particular namelist can occur in any particular order within an input statement, the namelists themselves must occur in a particular order. One should put them in the order they appear in Appendix C, or in the sequence they are listed in the section describing the namelists.

The input deck for the non-equilibrium part of the program is the same in construct as that for the equilibrium part.

Namelists for the Equilibrium Part of the Program

The equilibrium part of the program serves not only as an initial guess for the non-equilibrium run, but also to define the structure of the device.

Namelist DEFPRO

DEFPRO is an acronym for DEFinition of the PROblem, and as such it defines the basic structural characteristics of the device, options pertaining to the equilibrium run itself, and convergence and iteration criteria.

TEMP

This is the device operating temperature in degrees centigrade ($^\circ$ C).

Default = 27.0

BGN

If parts of the semiconductor are very heavily doped then the effective bandgap becomes smaller. The effects on the operating characteristics of the device may be strongly affected in this situation. DAP2D provides three options: (1) bandgap narrowing can be ignored. In this case one would type bgn = 'none'. Note that bgn is a character variable, therefore the argument must be enclosed in single quotes. (2) Bandgap narrowing model developed by Slotboom and DeGraaff [1]. In this case one types bgn = 'sb'. (3) Bandgap narrowing model developed by Lanyon and Tuft [2]. In this case one types bgn = 'lt'.

Default = 'none'

DOPBLK

This variable indicates to the program an overall doping density. This is the first step in assigning doping densities within the device. Every nodal point is first assigned this value of doping, this can then be added to or subtracted from in sections of the device by the DOPNG, DOPNG2 and DOPNG3 namelists. If the bulk dopants are donors then this is a positive constant, whereas for acceptors it is negative.

Default = 1×10^{15} cm^{-3}

XMAX

This indicates the width of the device in *microns*.

Default = 100 μm

YMAX

This indicates the thickness or height of the device in *microns*.

Default = 100 μm

NXF

This indicates the number of mesh lines in the x-direction. Presently one can have a maximum of 200 lines in either the x or y direction. Note that the total number of nodal points (points where the lines cross) must be less than 20000 (ie. NXF*NYF $\leqq$ 20000).

Default = 10

NYF

Exactly the same as NXF except in the y-direction. The same restrictions apply.

Default = 10

ITMAX

The equilibrium part of the program uses a method called Successive Over Relaxation to obtain a solution to the discretized problem. This has a much slower convergence rate than Newton's method which is used in the non-equilibrium part. Consequently, the number of iterations required to obtain a solution is much larger. However, using this method saves on storage.

Default = 500

DELTST

During the course of one SOR iteration the program stores the maximum change that it made in the potential at the nodal points. If this maximum change is less than DELTST, then it is assumed that you have converged to a solution. Note that DELTST is in units of kT (ie. the units are eV and a function of temperature).

Default = 1×10^{-4}

FIT

This indicates how one wishes to fit the user supplied doping data to the nodal points. Since the placement of the mesh lines and the points where the doping is known do not in general match up, the doping data must be interpolated to find the doping at the mesh lines. If the data has no real steep gradients then the cubic spline routine will give the better fit, if however there are real steep gradients in the data, it has been found that the cubic spline routine has a bad tendency to oscillate and give poor results.

If the user has selected the 'cubspl' option then he should check the output to see how good the fit is. The alternative is fit = 'linfit'. This is just a simple linear interpolant. If the data points are very finely spaced (for instance SUPREM gives a data point at every .005 microns) then the linear fit works very well, and avoids the problem of oscillation found with the cubic spline. The output should also be checked here to see how well the fit has been made.

Default = 'cubspl'.

Namelist TOPBND

TOPBND is used to communicate to the program the locations of contacts, the positions of diffusion windows, density of interface charge, and other information regarding doping for the *top* surface of the device. The reader is referred to Fig. 12 for a pictorial representation of the function of the variables in TOPBND.

XT

XT indicates the beginning point and end point of a contact (in microns) starting from the left edge of the device. XT and TOPC work together. For instance, referring to Fig. 12, note that there is a contact between the points at 32 μm and 40 μm. This is communicated to the program by setting topc (3) = 2, and xt(2) = 32.0 and xt(3) = 40.0. Note that xt(k-1) and xt(k) position the topc(k) contact. If the contact went all the way across the top then one need only set topc (1) equal to a positive number, because the default values for all of the elements in the array xt are 10^{10}, and the program would automatically assume that the contact began at zero in this case. If there was a contact which began at zero and ended at 32 μm then it is only necessary to set xt(1) = 32.0 and topc(1) = a positive number. It is assumed in this case that the contact begins at zero. If a contact runs all the way to the end of the device (ie. all the way to the right hand side when referring to the top surface) it is good practice to set the element of xt which signifies the end of this contact to a value larger than the length of the device. This is necessary sometimes because, due to roundoff errors, it will occasionally not put the contact all the way to the last mesh line. One should check the NODTYPS and the DEVICE PLOT on the output to see where the program thinks the contacts are. There are 10 elements in the xt array, so it is necessary that all of the contacts on the top can be located with this number of elements.

Default: all elements are set to 10^{10}.

TOPC

TOPC(k) is used to indicate whether the interval from xt(k-1) to xt(k) is a contact or not. TOPC is also used to number the contacts. The numbering can be used to give a letter to the contact on the DEVICE PLOT. If two contacts on different parts of the device have the same number, it is assumed they are shorted together. In the case of a transistor it *must* be used to distinguish between the collector, base, and emitter contacts. In other words whatever element of TOPC refers to the collector contact, if the collector contact is on top, that element must be set to 3 (TOPC(k) = 3) for the third letter of the alphabet c. The element for the emitter contact must be set to 5 etc. The contacts then appear on the DEVICE PLOT as C, B and E. TOPC(k) = 0 indicates that there is *not* a contact between xt(k-1) and xt(k).

Default: TOPC(k) = 0 for all k.

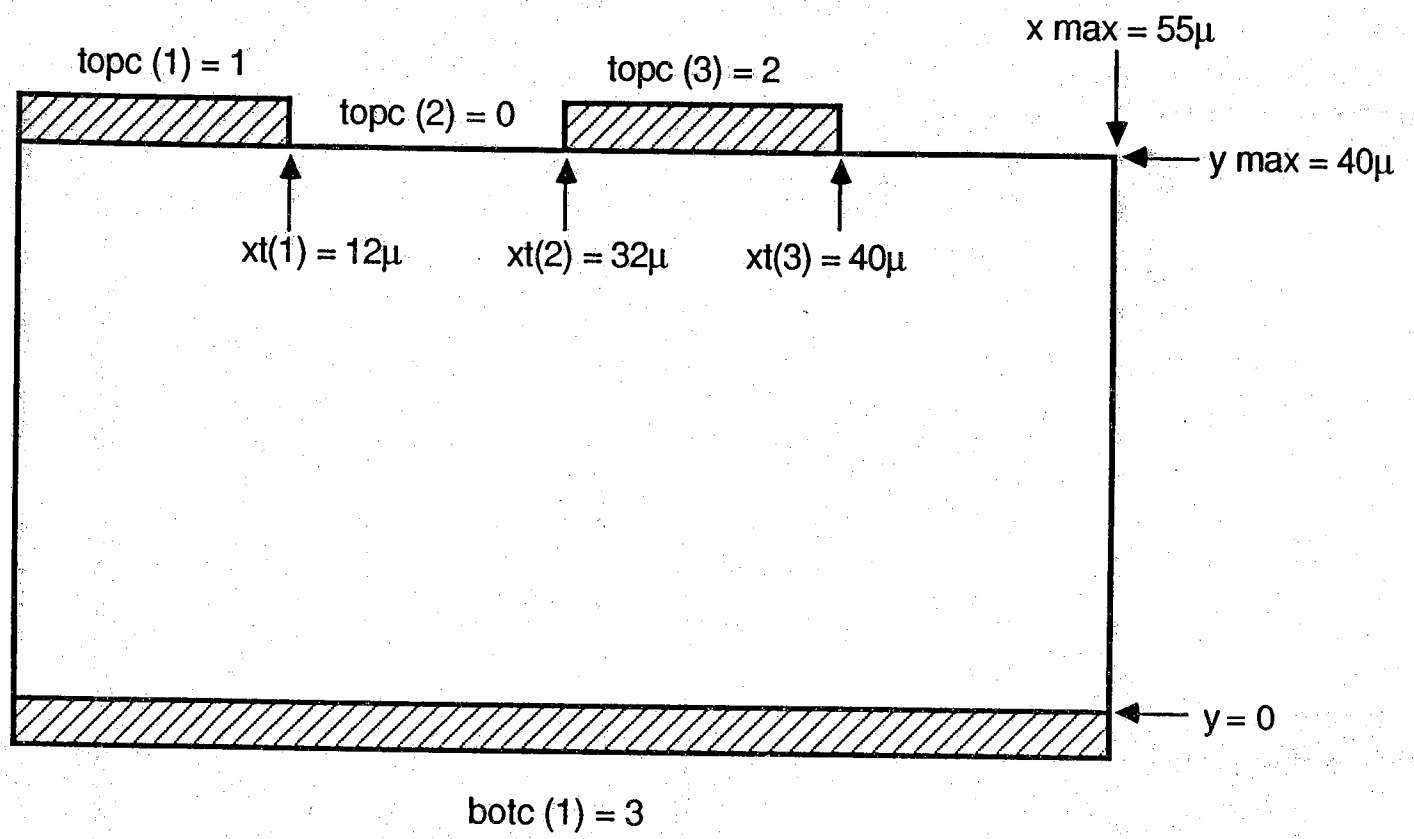
x max = 55μ
topc (1) = 1
topc (3) = 2
topc (2) = 0
y max = 40μ
xt(1) = 12μ
xt(2) = 32μ
xt(3) = 40μ
y = 0
botc (1) = 3

Figure 12

For the following see Fig.'s 13 and 14.

DXT

DXT and PTOP work in a manner very similar to XT and TOPC, however they refer to the segments defining doping profiles. DXT defines the beginning and end of a diffusion window while PTOP defines the particular profile desired. The program automatically "rounds out" the profile so that the doping goes underneath the diffusion window.

Default = 10^{10} for all elements

PTOP

PTOP is the analogue of TOPC. It indicates the type of profile under the corresponding window. PTOP(k) refers to the profile under the window defined by DXT(k-1) and DXT(k). See the quick reference guide for all of the possible profiles.

Default = 0 for all elements

DTOP

If one selects either 1 or 2 for the profile (ie. complementary error function or Gaussian), then the peak doping concentration for *that particular segment* must be specified. This is the function of DTOP(k). It is less than zero for a p-type impurity and greater than zero for n-type. DTOP has no effect if a user - supplied doping profile is selected.

Default = 0.0

ZT

It may not be that the peak doping concentration for a complementary error function or Gaussian profile occurs at the top. ZT serves to specify the position of the peak (in microns) *from the top surface*. There are corresponding arrays for the bottom left, and right surfaces (ZB, ZL, ZR) which give the peak concentration position from the bottom, left, and right surfaces

Default = 0.0

XJTOP

If either a complementary error function or Gaussian profile is selected then this defines the point at which the doping reaches the background doping (ie. DOPBLK) in microns for the k^{th} segment. There are similar arrays for the bottom, left, and right sides. This also has no effect if a user supplied doping profile is used.

Default = 0.0

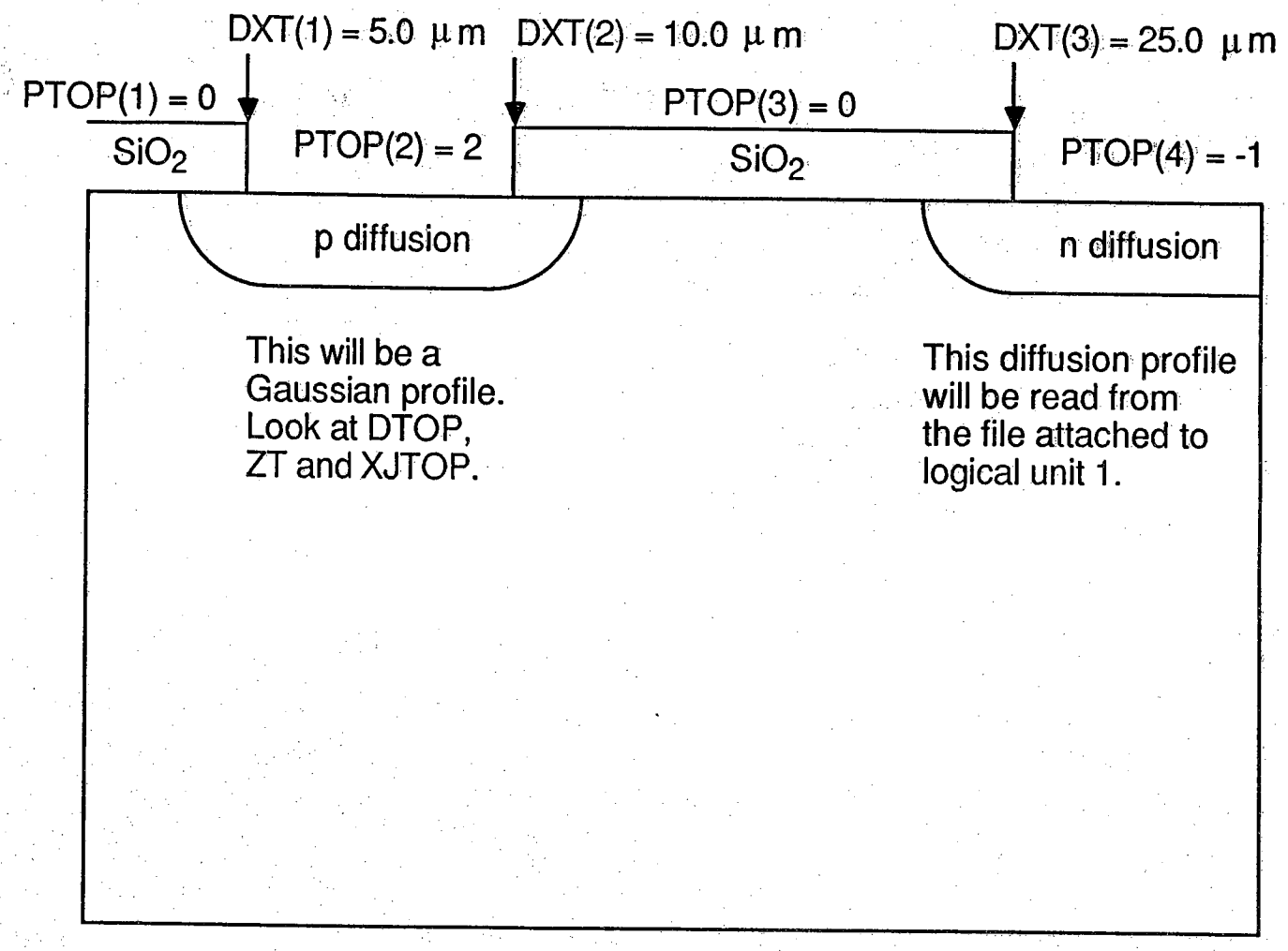
DXT(1) = 5.0 μm
DXT(2) = 10.0 μm
DXT(3) = 25.0 μm
PTOP(1) = 0
PTOP(2) = 2
PTOP(3) = 0
PTOP(4) = -1
SiO2
SiO2
p diffusion
n diffusion
This will be a Gaussian profile. Look at DTOP, ZT and XJTOP.
This diffusion profile will be read from the file attached to logical unit 1.

Figure 13

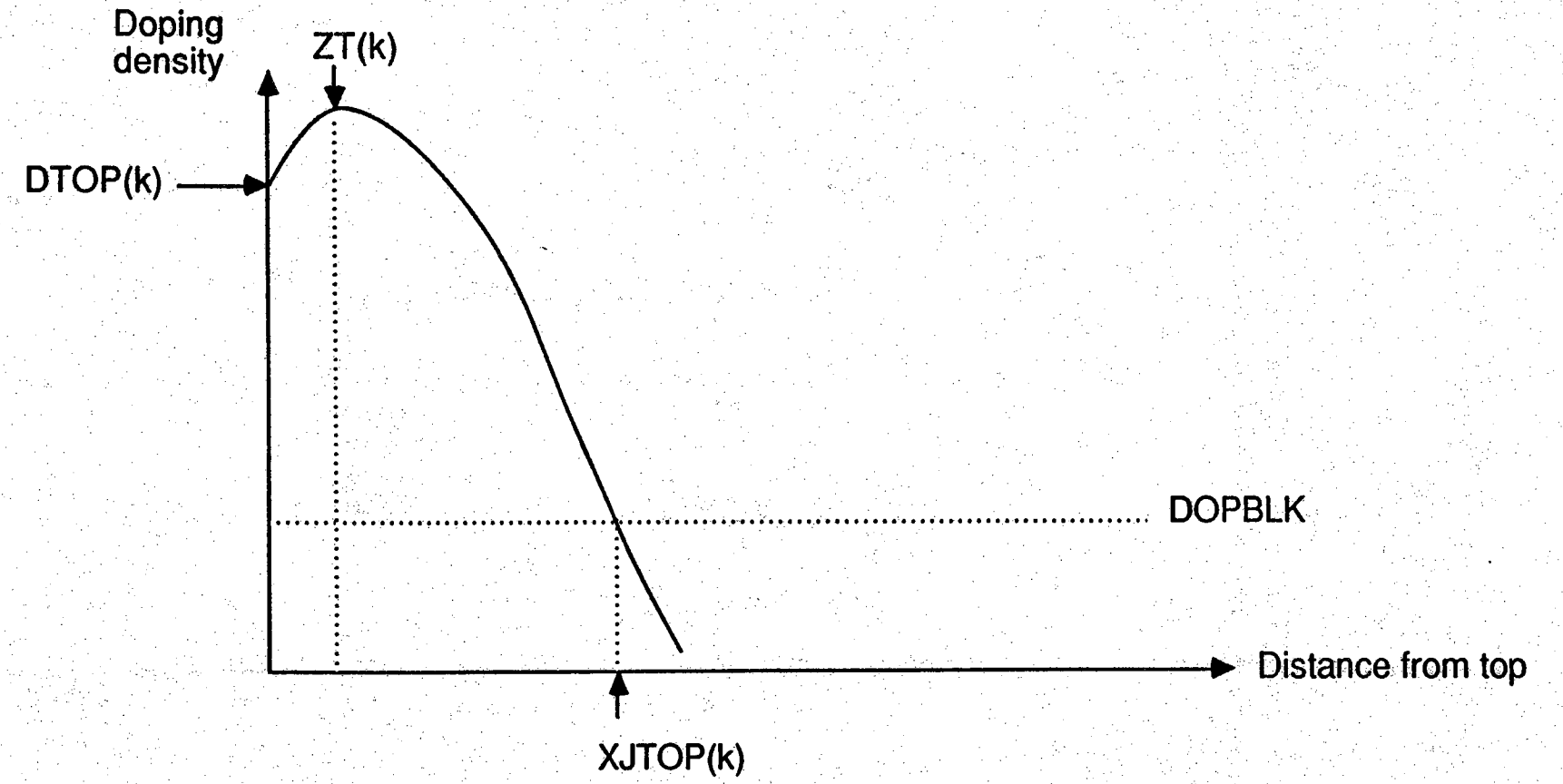

Figure 14

QSSTOP

At interfaces between insulator and semiconductor Gauss' law will be obeyed,

$$\epsilon_{sem} \frac{\partial \psi}{\partial \vec{n}} - \epsilon_{ins} \frac{\partial \psi}{\partial \vec{n}} = Q_{ss}$$

where ϵ_{sem} is the permittivity of the semiconductor, ϵ_{ins} that of the insulator, ψ is the potential and $\vec{n}$ denotes the normal derivative (for rectangular geometries the derivatives become $\partial\psi/\partial x$ or $\partial\psi/\partial y$). Q_{ss} then is the fixed surface charge at the interface per cm^{-2}. QSSTOP then is the fixed surface charge at the *top* semiconductor insulator interfaces. There are similar expressions for the bottom, left, and right sides.

Default = 0.0

Namelists BOTBND, LEFBND, and RITBND are all similar to TOPBND.

Namelist XMESH

XMESH provides a way for the user to place mesh lines over the domain. One could place the number of desired mesh lines in the x-direction evenly spaced by typing

$$\&\text{ xmesh } nx = 9,\ xx = 1.0\ \&\text{end}$$

if xmax = 1.0. If nxf = 10, then this completely determines the number of mesh lines in the x-direction (note that the first mesh line at x = 0 is automatic). The program will place a mesh line at 0 and then at intervals of 1.0/9.

It is seldom the case that uniformly spaced mesh lines accross the entire domain is adequate. Regions where the doping is changing from p-type to n-type require the most closely spaced mesh lines, because in these regions the potential and carrier concentrations change most rapidly. Regions containing steep gradients in doping also require closely spaced mesh lines for the same reasons.

Since it is not known a priori the ideal placement of the mesh lines other than the general guidelines given above, the program allows you to specify less than the final number of mesh lines using the XMESH namelist. NXF in the DEFPRO namelist specified the final number of mesh lines in the x-direction. If the total number specified using XMESH is less than NXF then the program will select the remaining mesh lines according to the following guidelines: it will do a "rough" solve of the equilibrium problem, find the places where the potential has the largest jumps and place mesh lines here, it repeats this process until we have NXF mesh lines in the x-direction.

An optimized mesh is probably the most important part of the run. If the mesh is very poorly chosen, the program may not be able to obtain a solution at all. The assumption that is made when discretizing a continuous problem is that the variables of concern are changing slowly from one mesh line to the next. Ideally we would have an infinite number of mesh lines. Since we have only a finite number of mesh lines they have to be chosen so as to "best" satisfy the above assumption with the available number.

A good starting point is to space mesh lines far apart in regions of approximately constant doping. Space them closer together where large doping gradients exist and space them even closer near p-n junctions. Use approximately 90% of the available mesh lines (ie. NXF) and allow the program to select the remaining 10%. Locate where the program has added mesh lines and compare the changes in potential. Also look at the equilibrium execution summary where you will find listed the maximum change in potential in the x and y directions. If at all possible these should be less than 5 in units of kT/q. This may not be possible without making the job size too large, hence the only thing that can be done is to make the change between mesh lines as small as possible. Only after you are satisfied that you have the optimum mesh for the available number of mesh lines should you then make the full equilibrium and non-equilibrium runs.

Namelist YMESH

See XMESH

Namelists for Non-Equilibrium

Namelist PROBLM

NUM2D

This can be used to associate a run number to the run for identification purposes. This is printed out on the output. If one has the file RUNNO attached to the job and NUM2D is less than zero then the job will acquire the run number from RUNNO. NUM2D is also used in the plotting routines.

Default = -1

INFO

This is used to control the amount of output. During debugging this should be set to 5.

Default = 3

TAPE

After each step in voltage the variables (p,n,v) at each of the mesh points are output to a local file. If the user wishes to save all this data to magnetic tape then he must set tape = .true. The details on how this is accomplished varies from one system to another, this simply tells the program to write the results to tape. A tape drive must be attached to the job in order for the actual writing to tape to occur.

Default = .FALSE.

Namelist NEWTON

ITMAX

The program solves the set of linearized equations by Newton's method. There are many reasons for a particular problem not converging to a solution some of which are, poorly chosen mesh, too coarse a mesh, too large a jump in voltage, poor initial guess, among others. There are times when the corrections may exhibit an oscillatory behavior, in which case, in general, regardless of the number of iterations it will never converge to a solution. For these reasons, it is necessary to limit the maximum number of iterations per voltage step allowed.

Default = 100

DELTST

This is the convergence criterion, it is assumed that if the maximum change in the potential is less than DELTST you have a reasonable solution and the iteration stops.

Default = 1×10^{-3} (in units of kT)

IDVRG

Like ITMAX this is designed to catch non-convergence. Unlike ITMAX, IDVRG specifically checks for divergence of the solution. The program checks to see if the maximum change in potential is greater than the last iteration's max change in potential. If this is so, and this continues for several iterations, in general, the solution will diverge. However, it sometimes happens that the maximum correction will increase for a while then come back down, in which case, IDVRG may have already stopped execution when a solution was actually possible. IDVRG does not distinguish between large increases in the corrections and small ones. Consequently, the user should check the max change in potential for each iteration. If it is believed that the program would have converged but was stopped with the message

*** SOLUTION DIVERGING ***

then IDVRG should be set higher and the program run again.

Default = 5

MTEST (real variable)

If the maximum correction (in units of kT/q) is less than MTEST, the program uses the previous Jacobi matrix. This option is rarely set to any value other than the default, but could possibly be used to reduce CPU time.

Default = 0.0

MTMX (integer variable)

If the number of iterations made after MTEST is satisfied exceeds MTMX, the program recomputes the Jacobi matrix. This option is rarely set to any value other than the default.

Default = 3

NDAMP

The main problem associated with the classical Newton method is the tendency to overestimate the length of the actual correction step for the iterate. This phenomenon is frequently called overshoot. There are a couple of methods incorporated into the program to deal with this problem. The three possibilities are the method of Brown & Lindsay [3], the method of Rose & Fichtner [4], or a combination of these two, NDAMP = 1,2,3 selects the above methods in that order.

Default = 1

REDUCE (real variable)

The reduction factor used when NDAMP is chosen to be 2 or 3. See Gray [7] for details.

Default = 2.0

KMAX (integer variable)

The maximum number of reductions if NDAMP is set equal to 2 or 3.

Default = 5

LTEST (real variable)

The local convergence test of F = 0.

Default = 1.0×10^{50}

GTEST (real variable)

The global convergence test of F = 0.

Default is 1.0×10^{50}.

Namelist RECOMB

TAUN

This is the Schockley-Read-Hall carrier lifetime. Note that the program includes the capability for doping dependent lifetimes by using the NC parameter. If NC is set to a reasonable value to include doping dependent lifetimes then this TAUN becomes in effect a τ_{no}, because now the carrier lifetime is defined as

$$\tau_n = \frac{\tau_{no}}{1+\text{doping}/NC}$$

Default: TAUN = 1×10^{-4} seconds

TAUP

Same as TAUN except this refers to the holes. If NC is included then

$$\tau_p = \frac{\tau_{po}}{1+\text{doping}/NC}$$

Default: TAUP = 1×10^{-4} seconds

NC

This is the number used in the SRH doping-dependent lifetimes

ie. $$\tau_\mu = \frac{\tau_\mu o}{1+\text{doping}/NC}$$

where μ can be n or p.

Default: NC = $1\times10^{50}\text{cm}^{-3}$

ET

The program at the moment only includes the capability of defining single trap energy levels. ET defines this trap energy level with respect to the intrinsic level.

Default: ET = 0.0 eV

AN

The auger recombination term is,

$$R_{auger} = (A_n n + A_p p)(pn - n_i^2)$$

AN defines the electron Auger coefficient A_n.

Default: AN = 5×10^{-32} cm^6/sec

AP

Same as AN except AP refers to the hole Auger coefficient.

Default: AP = 9.9×10^{-32} cm^6/sec

Namelist MOBLTY

MODEL

MODEL is a character variable which defines the type of carrier mobility model the user wishes to use. There are currently 4 choices.

MODEL = CT
use the Caughey-Thomas expression [5]

MODEL = CT-CCS
the effects of carrier - carrier scattering can be included with the Caughey-Thomas expression

MODEL = ARORA
the Arora mobility model [6]

MODEL = ARORA - CCS
The effects of carrier - carrier scattering can be included here also [6].

Default: MODEL = ARORA - CCS

Namelist BC (Boundary Conditions)

QSSTOP

This is the same QSSTOP as in the namelist TOPBND from the equilibrium run. If one wished to have a different surface charge between the equilibrium and non-equilibrium runs one could do this here, otherwise it will simply be read in from the non-equilibrium run.

Default = read in from equilibrium run.

SPTOP

This is the surface recombination velocity for holes under passivated surfaces on the top. From SRH theory, the recombination, R_s, at a surface is

$$R_s = \frac{pn - n_i^2}{(n+n_{1s})/\sigma_p v_{th} N_{st} + (p+p_{1s})/\sigma_n v_{th} N_{st}}$$

The surface recombination velocity for holes is then $S_p = \sigma_p v_{th} N_{st}$, where σ_p is the capture cross-section, v_{th} is the thermal velocity and N_{st} is the density of traps at the surface.

Default = 0.0 cm/sec

SNTOP

Surface recombination velocity under passivated surfaces for electrons.

Default = 0.0 cm/sec

QSSBOT

See QSSTOP

SPBOT

See SPTOP

SNBOT

See SNTOP

QSSLEF

See QSSTOP

SPLEF

See SPTOP

SNLEF

See SNTOP

QSSRIT

See QSSTOP

SPRIT

See SPTOP

SNRIT

See SPTOP

ETS

This is the surface energy trap level relative to the intrinsic level E_i.

Default = 0.0 eV

IDEAL

This is a logical variable which determines whether the contacts are ohmic or not. If ideal = .true., then the recombination velocities for holes and electrons under contacts are infinite. Another way of stating this is that equilibrium conditions prevail under the contacts.

Default = .true.

SPP

This is the hole surface recombination velocity under contacts for p-type doping regions, in case one wishes to have something other than an ohmic contact, a more realistic situation.

Default = 1.0×10^7 cm/sec

SNP

Electron surface recombination velocity under contacts for p-type doping regions.

Default = 0.99×10^7 cm/sec

SPN

Hole surface recombination velocity under contacts for n-type doping regions.

Default = 0.99×10^7 cm/sec

SNN

Electron surface recombination velocity under contacts for n-type doping regions.
Default = 1.0×10^7 cm/sec

Note: SPP, SNP, SPN, and SNN are all ignored if ideal = .true.

Namelist OPTON5

This option is exclusively for the simulation of bipolar transistors.

VBE

This is the desired applied voltage difference on the base-emitter contacts. If the base voltage is higher than the emitter voltage this is a positive number and vice versa. Since the desired base-emitter voltage must be approached in increments, VBE and DVBE work together. VBE is the final base-emitter voltage desired and DVBE is the voltage increments used to reach the desired voltage.

Default: none, must be supplied if this option is selected

VCE

This is the desired applied voltage difference on the collector-emitter contacts. As in the case of VBE, VCE works hand-in-hand with DVCE

Default: none, must be supplied if this option is selected

DVBE

The voltage increment taken per Newton iteration loop to reach desired stopping voltage VBE. Note that DVBE should be $\sim$ an order of magnitude less than DVCE for a normally operating transistor (ie. base-emitter forward biased collector base reverse biased).

Default: DVBE = 0.05 volts

DVCE

Voltage increment taken to reach VCE.

Default DVCE = 0.5 volts

XAI

The way that the program calculates terminal currents is described in some detail in Appendix A. Briefly, what is needed is a partitioning of the device domain into three subdomains (see Fig. 15). For purposes of illustration an npn transistor is used. The device has been partitioned into a subdomain A, subdomain B, and then whatever is left over. It is necessary to keep the line defining A within the p diffusion, consequently it is necessary to supply the x-coordinate and the y coordinate of the lower left hand corner of A, these are the variables XAI and YA respectively. XBI and YB have a similar function for the subdomain B. Note that it is necessary to isolate the middle contact within A.

Default: none, this *must* be supplied.

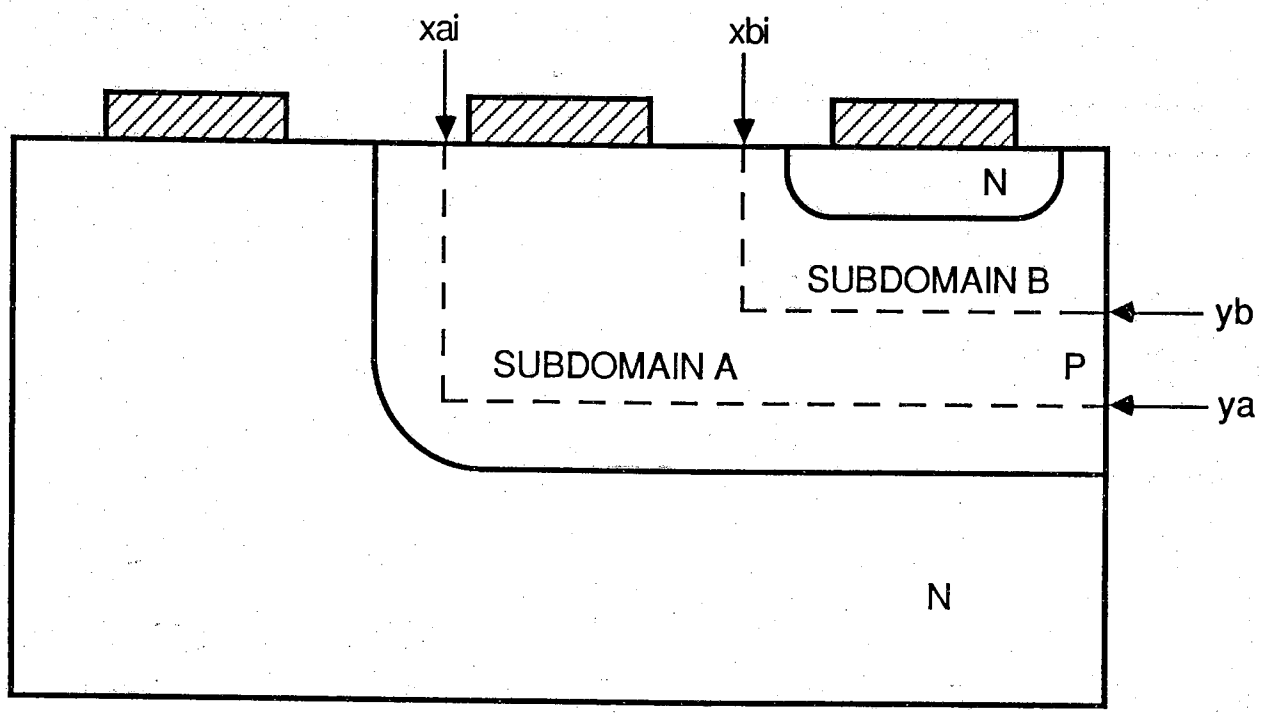

Figure 15

XBI

See XAI.

YA

See XAI

YB

See XAI

DELJB

As the base-emitter voltage begins to approach the high-injection condition it is necessary to decrease the voltage steps on the base-emitter so that the Newton iteration doesn't diverge. It is possible to get nearly linear jumps in the base current from one Newton iteration to the next by taking voltage steps of DELJB/JB, where JB is the last calculated base current. This has the effect of canceling the exponential behavior of the base current on the base-emitter voltage. Once DELJB/JB becomes less than DVBE the program jumps out of the loop which was incrementing V_{be} by DVBE and begins incrementing the voltage steps in units of DELJB/JB.

Default: DELJB $= 1\times10^{-5}$ **A/cm**

References

1. J. W. Slotboom and H. C. DeGraaff, "Measurements of Bandgap Narrowing in Si Bipolar Transistors," Solid-State Electron. 19, pp. 857-862 (1976).

2. H. P. D. Lanyon and R. A. Tuft, "Bandgap Narrowing in Moderately to Heavily Doped Silicon," IEEE Trans. on Electron Devices ED-26, No. 7, 1014-1018 (1979).

3. G. W. Brown and B. W. Lindsay, "The Numerical Solution of Poisson's Equation for Two-Dimensional Semiconductor Devices," Solid-State Electron. 19, pp. 991-992 (1976).

4. W. Fichtner and D. J. Rose, "On the Numerical Solution of Nonlinear Elliptic PDE's Arising from Semiconductor Device Modeling," *Elliptic Problem Solvers,* pp. 227-284, New York, Academic Press 1981.

5. D. M. Caughey and R. E. Thomas, "Carrier Mobilities in Silicon Empirically Related to Doping and Field," Proc. IEEE 52, 2192-2193 (1967).

6. N. D. Arora, J. R. Hauser, D. J. Roulston, "Electron and Hole Mobilities in Silicon as a Function of Concentration and Temperature," IEEE Trans. Electron Dev. ED-29, 292-295 (1982).

7. J. L. Gray, Two Dimensional Modeling of Silicon Solar Cells, Ph.D. Thesis, Purdue University, W. Lafayette, IN (August 1982).

EQDAP2 QUICK REFERENCE GUIDE

The EQDAP2 input deck consists of a comment card followed by several NAMELISTS, as below.

```
COMMENT CARD
 &DEFPRO &end
 &TOPBND &end
 &BOTBND &end
 &LEFBND &end
 &RITBND &end
 &XMESH &end
 .
 .
 .
 &XMESH &end
 &YMESH &end
 .
 .
 .
 &YMESH &end
```

The parameters and their default values are listed for each NAMELIST in the following tables.

Namelist DEFPRO

Parameter	Type	Default	Description
INFO	integer	0	amount of desired output information
TEMP	real	27.	device temp (° C)
BGN	char	NONE	set bandgap narrowing model choices- NONE SB (Slotboom-DeGraaff) LT (Lanyon-Tuft)
DOPBLK	real	1×10^{15}	background doping (cm^{-3})
XMAX	real	100	device width (μm)
YMAX	real	100	device thickness (μm)
NXF	integer	10	# of nodes in x direction ($\leqq$ 200) (NXF*NYF $\leqq$ 20000)
NYF	integer	10	# of nodes in y direction ($\leqq$ 200) (NXF*NYF $\leqq$ 20000)
ITMAX	integer	500	max # of SOR iterations
DELTST	real	1×10^{-4}	maximum allowed change in potential for convergence (kT)
FIT	char	'cubspl'	method used to interpolate the doping data

Namelist TOPBND

Parameter	Type	Default	Description
XT	real array	$10*10^{10}$	the position of the segments defining the contacts (μm)
TOPC	integer array	10*0	if TOPC(K) $>$ 0, the segment between XT(K-1) and XT(K) is a contact
DXT	real array	$10*10^{10}$	the position of the segments defining the doping profiles (μm)
PTOP	integer array	10*0	defines the doping profile in the segment between DXT(K-1) and DXT(K) =0, no profile =1, ERFC profile =2, gaussian profile =-1,-2,-3,-4, use data on tape1,2,3,or 4 (see notes) =-11,-12,-13,-14, use data on tape11,12,13,or 14 (see notes)
DTOP	real array	10*0.0	net peak doping conc in Kth segment (cm^{-3}) <0, p-type >0, n-type
ZT	real array	10*0.0	position (from top surface) of net peak doping conc in Kth segment(μm)
XJTOP	real array	10*0.0	junction depth in Kth segment (μm)
QSSTOP	real	0.0	density of fixed surface charge on top surface (cm^{-2})

Namelist BOTBND

Parameter	Type	Default	Description
XB BOTC DXB PBOT DBOT ZB XJBOT QSSBOT			similar to NAMELIST TOPBND

Namelist LEFBND

Parameter	Type	Default	Description
XL LEFC DXL PLEF DLEF ZL XJLEF QSSLEF			similar to NAMELIST TOPBND

Namelist RITBND

Parameter	Type	Default	Description
XR RITC DXR PRIT DRIT ZR XJRIT QSSRIT			similar to NAMELIST TOPBND

Namelist DOPE2T

Parameter	Type	Default	Description
DOPG2	logical	.FALSE.	logical variable indicating whether there is a second diffusion
D2XT	real array	$10*10^{10}$	the position of the segments defining the doping profiles (μm)
P2TOP	integer array	10*0	defines the doping profile in the segment between D2XT(K-1) and D2XT(K) =0, no profile =1, ERFC profile =2, gaussian profile =-1,-2,-3,-4, use data on tape1,2,3,or 4 (see notes) =-11,-12,-13,-14, use data on tape11,12,13,or 14 (see notes)
D2TOP	real array	10*0.0	net peak doping conc in Kth segment (cm^{-3}) <0, p-type >0, n-type
Z2T	real array	10*0.0	position (from top surface) of net peak doping conc in Kth segment(μm)
XJ2TOP	real array	10*0.0	junction depth in Kth segment (μm)

Namelist DOPE2B

Parameter	Type	Default	Description
D2XB P2BOT D2BOT Z2B XJ2BOT			similar to NAMELIST DOPE2T

Namelist DOPE2L

Parameter	Type	Default	Description
D2XL P2LEF D2LEF Z2L XJ2LEF			similar to NAMELIST DOPE2T

Namelist DOPE2R

Parameter	Type	Default	Description
D2XR P2RIT D2RIT Z2R XJ2RIT			similar to NAMELIST DOPE2T

Namelist DOPE3T

Parameter	Type	Default	Description
DOPG3 D3XT P3TOP D3TOP Z3T XJ3TOP			similar to NAMELIST DOPE2T

Namelist DOPE3B

Parameter	Type	Default	Description
D3XB P3BOT D3BOT Z3B XJ3BOT			similar to NAMELIST DOPE2T

Namelist DOPE3L

Parameter	Type	Default	Description
D3XL P3LEF D3LEF Z3L XJ3LEF			similar to NAMELIST DOPE2T

Namelist DOPE3R

Parameter	Type	Default	Description
D3XR P3RIT D3RIT Z3R XJ3RIT			similar to NAMELIST DOPE2T

Namelist XMESH

Parameter	Type	Default	Description
NX	real		# of nodes in this segment
XX	real		position of this segment (μm)

Namelist YMESH

Parameter	Type	Default	Description
NY	real		# of nodes in this segment
YY	real		position of this segment (μm)

DAP2D QUICK REFERENCE GUIDE

The DAP2D input deck consists of a comment card followed by eight NAMELISTS, as below.

COMMENT CARD
&PROBLM &end
&NEWTON &end
&RECOMB &end
&GENRAT &end
&MOBLTY &end
&BC &end
&TABLES &end
&option &end

The parameters and their default values are listed for each NAMELIST in the following tables.

Namelist PROBLM

Parameter	Type	Default	Description
NUM2D	integer	-1	run number of this run if <0, NUM2D is set automatically using data on tape10
INFO	integer	3	=0 for minimum output =5 for maximum output
TAPE	logical	.FALSE.	store results on tape

Namelist NEWTON

Parameter	Type	Default	Description
ITMAX	integer	100	max number of Newton iterations
DELTST	real	1×10^{-3}	maximum allowed change in potential for convergence (kT)
IDVRG	integer	5	max # of iterations for which max change in potential may increase before divergence is presumed
MTEST	real	0.0	if max correction (in kT/q) is < MTEST, use previous Jacobi matrix (may save CPU time)
MTMX	integer	3	if # of iterations after MTEST satisfied exceeds MTMX, recompute Jacobi matrix
NDAMP	integer	1	selects damping for Newton's method =1 for method of Brown & Lindsay =2 for method of Rose & Fitchner =3 for combination of 1 & 2
REDUCE	real	2.	reduction factor used if NDAMP = 2 or 3
KMAX	integer	5	maximum number of reductions if NDAMP = 2 or 3
LTEST	real	1×10^{50}	local convergence test of $\mathbf{F} = 0$
GTEST	real	1×10^{50}	global convergence test of $\mathbf{F} = 0$

Namelist RECOMB

Parameter	Type	Default	Description
TAUN	real	1×10^{-4}	SRH electron lifetime (sec) actual lifetime is τ_n = TAUN/(1+DOP/NC) where DOP is the total impurity concentration
TAUP	real	1×10^{-4}	SRH hole lifetime (sec) actual lifetime is τ_p = TAUP/(1+DOP/NC) where DOP is the total impurity concentration
NC	real	1×10^{50}	cut-off for impurity dependent SRH lifetime (cm^{-3})
ET	real	0.0	trap level w.r.t. intrinsic level (eV)
AN	real	2.8×10^{-31}	electron Auger coefficient (cm^6/sec)
AP	real	9.9×10^{-32}	hole Auger coefficient (cm^6/sec)

Namelist MOBLTY

Parameter	Type	Default	Description
MODEL	char	ARORA-CCS	sets mobility model choices- CT (Caughey-Thomas) CT-CCS (with carrier-carrier scattering) ARORA ARORA-CCS

Namelist BC

Parameter	Type	Default	Description
SNTOP SNBOT SNLEF SNRIT	real real real real	0.0 0.0 0.0 0.0	electron surface recombination velocities along top, bottom left, and right boundaries (cm/sec)
SPTOP SPBOT SPLEF SPRIT	real real real real	0.0 0.0 0.0 0.0	hole surface recombination velocities along top, bottom left, and right boundaries (cm/sec)
IDEAL	logical	.TRUE.	if .TRUE., assume ideal ohmic contacts
SPP	real	1×10^7	if IDEAL=.FALSE., effective hole recombination velocity at p-contact (cm/sec)
SNP	real	0.99×10^7	effective electron recombination velocity at p-contact (cm/sec)
SNN	real	1×10^7	effective electron recombination velocity at n-contact (cm/sec)
SPN	real	0.99×10^7	effective hole recombination velocity at n-contact (cm/sec)
ETS	real	0.0	surface state trap level w.r.t. intrinsic level (eV)
QSSTOP QSSBOT QSSLEF QSSRIT	real real real real	0.0 0.0 0.0 0.0	fixed surface charge densities along top, bottom, left, and right boundaries (cm^{-2}) (usually set in EQSCAP2)

Namelist TABLES

Parameter	Type	Default	Description
XLINE()	real		print table of data for x = XLINE(i) (μm) (i $\leqq$ 10)
YLINE()	real		print table of data for y = YLINE(i) (μm) (i $\leqq$ 10)
VEES()	real		applied voltage for which tables are to be printed. = 101. for V_{MP} and = 102. for V_{OC} (V) ($\leqq$ 25 voltages)

Namelist OPTON1

Parameter	Type	Default	Description
VSTART	real	**0.0**	start voltage (V)
VSTOP	real	**0.7**	stop voltage (V)
DV	real	**0.1**	voltage increment (V)
V(i)	real	**101.**	applied voltage array (V) i $\leqq$ 20
JEQ0	logical	.FALSE.	if .TRUE., use J=0 initial guess (first voltage only)

Namelist OPTON5

Parameter	Type	Default	Description
VBE	real	none	applied voltage on base-emitter(V)
VCE	real	none	applied voltage on collector-emitter(V)
DVBE	real	0.05	voltage increment on base-emitter(V)
DVCE	real	0.5	voltage increment on collector-emitter(V)
XAI	real	none	x-position of subdomain A (see Fig. 4)
XBI	real	none	x-position of subdomain B (see Fig. 4)
YA	real	none	y-position of subdomain A (see Fig. 4)
YB	real	none	y-position of subdomain B (see Fig. 4)
DELJB	real	1.0×10^{-5} A/cm	voltage increment becomes DELJB/JB when high injection is reached

NOTES

Files used by EQDAP2

The files used by EQDAP2 are listed below.

TAPE1 - doping profile, see next section.
TAPE2 - doping profile, see next section.
TAPE3 - doping profile, see next section.
TAPE4 - doping profile, see next section.
TAPE5 - standard input
TAPE6 - standard output
TAPE8 - equilibrium results
TAPE9 - summary file
TAPE10 - contains current run number
TAPE11 - doping profile, see next section.
TAPE12 - doping profile, see next section.
TAPE13 - doping profile, see next section.
TAPE14 - doping profile, see next section.

User Supplied Doping Profiles

The user supplied doping profiles must have the following format.

1) The first line is a comment line in A80 format.
2) The second line describes the profiles data. It is a character string in left justified A8 format. If the string = NET, then the profile data is treated as containing net impurity information and the last data point is assumed to be a background doping. This background level is subtracted from the data before it is used by EQDAP2. Otherwise, the data is used as is. P-type dopants are input as negative values while n-type dopants are input as positive values.
3) The remaining lines contain the relative position of the dopant from the surface (μm) and the dopant density at that position (cm^{-3}) in 2E16.0 format. The last line must contain -1.0 for the relative position.

A sample file is shown on the following page.

Sample User Supplied Doping Profile

arsenic deposition emitter and collector
actual

0.000e+00	0.328e+20
0.455e-03	0.352e+20
0.909e-03	0.363e+20
0.136e-02	0.364e+20
0.182e-02	0.359e+20
0.227e-02	0.351e+20
0.273e-02	0.340e+20
0.318e-02	0.330e+20
0.364e-02	0.320e+20
0.409e-02	0.311e+20
0.455e-02	0.304e+20
0.500e-02	0.298e+20
0.545e-02	0.293e+20
0.591e-02	0.290e+20
0.636e-02	0.286e+20
0.682e-02	0.283e+20
0.727e-02	0.280e+20
0.773e-02	0.277e+20
0.818e-02	0.273e+20
0.864e-02	0.269e+20
0.909e-02	0.263e+20
0.954e-02	0.257e+20
0.100e-01	0.250e+20
0.105e-01	0.242e+20
0.109e-01	0.234e+20
0.114e-01	0.224e+20
0.118e-01	0.214e+20
0.123e-01	0.204e+20
0.127e-01	0.194e+20
0.132e-01	0.184e+20
0.136e-01	0.173e+20
0.141e-01	0.163e+20
0.145e-01	0.153e+20
0.150e-01	0.144e+20
0.155e-01	0.135e+20
0.159e-01	0.126e+20
0.164e-01	0.118e+20
0.168e-01	0.111e+20
0.173e-01	0.104e+20
0.177e-01	0.972e+19
0.182e-01	0.911e+19
0.186e-01	0.854e+19
0.191e-01	0.801e+19
0.195e-01	0.752e+19
0.200e-01	0.706e+19
0.205e-01	0.662e+19
0.209e-01	0.621e+19
0.214e-01	0.582e+19
0.218e-01	0.545e+19
0.223e-01	0.510e+19
0.227e-01	0.477e+19
0.232e-01	0.445e+19
0.236e-01	0.414e+19
0.241e-01	0.385e+19
0.245e-01	0.357e+19
0.250e-01	0.330e+19
0.255e-01	0.305e+19
0.259e-01	0.281e+19
0.264e-01	0.258e+19
0.268e-01	0.237e+19
0.273e-01	0.218e+19
0.277e-01	0.199e+19
0.282e-01	0.183e+19
0.286e-01	0.167e+19
0.291e-01	0.153e+19
0.295e-01	0.140e+19
0.300e-01	0.128e+19
0.305e-01	0.117e+19
0.309e-01	0.108e+19
0.314e-01	0.986e+18
0.318e-01	0.905e+18
0.323e-01	0.831e+18

```
 0.327e-01     0.764e+18
 0.332e-01     0.701e+18
 0.336e-01     0.644e+18
 0.341e-01     0.590e+18
 0.345e-01     0.540e+18
 0.350e-01     0.493e+18
 0.355e-01     0.448e+18
 0.359e-01     0.406e+18
 0.364e-01     0.366e+18
 0.368e-01     0.329e+18
 0.373e-01     0.293e+18
 0.377e-01     0.259e+18
 0.382e-01     0.227e+18
 0.386e-01     0.197e+18
 0.391e-01     0.169e+18
 0.395e-01     0.144e+18
-0.450e-01    -0.116e+16
#eor
```

Files Used by DAP2D

The files used by DAP2D are listed below.

- TAPE2 - spectrum file, see next section.
- TAPE3 - initial guess file
- TAPE4 - nonequilibrium results
- TAPE5 - standard input
- TAPE6 - standard output
- TAPE9 - summary file
- TAPE10 - contains current run number
- TAPE15 - temporary file

APPENDIX C

Sample Input Deck

```
resource,jcat=s3.
attach,eqdap77,user=252430.
attach,runno,user=252430,access=rwam.
mflink(emit,st=lm3,dd=c6,jcs="pfiles(get,emit)").
mflink(base,st=lm3,dd=c6,jcs="pfiles(get,base)").
eqdap77,base,tape1=base,emit,tape2=emit.
attach,dap77,user=252430,access=rx.
mflink(summ2d,st=leg,dd=c8,jcs="*"
  "user egley","host ed.ecn.purdue.edu","get dap2d/pcgpak/summ2d")
request,newdata/256,rt=w.
dap77,data,tape3=data.
summary.
index,lo=d.
exit.
comment.run not stored on magnetic tape!
files.
summary.
index,lo=d.
#eor
 spreading resistance run
 &defpro temp=28.,nxf=69,nyf=48,bgn='sb',
 ymax=6.,xmax=62.,dopblk=8.4e14,deltst=1.0e-2,fit='linfit'&end
 &topbnd topc(1)=3,topc(2)=0,topc(3)=2,topc(4)=0,topc(5)=5,
 xt(1)=4.,xt(2)=30.,xt(3)=38.,xt(4)=58.,xt(5)=62.&end
 &botbnd qssbot=0.0&end
 &lefbnd qsslef=0.0&end
 &ritbnd qssrit=0.0&end
 &dope2t dopg2=.true.,p2top(2)=-1,
 d2xt(1)=19.,d2xt(2)=62.&end
 &dope2b d2xb=1.0e10&end
 &dope2l d2xl=1.0e10&end
 &dope2r d2xr=1.0e10&end
 &dope3t dopg3=.true.,p3top(1)=-2,p3top(3)=-2,
 d3xt(1)=9.,d3xt(2)=53.,d3xt(3)=62.&end
 &dope3b d3xb=1.0e10&end
```

```
&dope3l d3xl=1.0e10&end
&dope3r d3xr=1.0e10&end
&xmesh nx=4,xx=3.9&end
&xmesh nx=1,xx=4.1&end
&xmesh nx=1,xx=6.55&end
&xmesh nx=1,xx=9.&end
&xmesh nx=1,xx=9.024&end
&xmesh nx=2,xx=9.04625&end
&xmesh nx=2,xx=9.05&end
&xmesh nx=1,xx=9.07&end
&xmesh nx=1,xx=9.0925&end
&xmesh nx=1,xx=9.208&end
&xmesh nx=2,xx=16.&end
&xmesh nx=1,xx=16.175&end
&xmesh nx=4,xx=16.47&end
&xmesh nx=2,xx=16.54&end
&xmesh nx=2,xx=16.62&end
&xmesh nx=2,xx=16.69&end
&xmesh nx=2,xx=16.7625&end
&xmesh nx=2,xx=17.35&end
&xmesh nx=1,xx=17.58&end
&xmesh nx=1,xx=17.8&end
&xmesh nx=1,xx=21.7&end
&xmesh nx=2,xx=29.9&end
&xmesh nx=1,xx=30.1&end
&xmesh nx=3,xx=37.9&end
&xmesh nx=1,xx=38.1&end
&xmesh nx=3,xx=52.&end
&xmesh nx=1,xx=52.91&end
&xmesh nx=1,xx=52.915&end
&xmesh nx=1,xx=52.92&end
&xmesh nx=1,xx=52.9264&end
&xmesh nx=1,xx=52.93&end
&xmesh nx=1,xx=52.9367&end
&xmesh nx=1,xx=52.94336&end
&xmesh nx=6,xx=52.965625&end
&xmesh nx=2,xx=52.97&end
&xmesh nx=1,xx=52.99&end
&xmesh nx=1,xx=53.2&end
&xmesh nx=1,xx=53.5&end
```

```
&xmesh nx=1,xx=57.9&end
&xmesh nx=1,xx=58.1&end
&xmesh nx=3,xx=62.&end
&ymesh ny=4,yy=4.0&end
&ymesh ny=4,yy=4.375&end
&ymesh ny=2,yy=4.5&end
&ymesh ny=3,yy=4.625&end
&ymesh ny=2,yy=4.6875&end
&ymesh ny=2,yy=4.75&end
&ymesh ny=1,yy=5.0&end
&ymesh ny=1,yy=5.5&end
&ymesh ny=3,yy=5.6&end
&ymesh ny=1,yy=5.7&end
&ymesh ny=3,yy=5.8&end
&ymesh ny=1,yy=5.827&end
&ymesh ny=2,yy=5.8575&end
&ymesh ny=1,yy=5.875&end
&ymesh ny=2,yy=5.9&end
&ymesh ny=4,yy=5.94&end
&ymesh ny=1,yy=5.951&end
&ymesh ny=3,yy=5.962&end
&ymesh ny=2,yy=5.973&end
&ymesh ny=5,yy=6.&end
#eor
spreading resistance run
&problm tape=.false.,info=5,ivgss=0&end
&newton deltst=.0001,ndamp=1,itmax=40&end
&recomb taup=1.e-6,taun=1.e-6,nc=7.1e15&end
&genrat igen='dark'&end
&moblty model='arora-ccs'&end
&bc ideal=.false.,spn=0.0&end
&tables xline(1)=8.0,xline(2)=42.,xline(3)=70.,yline(1)=0.,yline(2)=5.5,
 yline(3)=6.00,vees(1)=0.0&end
&opton5 vbe=.66,dvbe=0.05,vce=2.6,dvce=0.5,xai=22.,xbi=52.,
 yb=5.92,ya=5.875,deljb=1.e-4&end
```

APPENDIX D

Sample Run

```
Q
  04.21.14 TAPEHIST        NRDJDT          252430  FUTURE     782  UURSP          09/22/87
  04.21.16 ** A new FTN200 compiler and run-time have been installed.  Report
  04.21.16 ** any problems to PUCC User Services.
  04.21.18 RESOURCE,JCAT=S5,TL=2000,LP=55.
  04.21.18 ATTACH,EQDAP77,USER=252430.
  04.21.21 ATTACH,RUNNO,USER=252430,ACCESS=RWAM.
  04.21.24 MFLINK(EMIT,ST=LM3,DD=C6,JCS="****************").
  04.21.34 MFLINK(BASE,ST=LM3,DD=C6,JCS="****************").
  04.21.45 EQDAP77,BASE,TAPE1=BASE,EMIT,TAPE2=EMIT.
  04.23.04 STOP
  04.23.04 RETURN,SUMM2D.
  04.23.06 W  Q5RETURN 1402 FILE SUMM2D   DOES NOT EXIST
  04.23.06  RETURN CODE =  4
  04.23.06 ATTACH,DAP77,USER=252430,ACCESS=RX.
  04.23.08 ATTACH,SUMM2D,USER=252430,ACCESS=RWMAX.
  04.23.09 REQUEST,NEWDATA/256,RT=W.
  04.23.11 DAP77,DATA,TAPE3=DATA.
  06.22.23 STOP
  06.22.24 MFLINK(NEWDATA,ST=LM3,DD=UU,JCS="******************************",
  06.22.24 "*********",
  06.22.24 "*********")
  06.27.19 60-BIT WORD COUNT -     410238
  06.27.21 MFLINK(SUMM2D,ST=LM3,DD=C6,JCS="****************")
  06.27.29        241 LINES TRANSFERRED
  06.27.30 PERMIT,SUMM2D,USER=030210,ACCESS=RWMAX.
  06.27.31 USER    030210  HAS     RWMAX   ACCESS TO FILE  SUMM2D
  06.27.31 SUMMARY.
  06.27.31 USER CPU TIME (SEC)          1448.098      1448.098 SBU
  06.27.31 SYSTEM CPU TIME (SEC)           2.858         2.858 SBU
  06.27.31 SM PG EXPLICIT ACCESSES       217             6.076 SBU
  06.27.31 SM PG IMPLICIT ACCESSES        11             0.308 SBU
  06.27.31 NET SMALL PAGE FAULTS          94             4.136 SBU
  06.27.31 LG PG IMPLICIT ACCESSES        30             0.840 SBU
  06.27.31 NET LARGE PAGE FAULTS           3             0.468 SBU
  06.27.31 BLOCKS OF EXPLICIT I/O       2236             2.236 SBU
  06.27.31 IMPLICIT BLOCKS WRITTEN     11712            11.712 SBU
  06.27.31 TOTAL                                      1476.731 SBU
  06.27.31 INDEX,LO=D.
  06.27.55 STOP
  06.27.55
  06.27.55 APPROXIMATE RESOURCE UTILIZATION
  06.27.55 --------------------------------
  06.27.55 USER CPU TIME (SEC)          1450.105      1450.105 SBU
  06.27.55 SYSTEM CPU TIME (SEC)           3.293         3.293 SBU
  06.27.55 SM PG EXPLICIT ACCESSES       221             6.188 SBU
  06.27.55 SM PG IMPLICIT ACCESSES        11             0.308 SBU
  06.27.55 NET SMALL PAGE FAULTS          99             4.356 SBU
  06.27.55 LG PG IMPLICIT ACCESSES        30             0.840 SBU
  06.27.55 NET LARGE PAGE FAULTS           3             0.468 SBU
  06.27.55 BLOCKS OF EXPLICIT I/O       2246             2.246 SBU
  06.27.55 IMPLICIT BLOCKS WRITTEN     11712            11.712 SBU
  06.27.55 TOTAL                                      1479.515 SBU
  06.27.55 TOTAL COST ESTIMATE                       $ 214.53
  06.27.55 $$COMPLETE$$
Q Q Q
8
0     MMMMMMMMMMM
      MMMMMMMMMMM
      MMMMMMMMMMM
R
#eor

     ********************************************** INPUT PARAMETERS **********************************************

 &DEFPRO
 TEMP = 28.000000000000
 NXF = 69
 NYF = 48
 XMAX = 62.000000000000
 YMAX = 6.0000000000000
 BGN = 'SB
 DOPBLK = 8.4000000000000E+0014
 DELTST = 0.01000000000000
 SOLAR = F
 PLOTDO = F
 INDEX = F
 ITMAX = 500
```

```
FIT = 'LINFIT'
&END
&TOPBND
XT = 4.0000000000000 30.000000000000 38.000000000000 58.000000000000 62.000000000000 10000000000.000 10000000000.000 10000000000.000
10000000000.000
DXT = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
10000000000.000
PTOP = 0 0 0 0 0 0 0 0 0 0
DTOP = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
XJTOP = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
ZT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
QSSTOP = 0.0000000000000
TOPC = 3 0 2 0 5 0 0 0 0 0
&END
&BOTBND
XB = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
10000000000.000
DXB = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
10000000000.000
PBOT = 0 0 0 0 0 0 0 0 0 0
DBOT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
XJBOT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
ZB = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
QSSBOT = 0.0000000000000
BOTC = 0 0 0 0 0 0 0 0 0 0
&END
&LEFBND
XL = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
10000000000.000
DXL = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
10000000000.000
PLEF = 0 0 0 0 0 0 0 0 0 0
DLEF = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
XJLEF = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
ZL = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
QSSLEF = 0.0000000000000
LEFC = 0 0 0 0 0 0 0 0 0 0
&END
&RITBND
XR = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
10000000000.000
DXR = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
10000000000.000
PRIT = 0 0 0 0 0 0 0 0 0 0
DRIT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
XJRIT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
ZR = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
QSSRIT = 0.0000000000000
RITC = 0 0 0 0 0 0 0 0 0 0
&END
&DOPE2T
D2XT = 19.000000000000 62.000000000000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
10000000000.000
P2TOP = 0 -1 0 0 0 0 0 0 0 0
D2TOP = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
XJ2TOP = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
Z2T = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
DOPG2 = T
&END
&DOPE2B
D2XB = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
10000000000.000
P2BOT = 0 0 0 0 0 0 0 0 0 0
D2BOT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
XJ2BOT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
Z2B = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
&END
&DOPE2L
D2XL = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
10000000000.000
P2LEF = 0 0 0 0 0 0 0 0 0 0
D2LEF = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
XJ2LEF = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
0.0000000000000 0.0000000000000
Z2L = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
```

```
 0.0000000000000 0.0000000000000
 &END
 &DOPE2R
 D2XR = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
 10000000000.000
 P2RIT = 0 0 0 0 0 0 0 0 0 0
 D2RIT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 XJ2RIT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 Z2R = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 &END
 &DOPE3T
 D3XT = 9.0000000000000 53.000000000000 62.000000000000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
 10000000000.000
 P3TOP = -2 0 -2 0 0 0 0 0 0 0
 D3TOP = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 XJ3TOP = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 Z3T = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 DOPG3 = T
 &END
 &DOPE3B
 D3XB = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
 10000000000.000
 P3BOT = 0 0 0 0 0 0 0 0 0 0
 D3BOT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 XJ3BOT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 Z3B = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 &END
 &DOPE3L
 D3XL = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
 10000000000.000
 P3LEF = 0 0 0 0 0 0 0 0 0 0
 D3LEF = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 XJ3LEF = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 Z3L = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 &END
 &DOPE3R
 D3XR = 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000 10000000000.000
 10000000000.000
 P3RIT = 0 0 0 0 0 0 0 0 0 0
 D3RIT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 XJ3RIT = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 Z3R = 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000 0.0000000000000
 0.0000000000000 0.0000000000000
 &END
1    XMAX=     62.00000      YMAX=      6.00000

         1 NXD=     4 XD=      3.9000
         2 NXD=     1 XD=      4.1000
         3 NXD=     1 XD=      6.5500
         4 NXD=     1 XD=      9.0000
         5 NXD=     1 XD=      9.0240
         6 NXD=     2 XD=      9.0462
         7 NXD=     2 XD=      9.0500
         8 NXD=     1 XD=      9.0700
         9 NXD=     1 XD=      9.0925
        10 NXD=     1 XD=      9.2080
        11 NXD=     2 XD=     16.0000
        12 NXD=     1 XD=     16.1750
        13 NXD=     4 XD=     16.4700
        14 NXD=     2 XD=     16.5400
        15 NXD=     2 XD=     16.6200
        16 NXD=     2 XD=     16.6900
        17 NXD=     2 XD=     16.7625
        18 NXD=     2 XD=     17.3500
        19 NXD=     1 XD=     17.5800
        20 NXD=     1 XD=     17.8000
        21 NXD=     1 XD=     21.7000
        22 NXD=     2 XD=     29.9000
        23 NXD=     1 XD=     30.1000
        24 NXD=     3 XD=     37.9000
        25 NXD=     1 XD=     38.1000
        26 NXD=     3 XD=     52.0000
        27 NXD=     1 XD=     52.9100
        28 NXD=     1 XD=     52.9150
        29 NXD=     1 XD=     52.9200
        30 NXD=     1 XD=     52.9264
        31 NXD=     1 XD=     52.9300
        32 NXD=     1 XD=     52.9367
        33 NXD=     1 XD=     52.9434
        34 NXD=     6 XD=     52.9656
```

```
    35 NXD=    2 XD=    52.9700
    36 NXD=    1 XD=    52.9900
    37 NXD=    1 XD=    53.2000
    38 NXD=    1 XD=    53.5000
    39 NXD=    1 XD=    57.9000
    40 NXD=    1 XD=    58.1000
    41 NXD=    3 XD=    62.0000
     1 NYD=    4 YD=     4.0000
     2 NYD=    4 YD=     4.3750
     3 NYD=    2 YD=     4.5000
     4 NYD=    3 YD=     4.6250
     5 NYD=    2 YD=     4.6875
     6 NYD=    2 YD=     4.7500
     7 NYD=    1 YD=     5.0000
     8 NYD=    1 YD=     5.5000
     9 NYD=    3 YD=     5.6000
    10 NYD=    1 YD=     5.7000
    11 NYD=    3 YD=     5.8000
    12 NYD=    1 YD=     5.8270
    13 NYD=    2 YD=     5.8575
    14 NYD=    1 YD=     5.8750
    15 NYD=    2 YD=     5.9000
    16 NYD=    4 YD=     5.9400
    17 NYD=    1 YD=     5.9510
    18 NYD=    3 YD=     5.9620
    19 NYD=    2 YD=     5.9730
    20 NYD=    5 YD=     6.0000
 NXFIRS=       69     NYFIRS=       48

 ********************************************************************************************************************************

***** ENTER MESH2
    1 X = 0.000000E+00 HX = 0.975000E-04
    2 X = 0.975000E-04 HX = 0.975000E-04
    3 X = 0.195000E-03 HX = 0.975000E-04
    4 X = 0.292500E-03 HX = 0.975000E-04
    5 X = 0.390000E-03 HX = 0.975000E-04
    6 X = 0.410000E-03 HX = 0.200000E-04
    7 X = 0.655000E-03 HX = 0.245000E-03
    8 X = 0.900000E-03 HX = 0.245000E-03
    9 X = 0.902400E-03 HX = 0.240000E-05
   10 X = 0.903512E-03 HX = 0.111250E-05
   11 X = 0.904625E-03 HX = 0.111250E-05
   12 X = 0.904812E-03 HX = 0.187500E-06
   13 X = 0.905000E-03 HX = 0.187500E-06
   14 X = 0.907000E-03 HX = 0.200000E-05
   15 X = 0.909250E-03 HX = 0.225000E-05
   16 X = 0.920800E-03 HX = 0.115500E-04
   17 X = 0.126040E-02 HX = 0.339600E-03
   18 X = 0.160000E-02 HX = 0.339600E-03
   19 X = 0.161750E-02 HX = 0.175000E-04
   20 X = 0.162487E-02 HX = 0.737500E-05
   21 X = 0.163225E-02 HX = 0.737500E-05
   22 X = 0.163962E-02 HX = 0.737500E-05
   23 X = 0.164700E-02 HX = 0.737500E-05
   24 X = 0.165050E-02 HX = 0.350000E-05
   25 X = 0.165400E-02 HX = 0.350000E-05
   26 X = 0.165800E-02 HX = 0.400000E-05
   27 X = 0.166200E-02 HX = 0.400000E-05
   28 X = 0.166550E-02 HX = 0.350000E-05
   29 X = 0.166900E-02 HX = 0.350000E-05
   30 X = 0.167262E-02 HX = 0.362500E-05
   31 X = 0.167625E-02 HX = 0.362500E-05
   32 X = 0.170562E-02 HX = 0.293750E-04
   33 X = 0.173500E-02 HX = 0.293750E-04
   34 X = 0.175800E-02 HX = 0.230000E-04
   35 X = 0.178000E-02 HX = 0.220000E-04
   36 X = 0.217000E-02 HX = 0.390000E-03
   37 X = 0.258000E-02 HX = 0.410000E-03
   38 X = 0.299000E-02 HX = 0.410000E-03
   39 X = 0.301000E-02 HX = 0.200000E-04
   40 X = 0.327000E-02 HX = 0.260000E-03
   41 X = 0.353000E-02 HX = 0.260000E-03
   42 X = 0.379000E-02 HX = 0.260000E-03
   43 X = 0.381000E-02 HX = 0.200000E-04
   44 X = 0.427333E-02 HX = 0.463333E-03
   45 X = 0.473667E-02 HX = 0.463333E-03
   46 X = 0.520000E-02 HX = 0.463333E-03
   47 X = 0.529100E-02 HX = 0.910000E-04
   48 X = 0.529150E-02 HX = 0.500000E-06
   49 X = 0.529200E-02 HX = 0.500000E-06
   50 X = 0.529264E-02 HX = 0.640000E-06
   51 X = 0.529300E-02 HX = 0.360000E-06
   52 X = 0.529367E-02 HX = 0.670000E-06
   53 X = 0.529434E-02 HX = 0.666000E-06
   54 X = 0.529471E-02 HX = 0.371083E-06
   55 X = 0.529508E-02 HX = 0.371083E-06
   56 X = 0.529545E-02 HX = 0.371083E-06
   57 X = 0.529582E-02 HX = 0.371083E-06
   58 X = 0.529619E-02 HX = 0.371083E-06
   59 X = 0.529656E-02 HX = 0.371083E-06
   60 X = 0.529678E-02 HX = 0.218750E-06
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 61 X = 0.529700E-02 HX = 0.218750E-06
 62 X = 0.529900E-02 HX = 0.200000E-05
 63 X = 0.532000E-02 HX = 0.210000E-04
 64 X = 0.535000E-02 HX = 0.300000E-04
 65 X = 0.579000E-02 HX = 0.440000E-03
 66 X = 0.581000E-02 HX = 0.200000E-04
 67 X = 0.594000E-02 HX = 0.130000E-03
 68 X = 0.607000E-02 HX = 0.130000E-03
 69 X = 0.620000E-02 HX = 0.130000E-03
 70                  HX = 0.130000E-03
  1 Y = 0.000000E+00 HY = 0.100000E-03
  2 Y = 0.100000E-03 HY = 0.100000E-03
  3 Y = 0.200000E-03 HY = 0.100000E-03
  4 Y = 0.300000E-03 HY = 0.100000E-03
  5 Y = 0.400000E-03 HY = 0.100000E-03
  6 Y = 0.409375E-03 HY = 0.937500E-05
  7 Y = 0.418750E-03 HY = 0.937500E-05
  8 Y = 0.428125E-03 HY = 0.937500E-05
  9 Y = 0.437500E-03 HY = 0.937500E-05
 10 Y = 0.443750E-03 HY = 0.625000E-05
 11 Y = 0.450000E-03 HY = 0.625000E-05
 12 Y = 0.454167E-03 HY = 0.416667E-05
 13 Y = 0.458333E-03 HY = 0.416667E-05
 14 Y = 0.462500E-03 HY = 0.416667E-05
 15 Y = 0.465625E-03 HY = 0.312500E-05
 16 Y = 0.468750E-03 HY = 0.312500E-05
 17 Y = 0.471875E-03 HY = 0.312500E-05
 18 Y = 0.475000E-03 HY = 0.312500E-05
 19 Y = 0.500000E-03 HY = 0.250000E-04
 20 Y = 0.550000E-03 HY = 0.500000E-04
 21 Y = 0.553333E-03 HY = 0.333333E-05
 22 Y = 0.556667E-03 HY = 0.333333E-05
 23 Y = 0.560000E-03 HY = 0.333333E-05
 24 Y = 0.570000E-03 HY = 0.100000E-04
 25 Y = 0.573333E-03 HY = 0.333333E-05
 26 Y = 0.576667E-03 HY = 0.333333E-05
 27 Y = 0.580000E-03 HY = 0.333333E-05
 28 Y = 0.582700E-03 HY = 0.270000E-05
 29 Y = 0.584225E-03 HY = 0.152500E-05
 30 Y = 0.585750E-03 HY = 0.152500E-05
 31 Y = 0.587500E-03 HY = 0.175000E-05
 32 Y = 0.588750E-03 HY = 0.125000E-05
 33 Y = 0.590000E-03 HY = 0.125000E-05
 34 Y = 0.591000E-03 HY = 0.100000E-05
 35 Y = 0.592000E-03 HY = 0.100000E-05
 36 Y = 0.593000E-03 HY = 0.100000E-05
 37 Y = 0.594000E-03 HY = 0.100000E-05
 38 Y = 0.595100E-03 HY = 0.110000E-05
 39 Y = 0.595467E-03 HY = 0.366667E-06
 40 Y = 0.595833E-03 HY = 0.366667E-06
 41 Y = 0.596200E-03 HY = 0.366667E-06
 42 Y = 0.596750E-03 HY = 0.550000E-06
 43 Y = 0.597300E-03 HY = 0.550000E-06
 44 Y = 0.597840E-03 HY = 0.540000E-06
 45 Y = 0.598380E-03 HY = 0.540000E-06
 46 Y = 0.598920E-03 HY = 0.540000E-06
 47 Y = 0.599460E-03 HY = 0.540000E-06
 48 Y = 0.600000E-03 HY = 0.540000E-06
 49                  HY = 0.540000E-06
***** ENTER DOPING
***** ENTER DOPNG2
***** ENTER READOP    1
BORON DEPOSITION BASE
KIND=ACTUAL
EXITING FROM READOP
***** ENTER DOPNG3
***** ENTER READOP    2
ARSENIC DEPOSITION EMITTER AND COLLECTOR
KIND=ACTUAL
EXITING FROM READOP
***** ENTER READOP    2
ARSENIC DEPOSITION EMITTER AND COLLECTOR
KIND=ACTUAL
EXITING FROM READOP
***** ENTER BGNSB2

************************************************** NODTYPES **********************************************

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***** ENTER GUESS2
***** ENTER SOLVQ2

      *************************************** ITERATION INFORMATION ***************************************

IT NO.     1  DELMAX= 0.169E+02  XMAX= 0.530E-02  YMAX= 0.597E-03    ENORM= 0.845E+10
IT NO.     2  DELMAX= 0.105E+02  XMAX= 0.530E-02  YMAX= 0.597E-03    ENORM= 0.543E+10
IT NO.     3  DELMAX= 0.543E+01  XMAX= 0.530E-02  YMAX= 0.597E-03    ENORM= 0.344E+10
IT NO.     4  DELMAX= 0.325E+01  XMAX= 0.620E-02  YMAX= 0.595E-03    ENORM= 0.242E+10
IT NO.     5  DELMAX= 0.293E+01  XMAX= 0.530E-02  YMAX= 0.597E-03    ENORM= 0.194E+10
IT NO.     6  DELMAX= 0.221E+01  XMAX= 0.301E-02  YMAX= 0.584E-03    ENORM= 0.149E+10
IT NO.     7  DELMAX= 0.205E+01  XMAX= 0.581E-02  YMAX= 0.584E-03    ENORM= 0.121E+10
IT NO.     8  DELMAX= 0.191E+01  XMAX= 0.581E-02  YMAX= 0.584E-03    ENORM= 0.104E+10
IT NO.     9  DELMAX= 0.160E+01  XMAX= 0.581E-02  YMAX= 0.584E-03    ENORM= 0.930E+09
IT NO.    10  DELMAX= 0.153E+01  XMAX= 0.581E-02  YMAX= 0.583E-03    ENORM= 0.829E+09
IT NO.    11  DELMAX= 0.144E+01  XMAX= 0.581E-02  YMAX= 0.583E-03    ENORM= 0.736E+09
IT NO.    12  DELMAX= 0.135E+01  XMAX= 0.581E-02  YMAX= 0.583E-03    ENORM= 0.661E+09
IT NO.    13  DELMAX= 0.110E+01  XMAX= 0.581E-02  YMAX= 0.583E-03    ENORM= 0.587E+09
IT NO.    14  DELMAX= 0.101E+01  XMAX= 0.581E-02  YMAX= 0.580E-03    ENORM= 0.517E+09
IT NO.    15  DELMAX= 0.944E+00  XMAX= 0.581E-02  YMAX= 0.577E-03    ENORM= 0.462E+09
IT NO.    16  DELMAX= 0.893E+00  XMAX= 0.581E-02  YMAX= 0.573E-03    ENORM= 0.418E+09
IT NO.    17  DELMAX= 0.852E+00  XMAX= 0.581E-02  YMAX= 0.570E-03    ENORM= 0.385E+09
IT NO.    18  DELMAX= 0.721E+00  XMAX= 0.581E-02  YMAX= 0.560E-03    ENORM= 0.358E+09
IT NO.    19  DELMAX= 0.693E+00  XMAX= 0.581E-02  YMAX= 0.557E-03    ENORM= 0.333E+09
IT NO.    20  DELMAX= 0.667E+00  XMAX= 0.581E-02  YMAX= 0.553E-03    ENORM= 0.311E+09
IT NO.    21  DELMAX= 0.639E+00  XMAX= 0.581E-02  YMAX= 0.550E-03    ENORM= 0.290E+09
IT NO.    22  DELMAX= 0.531E+00  XMAX= 0.620E-02  YMAX= 0.550E-03    ENORM= 0.272E+09
IT NO.    23  DELMAX= 0.401E+00  XMAX= 0.379E-02  YMAX= 0.550E-03    ENORM= 0.255E+09
IT NO.    24  DELMAX= 0.289E+00  XMAX= 0.530E-02  YMAX= 0.577E-03    ENORM= 0.241E+09
IT NO.    25  DELMAX= 0.275E+00  XMAX= 0.530E-02  YMAX= 0.577E-03    ENORM= 0.227E+09
IT NO.    26  DELMAX= 0.259E+00  XMAX= 0.530E-02  YMAX= 0.577E-03    ENORM= 0.215E+09
IT NO.    27  DELMAX= 0.245E+00  XMAX= 0.529E-02  YMAX= 0.577E-03    ENORM= 0.204E+09
IT NO.    28  DELMAX= 0.230E+00  XMAX= 0.529E-02  YMAX= 0.577E-03    ENORM= 0.193E+09
IT NO.    29  DELMAX= 0.217E+00  XMAX= 0.530E-02  YMAX= 0.577E-03    ENORM= 0.183E+09
IT NO.    30  DELMAX= 0.205E+00  XMAX= 0.530E-02  YMAX= 0.577E-03    ENORM= 0.174E+09
IT NO.    31  DELMAX= 0.195E+00  XMAX= 0.530E-02  YMAX= 0.573E-03    ENORM= 0.166E+09
IT NO.    32  DELMAX= 0.186E+00  XMAX= 0.530E-02  YMAX= 0.573E-03    ENORM= 0.158E+09
IT NO.    33  DELMAX= 0.178E+00  XMAX= 0.530E-02  YMAX= 0.573E-03    ENORM= 0.151E+09
IT NO.    34  DELMAX= 0.171E+00  XMAX= 0.530E-02  YMAX= 0.573E-03    ENORM= 0.144E+09
IT NO.    35  DELMAX= 0.163E+00  XMAX= 0.530E-02  YMAX= 0.573E-03    ENORM= 0.138E+09
IT NO.    36  DELMAX= 0.156E+00  XMAX= 0.530E-02  YMAX= 0.573E-03    ENORM= 0.132E+09
IT NO.    37  DELMAX= 0.149E+00  XMAX= 0.530E-02  YMAX= 0.573E-03    ENORM= 0.127E+09
IT NO.    38  DELMAX= 0.143E+00  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.122E+09
IT NO.    39  DELMAX= 0.138E+00  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.117E+09
IT NO.    40  DELMAX= 0.132E+00  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.113E+09
IT NO.    41  DELMAX= 0.128E+00  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.109E+09
IT NO.    42  DELMAX= 0.123E+00  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.105E+09
IT NO.    43  DELMAX= 0.118E+00  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.101E+09
IT NO.    44  DELMAX= 0.114E+00  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.975E+08
IT NO.    45  DELMAX= 0.110E+00  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.942E+08
IT NO.    46  DELMAX= 0.106E+00  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.911E+08
IT NO.    47  DELMAX= 0.102E+00  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.882E+08
IT NO.    48  DELMAX= 0.980E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.854E+08
IT NO.    49  DELMAX= 0.944E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.828E+08
IT NO.    50  DELMAX= 0.910E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.803E+08
IT NO.    51  DELMAX= 0.877E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.779E+08
IT NO.    52  DELMAX= 0.845E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.757E+08
IT NO.    53  DELMAX= 0.815E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.735E+08
IT NO.    54  DELMAX= 0.787E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.715E+08
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 IT NO.   55  DELMAX= 0.759E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.696E+08
 IT NO.   56  DELMAX= 0.733E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.677E+08
 IT NO.   57  DELMAX= 0.708E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.660E+08
 IT NO.   58  DELMAX= 0.684E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.643E+08
 IT NO.   59  DELMAX= 0.661E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.627E+08
 IT NO.   60  DELMAX= 0.639E-01  XMAX= 0.530E-02  YMAX= 0.570E-03    ENORM= 0.611E+08
 IT NO.   61  DELMAX= 0.621E-01  XMAX= 0.529E-02  YMAX= 0.560E-03    ENORM= 0.596E+08
 IT NO.   62  DELMAX= 0.608E-01  XMAX= 0.529E-02  YMAX= 0.560E-03    ENORM= 0.582E+08
 IT NO.   63  DELMAX= 0.595E-01  XMAX= 0.529E-02  YMAX= 0.560E-03    ENORM= 0.569E+08
 IT NO.   64  DELMAX= 0.583E-01  XMAX= 0.529E-02  YMAX= 0.560E-03    ENORM= 0.556E+08
 IT NO.   65  DELMAX= 0.571E-01  XMAX= 0.529E-02  YMAX= 0.560E-03    ENORM= 0.543E+08
 IT NO.   66  DELMAX= 0.560E-01  XMAX= 0.529E-02  YMAX= 0.560E-03    ENORM= 0.531E+08
 IT NO.   67  DELMAX= 0.549E-01  XMAX= 0.529E-02  YMAX= 0.560E-03    ENORM= 0.520E+08
 IT NO.   68  DELMAX= 0.538E-01  XMAX= 0.529E-02  YMAX= 0.560E-03    ENORM= 0.509E+08
 IT NO.   69  DELMAX= 0.527E-01  XMAX= 0.529E-02  YMAX= 0.560E-03    ENORM= 0.498E+08
 IT NO.   70  DELMAX= 0.517E-01  XMAX= 0.529E-02  YMAX= 0.560E-03    ENORM= 0.487E+08
 IT NO.   71  DELMAX= 0.506E-01  XMAX= 0.529E-02  YMAX= 0.560E-03    ENORM= 0.477E+08
 IT NO.   72  DELMAX= 0.497E-01  XMAX= 0.529E-02  YMAX= 0.557E-03    ENORM= 0.468E+08
 IT NO.   73  DELMAX= 0.489E-01  XMAX= 0.529E-02  YMAX= 0.557E-03    ENORM= 0.458E+08
 IT NO.   74  DELMAX= 0.481E-01  XMAX= 0.529E-02  YMAX= 0.557E-03    ENORM= 0.449E+08
 IT NO.   75  DELMAX= 0.473E-01  XMAX= 0.529E-02  YMAX= 0.557E-03    ENORM= 0.441E+08
 IT NO.   76  DELMAX= 0.466E-01  XMAX= 0.529E-02  YMAX= 0.557E-03    ENORM= 0.432E+08
 IT NO.   77  DELMAX= 0.458E-01  XMAX= 0.529E-02  YMAX= 0.557E-03    ENORM= 0.424E+08
 IT NO.   78  DELMAX= 0.451E-01  XMAX= 0.529E-02  YMAX= 0.557E-03    ENORM= 0.416E+08
 IT NO.   79  DELMAX= 0.444E-01  XMAX= 0.529E-02  YMAX= 0.553E-03    ENORM= 0.408E+08
 IT NO.   80  DELMAX= 0.438E-01  XMAX= 0.529E-02  YMAX= 0.553E-03    ENORM= 0.401E+08
 IT NO.   81  DELMAX= 0.432E-01  XMAX= 0.529E-02  YMAX= 0.553E-03    ENORM= 0.393E+08
 IT NO.   82  DELMAX= 0.426E-01  XMAX= 0.529E-02  YMAX= 0.553E-03    ENORM= 0.386E+08
 IT NO.   83  DELMAX= 0.421E-01  XMAX= 0.529E-02  YMAX= 0.553E-03    ENORM= 0.379E+08
 IT NO.   84  DELMAX= 0.415E-01  XMAX= 0.529E-02  YMAX= 0.553E-03    ENORM= 0.372E+08
 IT NO.   85  DELMAX= 0.410E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.366E+08
 IT NO.   86  DELMAX= 0.405E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.359E+08
 IT NO.   87  DELMAX= 0.400E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.353E+08
 IT NO.   88  DELMAX= 0.395E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.347E+08
 IT NO.   89  DELMAX= 0.390E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.341E+08
 IT NO.   90  DELMAX= 0.385E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.335E+08
 IT NO.   91  DELMAX= 0.380E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.330E+08
 IT NO.   92  DELMAX= 0.376E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.324E+08
 IT NO.   93  DELMAX= 0.371E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.319E+08
 IT NO.   94  DELMAX= 0.366E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.313E+08
 IT NO.   95  DELMAX= 0.361E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.308E+08
 IT NO.   96  DELMAX= 0.357E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.303E+08
 IT NO.   97  DELMAX= 0.352E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.298E+08
 IT NO.   98  DELMAX= 0.348E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.293E+08
 IT NO.   99  DELMAX= 0.343E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.289E+08
 IT NO.  100  DELMAX= 0.338E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.284E+08
 IT NO.  101  DELMAX= 0.334E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.279E+08
 IT NO.  102  DELMAX= 0.330E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.275E+08
 IT NO.  103  DELMAX= 0.325E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.271E+08
 IT NO.  104  DELMAX= 0.321E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.266E+08
 IT NO.  105  DELMAX= 0.316E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.262E+08
 IT NO.  106  DELMAX= 0.312E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.258E+08
 IT NO.  107  DELMAX= 0.308E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.254E+08
 IT NO.  108  DELMAX= 0.304E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.250E+08
 IT NO.  109  DELMAX= 0.299E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.246E+08
 IT NO.  110  DELMAX= 0.295E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.242E+08
 IT NO.  111  DELMAX= 0.291E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.238E+08
 IT NO.  112  DELMAX= 0.287E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.235E+08
 IT NO.  113  DELMAX= 0.283E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.231E+08
 IT NO.  114  DELMAX= 0.279E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.227E+08
 IT NO.  115  DELMAX= 0.275E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.224E+08
 IT NO.  116  DELMAX= 0.272E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.220E+08
 IT NO.  117  DELMAX= 0.268E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.217E+08
 IT NO.  118  DELMAX= 0.264E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.214E+08
 IT NO.  119  DELMAX= 0.260E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.210E+08
 IT NO.  120  DELMAX= 0.257E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.207E+08
 IT NO.  121  DELMAX= 0.253E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.204E+08
 IT NO.  122  DELMAX= 0.249E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.201E+08
 IT NO.  123  DELMAX= 0.246E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.198E+08
 IT NO.  124  DELMAX= 0.242E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.195E+08
 IT NO.  125  DELMAX= 0.239E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.192E+08
 IT NO.  126  DELMAX= 0.236E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.189E+08
 IT NO.  127  DELMAX= 0.232E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.186E+08
 IT NO.  128  DELMAX= 0.229E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.183E+08
 IT NO.  129  DELMAX= 0.226E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.181E+08
 IT NO.  130  DELMAX= 0.222E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.178E+08
 IT NO.  131  DELMAX= 0.219E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.175E+08
 IT NO.  132  DELMAX= 0.216E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.173E+08
 IT NO.  133  DELMAX= 0.213E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.170E+08
 IT NO.  134  DELMAX= 0.210E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.167E+08
 IT NO.  135  DELMAX= 0.207E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.165E+08
 IT NO.  136  DELMAX= 0.204E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.162E+08
 IT NO.  137  DELMAX= 0.201E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.160E+08
 IT NO.  138  DELMAX= 0.198E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.158E+08
 IT NO.  139  DELMAX= 0.195E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.155E+08
 IT NO.  140  DELMAX= 0.193E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.153E+08
 IT NO.  141  DELMAX= 0.190E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.151E+08
 IT NO.  142  DELMAX= 0.187E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.148E+08
 IT NO.  143  DELMAX= 0.184E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.146E+08
 IT NO.  144  DELMAX= 0.182E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.144E+08
 IT NO.  145  DELMAX= 0.179E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.142E+08
 IT NO.  146  DELMAX= 0.176E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.140E+08
 IT NO.  147  DELMAX= 0.174E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.138E+08
 IT NO.  148  DELMAX= 0.171E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.136E+08
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IT NO.  149  DELMAX= 0.169E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.134E+08
IT NO.  150  DELMAX= 0.167E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.132E+08
IT NO.  151  DELMAX= 0.164E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.130E+08
IT NO.  152  DELMAX= 0.162E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.128E+08
IT NO.  153  DELMAX= 0.159E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.126E+08
IT NO.  154  DELMAX= 0.157E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.124E+08
IT NO.  155  DELMAX= 0.155E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.122E+08
IT NO.  156  DELMAX= 0.153E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.120E+08
IT NO.  157  DELMAX= 0.150E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.119E+08
IT NO.  158  DELMAX= 0.148E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.117E+08
IT NO.  159  DELMAX= 0.146E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.115E+08
IT NO.  160  DELMAX= 0.144E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.113E+08
IT NO.  161  DELMAX= 0.142E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.112E+08
IT NO.  162  DELMAX= 0.140E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.110E+08
IT NO.  163  DELMAX= 0.138E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.109E+08
IT NO.  164  DELMAX= 0.136E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.107E+08
IT NO.  165  DELMAX= 0.134E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.105E+08
IT NO.  166  DELMAX= 0.132E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.104E+08
IT NO.  167  DELMAX= 0.130E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.102E+08
IT NO.  168  DELMAX= 0.128E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.101E+08
IT NO.  169  DELMAX= 0.126E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.993E+07
IT NO.  170  DELMAX= 0.124E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.978E+07
IT NO.  171  DELMAX= 0.123E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.964E+07
IT NO.  172  DELMAX= 0.121E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.950E+07
IT NO.  173  DELMAX= 0.119E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.936E+07
IT NO.  174  DELMAX= 0.117E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.922E+07
IT NO.  175  DELMAX= 0.116E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.909E+07
IT NO.  176  DELMAX= 0.114E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.895E+07
IT NO.  177  DELMAX= 0.112E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.882E+07
IT NO.  178  DELMAX= 0.111E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.869E+07
IT NO.  179  DELMAX= 0.109E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.857E+07
IT NO.  180  DELMAX= 0.107E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.844E+07
IT NO.  181  DELMAX= 0.106E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.832E+07
IT NO.  182  DELMAX= 0.104E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.820E+07
IT NO.  183  DELMAX= 0.103E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.808E+07
IT NO.  184  DELMAX= 0.101E-01  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.796E+07
IT NO.  185  DELMAX= 0.999E-02  XMAX= 0.529E-02  YMAX= 0.550E-03    ENORM= 0.784E+07
*** TIME FOR SOLUTION =      18.02841 SEC
1
************************************************************ NODE TYPES ************************************************************

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1                                          ***  TABLE OF DOPING AND POTENTIAL  ***

                              X=0.0000E+00                   X=0.1758E-02                   X=0.6200E-02
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1	Y=0.0000E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
2	Y=0.1000E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
3	Y=0.2000E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
4	Y=0.3000E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
5	Y=0.4000E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2869E+00
6	Y=0.4094E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2869E+00
7	Y=0.4187E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2868E+00
8	Y=0.4281E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2866E+00
9	Y=0.4375E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2863E+00
10	Y=0.4437E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2859E+00
11	Y=0.4500E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2854E+00
12	Y=0.4542E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2848E+00
13	Y=0.4583E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2841E+00
14	Y=0.4625E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2831E+00
15	Y=0.4656E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2869E+00	DOP=0.8400E+15	PSI=0.2822E+00
16	Y=0.4687E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2869E+00	DOP=0.8400E+15	PSI=0.2811E+00
17	Y=0.4719E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2869E+00	DOP=0.8400E+15	PSI=0.2797E+00
18	Y=0.4750E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2869E+00	DOP=0.8400E+15	PSI=0.2780E+00
19	Y=0.5000E-03	DOP=0.8400E+15	PSI=0.2871E+00	DOP=0.8400E+15	PSI=0.2869E+00	DOP=0.8400E+15	PSI=0.2513E+00
20	Y=0.5500E-03	DOP=0.8400E+15	PSI=0.2886E+00	DOP=0.8400E+15	PSI=0.2868E+00	DOP=0.8400E+15	PSI=0.1741E-01
21	Y=0.5533E-03	DOP=0.8400E+15	PSI=0.2894E+00	DOP=0.8400E+15	PSI=0.2868E+00	DOP=0.8400E+15	PSI=-.9630E-02
22	Y=0.5567E-03	DOP=0.8400E+15	PSI=0.2904E+00	DOP=0.8400E+15	PSI=0.2868E+00	DOP=0.8400E+15	PSI=-.3810E-01
23	Y=0.5600E-03	DOP=0.8400E+15	PSI=0.2916E+00	DOP=0.8400E+15	PSI=0.2867E+00	DOP=0.8400E+15	PSI=-.6801E-01
24	Y=0.5700E-03	DOP=0.8400E+15	PSI=0.2968E+00	DOP=0.8400E+15	PSI=0.2867E+00	DOP=0.8400E+15	PSI=-.1663E+00
25	Y=0.5733E-03	DOP=0.8400E+15	PSI=0.2998E+00	DOP=0.8400E+15	PSI=0.2867E+00	DOP=0.8400E+15	PSI=-.2020E+00
26	Y=0.5767E-03	DOP=0.8400E+15	PSI=0.3038E+00	DOP=0.8400E+15	PSI=0.2867E+00	DOP=0.8400E+15	PSI=-.2391E+00
27	Y=0.5800E-03	DOP=0.8400E+15	PSI=0.3090E+00	DOP=0.8400E+15	PSI=0.2867E+00	DOP=0.8400E+15	PSI=-.2779E+00
28	Y=0.5827E-03	DOP=0.8400E+15	PSI=0.3147E+00	DOP=0.8400E+15	PSI=0.2867E+00	DOP=0.8400E+15	PSI=-.3111E+00
29	Y=0.5842E-03	DOP=0.8400E+15	PSI=0.3187E+00	DOP=0.8400E+15	PSI=0.2867E+00	DOP=0.8400E+15	PSI=-.3314E+00
30	Y=0.5857E-03	DOP=0.8400E+15	PSI=0.3234E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=0.8400E+15	PSI=-.3535E+00
31	Y=0.5875E-03	DOP=0.8400E+15	PSI=0.3300E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=-.1576E+17	PSI=-.3842E+00
32	Y=0.5887E-03	DOP=0.8400E+15	PSI=0.3357E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=-.1625E+18	PSI=-.4119E+00
33	Y=0.5900E-03	DOP=0.8400E+15	PSI=0.3425E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=-.4322E+18	PSI=-.4318E+00
34	Y=0.5910E-03	DOP=0.8400E+15	PSI=0.3490E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=-.5920E+18	PSI=-.4385E+00
35	Y=0.5920E-03	DOP=0.8400E+15	PSI=0.3568E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=-.6709E+18	PSI=-.4376E+00
36	Y=0.5930E-03	DOP=0.8400E+15	PSI=0.3664E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=-.7019E+18	PSI=-.4176E+00
37	Y=0.5940E-03	DOP=0.8400E+15	PSI=0.3786E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=-.6679E+18	PSI=-.3295E+00
38	Y=0.5951E-03	DOP=0.8400E+15	PSI=0.3970E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=-.5709E+18	PSI=-.1158E+00
39	Y=0.5955E-03	DOP=0.8400E+15	PSI=0.4055E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=-.3173E+18	PSI=-.2104E-01
40	Y=0.5958E-03	DOP=0.5314E+17	PSI=0.4156E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=-.1980E+16	PSI=0.8027E-01
41	Y=0.5962E-03	DOP=0.2401E+18	PSI=0.4273E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=0.1927E+18	PSI=0.1816E+00
42	Y=0.5967E-03	DOP=0.7976E+18	PSI=0.4456E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=0.7598E+18	PSI=0.3262E+00
43	Y=0.5973E-03	DOP=0.2293E+19	PSI=0.4635E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=0.2263E+19	PSI=0.4359E+00
44	Y=0.5978E-03	DOP=0.5633E+19	PSI=0.4790E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=0.5609E+19	PSI=0.4765E+00
45	Y=0.5984E-03	DOP=0.1211E+20	PSI=0.4922E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=0.1210E+20	PSI=0.4921E+00
46	Y=0.5989E-03	DOP=0.2360E+20	PSI=0.5034E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=0.2358E+20	PSI=0.5034E+00
47	Y=0.5995E-03	DOP=0.2936E+20	PSI=0.5073E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=0.2934E+20	PSI=0.5073E+00
48	Y=0.6000E-03	DOP=0.3280E+20	PSI=0.5092E+00	DOP=0.8400E+15	PSI=0.2866E+00	DOP=0.3279E+20	PSI=0.5092E+00

1 *** TABLE OF DOPING AND POTENTIAL ***

		Y=0.0000E+00		Y=0.5700E-03		Y=0.6000E-03	
1	X=0.0000E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2968E+00	DOP=0.3280E+20	PSI=0.5092E+00
2	X=0.9750E-04	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2968E+00	DOP=0.3280E+20	PSI=0.5092E+00
3	X=0.1950E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2968E+00	DOP=0.3280E+20	PSI=0.5092E+00
4	X=0.2925E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2968E+00	DOP=0.3280E+20	PSI=0.5092E+00
5	X=0.3900E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2968E+00	DOP=0.3280E+20	PSI=0.5092E+00
6	X=0.4100E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2968E+00	DOP=0.3280E+20	PSI=0.5092E+00
7	X=0.6550E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2968E+00	DOP=0.3280E+20	PSI=0.5092E+00
8	X=0.9000E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2963E+00	DOP=0.3280E+20	PSI=0.5092E+00
9	X=0.9024E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2954E+00	DOP=0.3907E+19	PSI=0.4720E+00
10	X=0.9035E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2949E+00	DOP=0.4822E+18	PSI=0.4326E+00
11	X=0.9046E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2945E+00	DOP=0.8400E+15	PSI=0.3924E+00
12	X=0.9048E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2944E+00	DOP=0.8400E+15	PSI=0.3872E+00
13	X=0.9050E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2943E+00	DOP=0.8400E+15	PSI=0.3823E+00
14	X=0.9070E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2935E+00	DOP=0.8400E+15	PSI=0.3500E+00
15	X=0.9092E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2926E+00	DOP=0.8400E+15	PSI=0.3274E+00
16	X=0.9208E-03	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2877E+00	DOP=0.8400E+15	PSI=0.2891E+00
17	X=0.1260E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
18	X=0.1600E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
19	X=0.1617E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
20	X=0.1625E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
21	X=0.1632E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
22	X=0.1640E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
23	X=0.1647E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
24	X=0.1650E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
25	X=0.1654E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
26	X=0.1658E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
27	X=0.1662E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
28	X=0.1665E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
29	X=0.1669E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
30	X=0.1673E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
31	X=0.1676E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2870E+00
32	X=0.1706E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2869E+00	DOP=0.8400E+15	PSI=0.2869E+00
33	X=0.1735E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2869E+00	DOP=0.8400E+15	PSI=0.2869E+00
34	X=0.1758E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2867E+00	DOP=0.8400E+15	PSI=0.2866E+00
35	X=0.1780E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=0.2858E+00	DOP=0.8400E+15	PSI=0.2855E+00
36	X=0.2170E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=-.1650E+00	DOP=-.9160E+16	PSI=-.3831E+00
37	X=0.2580E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=-.1663E+00	DOP=-.9160E+16	PSI=-.3831E+00
38	X=0.2990E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=-.1663E+00	DOP=-.9160E+16	PSI=-.3831E+00
39	X=0.3010E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=-.1663E+00	DOP=-.9160E+16	PSI=-.3487E+00
40	X=0.3270E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=-.1663E+00	DOP=-.9160E+16	PSI=-.3487E+00
41	X=0.3530E-02	DOP=0.8400E+15	PSI=0.2870E+00	DOP=0.8400E+15	PSI=-.1663E+00	DOP=-.9160E+16	PSI=-.3487E+00

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42 X=0.3790E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1663E+00  DOP=-.9160E+16  PSI=-.3487E+00
43 X=0.3810E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1663E+00  DOP=-.9160E+16  PSI=-.3831E+00
44 X=0.4273E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1663E+00  DOP=-.9160E+16  PSI=-.3831E+00
45 X=0.4737E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1663E+00  DOP=-.9160E+16  PSI=-.3831E+00
46 X=0.5200E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1658E+00  DOP=-.9160E+16  PSI=-.3831E+00
47 X=0.5291E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1515E+00  DOP=-.9160E+16  PSI=-.3792E+00
48 X=0.5291E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1511E+00  DOP=-.9160E+16  PSI=-.3496E+00
49 X=0.5292E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1509E+00  DOP=-.9160E+16  PSI=-.3180E+00
50 X=0.5293E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1506E+00  DOP=-.9160E+16  PSI=-.2731E+00
51 X=0.5293E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1505E+00  DOP=-.9160E+16  PSI=-.2447E+00
52 X=0.5294E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1502E+00  DOP=-.9160E+16  PSI=-.1849E+00
53 X=0.5294E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1500E+00  DOP=-.9160E+16  PSI=-.1139E+00
54 X=0.5295E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1500E+00  DOP=-.9160E+16  PSI=-.6803E-01
55 X=0.5295E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1500E+00  DOP=-.9160E+16  PSI=-.1689E-01
56 X=0.5295E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1501E+00  DOP=-.9160E+16  PSI=0.4025E-01
57 X=0.5296E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1502E+00  DOP=0.3875E+17  PSI=0.1044E+00
58 X=0.5296E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1503E+00  DOP=0.2248E+18  PSI=0.1758E+00
59 X=0.5297E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1505E+00  DOP=0.5460E+18  PSI=0.2519E+00
60 X=0.5297E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1506E+00  DOP=0.8379E+18  PSI=0.2966E+00
61 X=0.5297E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1509E+00  DOP=0.1271E+19  PSI=0.3393E+00
62 X=0.5299E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1520E+00  DOP=0.2499E+20  PSI=0.5045E+00
63 X=0.5320E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1598E+00  DOP=0.3279E+20  PSI=0.5092E+00
64 X=0.5350E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1655E+00  DOP=0.3279E+20  PSI=0.5092E+00
65 X=0.5790E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1663E+00  DOP=0.3279E+20  PSI=0.5092E+00
66 X=0.5810E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1663E+00  DOP=0.3279E+20  PSI=0.5092E+00
67 X=0.5940E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1663E+00  DOP=0.3279E+20  PSI=0.5092E+00
68 X=0.6070E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1663E+00  DOP=0.3279E+20  PSI=0.5092E+00
69 X=0.6200E-02  DOP=0.8400E+15  PSI=0.2870E+00  DOP=0.8400E+15  PSI=-.1663E+00  DOP=0.3279E+20  PSI=0.5092E+00
1                                    ***   TABLE OF COMPUTED POTENTIAL   ***

                                  X-MESH LINE NUMBER     1     X= 0.00000E+00

 1 Y=0.0000E+00  HY=0.1000E-03  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.4766E+03
 2 Y=0.1000E-03  HY=0.1000E-03  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.1738E+05
 3 Y=0.2000E-03  HY=0.1000E-03  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.8961E+06
 4 Y=0.3000E-03  HY=0.1000E-03  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.4627E+08
 5 Y=0.4000E-03  HY=0.1000E-03  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.2388E+10
 6 Y=0.4094E-03  HY=0.9375E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.8686E+10
 7 Y=0.4187E-03  HY=0.9375E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.1877E+11
 8 Y=0.4281E-03  HY=0.9375E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.3705E+11
 9 Y=0.4375E-03  HY=0.9375E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.7149E+11
10 Y=0.4437E-03  HY=0.6250E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.1118E+12
11 Y=0.4500E-03  HY=0.6250E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.1738E+12
12 Y=0.4542E-03  HY=0.4167E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.2338E+12
13 Y=0.4583E-03  HY=0.4167E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.3140E+12
14 Y=0.4625E-03  HY=0.4167E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.4213E+12
15 Y=0.4656E-03  HY=0.3125E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.5256E+12
16 Y=0.4687E-03  HY=0.3125E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.6554E+12
17 Y=0.4719E-03  HY=0.3125E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.8170E+12
18 Y=0.4750E-03  HY=0.3125E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=-.1018E+13
19 Y=0.5000E-03  HY=0.2500E-04  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2871E+00  RHO=-.4415E+13
20 Y=0.5500E-03  HY=0.5000E-04  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2886E+00  RHO=-.5393E+14
21 Y=0.5533E-03  HY=0.3333E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2894E+00  RHO=-.8311E+14
22 Y=0.5567E-03  HY=0.3333E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2904E+00  RHO=-.1185E+15
23 Y=0.5600E-03  HY=0.3333E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2916E+00  RHO=-.1629E+15
24 Y=0.5700E-03  HY=0.1000E-04  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2968E+00  RHO=-.3853E+15
25 Y=0.5733E-03  HY=0.3333E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2998E+00  RHO=-.5379E+15
26 Y=0.5767E-03  HY=0.3333E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3038E+00  RHO=-.7651E+15
27 Y=0.5800E-03  HY=0.3333E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3090E+00  RHO=-.1126E+16
28 Y=0.5827E-03  HY=0.2700E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3147E+00  RHO=-.1607E+16
29 Y=0.5842E-03  HY=0.1525E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3187E+00  RHO=-.2014E+16
30 Y=0.5857E-03  HY=0.1525E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3234E+00  RHO=-.2583E+16
31 Y=0.5875E-03  HY=0.1750E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3300E+00  RHO=-.3565E+16
32 Y=0.5887E-03  HY=0.1250E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3357E+00  RHO=-.4647E+16
33 Y=0.5900E-03  HY=0.1250E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3425E+00  RHO=-.6294E+16
34 Y=0.5910E-03  HY=0.1000E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3490E+00  RHO=-.8338E+16
35 Y=0.5920E-03  HY=0.1000E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3568E+00  RHO=-.1156E+17
36 Y=0.5930E-03  HY=0.1000E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3664E+00  RHO=-.1711E+17
37 Y=0.5940E-03  HY=0.1000E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3786E+00  RHO=-.2789E+17
38 Y=0.5951E-03  HY=0.1100E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.3970E+00  RHO=-.5748E+17
39 Y=0.5955E-03  HY=0.3667E-06  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.4055E+00  RHO=-.8007E+17
40 Y=0.5958E-03  HY=0.3667E-06  DOP=0.5314E+17  PSIG=0.2847E-02  GAMMA=0.5000E+00  PSI=0.4156E+00  RHO=-.7209E+17
41 Y=0.5962E-03  HY=0.3667E-06  DOP=0.2401E+18  PSIG=0.1802E-01  GAMMA=0.5000E+00  PSI=0.4273E+00  RHO=-.2246E+17
42 Y=0.5967E-03  HY=0.5500E-06  DOP=0.7976E+18  PSIG=0.3843E-01  GAMMA=0.5000E+00  PSI=0.4456E+00  RHO=0.9446E+16
43 Y=0.5973E-03  HY=0.5500E-06  DOP=0.2293E+19  PSIG=0.5709E-01  GAMMA=0.5000E+00  PSI=0.4635E+00  RHO=0.4398E+17
44 Y=0.5978E-03  HY=0.5400E-06  DOP=0.5633E+19  PSIG=0.7312E-01  GAMMA=0.5000E+00  PSI=0.4790E+00  RHO=0.5343E+17
45 Y=0.5984E-03  HY=0.5400E-06  DOP=0.1211E+20  PSIG=0.8681E-01  GAMMA=0.5000E+00  PSI=0.4922E+00  RHO=0.4334E+17
46 Y=0.5989E-03  HY=0.5400E-06  DOP=0.2360E+20  PSIG=0.9876E-01  GAMMA=0.5000E+00  PSI=0.5034E+00  RHO=0.1652E+18
47 Y=0.5995E-03  HY=0.5400E-06  DOP=0.2936E+20  PSIG=0.1027E+00  GAMMA=0.5000E+00  PSI=0.5073E+00  RHO=0.4316E+17
48 Y=0.6000E-03  HY=0.5400E-06  DOP=0.3280E+20  PSIG=0.1047E+00  GAMMA=0.5000E+00  PSI=0.5092E+00  RHO=0.8008E+07
1                                    ***   TABLE OF COMPUTED POTENTIAL   ***

                                  X-MESH LINE NUMBER    69     X= 0.62000E-02

 1 Y=0.0000E+00  HY=0.1000E-03  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=0.2026E+06
 2 Y=0.1000E-03  HY=0.1000E-03  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=0.5225E+07
 3 Y=0.2000E-03  HY=0.1000E-03  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=0.2696E+09
 4 Y=0.3000E-03  HY=0.1000E-03  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2870E+00  RHO=0.1392E+11
 5 Y=0.4000E-03  HY=0.1000E-03  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2869E+00  RHO=0.7181E+12
 6 Y=0.4094E-03  HY=0.9375E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2869E+00  RHO=0.2608E+13
 7 Y=0.4187E-03  HY=0.9375E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2868E+00  RHO=0.5624E+13
 8 Y=0.4281E-03  HY=0.9375E-05  DOP=0.8400E+15  PSIG=0.4682E-03  GAMMA=0.5000E+00  PSI=0.2866E+00  RHO=0.1105E+14
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9	Y=0.4375E-03	HY=0.9375E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2863E+00	RHO=0.2116E+14
10	Y=0.4437E-03	HY=0.6250E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2859E+00	RHO=0.3278E+14
11	Y=0.4500E-03	HY=0.6250E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2854E+00	RHO=0.5023E+14
12	Y=0.4542E-03	HY=0.4167E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2848E+00	RHO=0.6665E+14
13	Y=0.4583E-03	HY=0.4167E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2841E+00	RHO=0.8788E+14
14	Y=0.4625E-03	HY=0.4167E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2831E+00	RHO=0.1151E+15
15	Y=0.4656E-03	HY=0.3125E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2822E+00	RHO=0.1403E+15
16	Y=0.4687E-03	HY=0.3125E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2811E+00	RHO=0.1701E+15
17	Y=0.4719E-03	HY=0.3125E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2797E+00	RHO=0.2049E+15
18	Y=0.4750E-03	HY=0.3125E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2780E+00	RHO=0.2449E+15
19	Y=0.5000E-03	HY=0.2500E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2513E+00	RHO=0.6275E+15
20	Y=0.5500E-03	HY=0.5000E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.1741E-01	RHO=0.8400E+15
21	Y=0.5533E-03	HY=0.3333E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=-.9630E-02	RHO=0.8400E+15
22	Y=0.5567E-03	HY=0.3333E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=-.3810E-01	RHO=0.8401E+15
23	Y=0.5600E-03	HY=0.3333E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=-.6801E-01	RHO=0.8402E+15
24	Y=0.5700E-03	HY=0.1000E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=-.1663E+00	RHO=0.8480E+15
25	Y=0.5733E-03	HY=0.3333E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=-.2020E+00	RHO=0.8718E+15
26	Y=0.5767E-03	HY=0.3333E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=-.2391E+00	RHO=0.9729E+15
27	Y=0.5800E-03	HY=0.3333E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=-.2779E+00	RHO=0.1433E+16
28	Y=0.5827E-03	HY=0.2700E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=-.3111E+00	RHO=0.2971E+16
29	Y=0.5842E-03	HY=0.1525E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=-.3314E+00	RHO=0.5488E+16
30	Y=0.5857E-03	HY=0.1525E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=-.3535E+00	RHO=0.1177E+17
31	Y=0.5875E-03	HY=0.1750E-05	DOP=-.1576E+17	PSIG=0.1239E-02	GAMMA=0.5000E+00	PSI=-.3842E+00	RHO=0.2035E+17
32	Y=0.5887E-03	HY=0.1250E-05	DOP=-.1625E+18	PSIG=0.1224E-01	GAMMA=0.5000E+00	PSI=-.4119E+00	RHO=-.3259E+17
33	Y=0.5900E-03	HY=0.1250E-05	DOP=-.4322E+18	PSIG=0.2787E-01	GAMMA=0.5000E+00	PSI=-.4318E+00	RHO=-.5379E+17
34	Y=0.5910E-03	HY=0.1000E-05	DOP=-.5920E+18	PSIG=0.3328E-01	GAMMA=0.5000E+00	PSI=-.4385E+00	RHO=-.4927E+17
35	Y=0.5920E-03	HY=0.1000E-05	DOP=-.6709E+18	PSIG=0.3545E-01	GAMMA=0.5000E+00	PSI=-.4376E+00	RHO=-.1242E+18
36	Y=0.5930E-03	HY=0.1000E-05	DOP=-.7019E+18	PSIG=0.3624E-01	GAMMA=0.5000E+00	PSI=-.4176E+00	RHO=-.4445E+18
37	Y=0.5940E-03	HY=0.1000E-05	DOP=-.6679E+18	PSIG=0.3537E-01	GAMMA=0.5000E+00	PSI=-.3295E+00	RHO=-.6594E+18
38	Y=0.5951E-03	HY=0.1100E-05	DOP=-.5709E+18	PSIG=0.3265E-01	GAMMA=0.5000E+00	PSI=-.1158E+00	RHO=-.5709E+18
39	Y=0.5955E-03	HY=0.3667E-06	DOP=-.3173E+18	PSIG=0.2267E-01	GAMMA=0.5000E+00	PSI=-.2104E-01	RHO=-.3173E+18
40	Y=0.5958E-03	HY=0.3667E-06	DOP=-.1980E+16	PSIG=0.6726E-03	GAMMA=0.5000E+00	PSI=0.8027E-01	RHO=-.1980E+16
41	Y=0.5962E-03	HY=0.3667E-06	DOP=0.1927E+18	PSIG=0.1458E-01	GAMMA=0.5000E+00	PSI=0.1816E+00	RHO=0.1927E+18
42	Y=0.5967E-03	HY=0.5500E-06	DOP=0.7598E+18	PSIG=0.3758E-01	GAMMA=0.5000E+00	PSI=0.3262E+00	RHO=0.7520E+18
43	Y=0.5973E-03	HY=0.5500E-06	DOP=0.2263E+19	PSIG=0.5686E-01	GAMMA=0.5000E+00	PSI=0.4359E+00	RHO=0.1488E+19
44	Y=0.5978E-03	HY=0.5400E-06	DOP=0.5609E+19	PSIG=0.7304E-01	GAMMA=0.5000E+00	PSI=0.4765E+00	RHO=0.5584E+18
45	Y=0.5984E-03	HY=0.5400E-06	DOP=0.1210E+20	PSIG=0.8678E-01	GAMMA=0.5000E+00	PSI=0.4921E+00	RHO=0.9447E+17
46	Y=0.5989E-03	HY=0.5400E-06	DOP=0.2358E+20	PSIG=0.9875E-01	GAMMA=0.5000E+00	PSI=0.5034E+00	RHO=0.1678E+18
47	Y=0.5995E-03	HY=0.5400E-06	DOP=0.2934E+20	PSIG=0.1027E+00	GAMMA=0.5000E+00	PSI=0.5073E+00	RHO=0.4327E+17
48	Y=0.6000E-03	HY=0.5400E-06	DOP=0.3279E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8409E+07

1 *** TABLE OF COMPUTED POTENTIAL ***

Y-MESH LINE NUMBER 1 Y= 0.00000E+00

1	X=0.0000E+00	HX=0.9750E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=-.4766E+03
2	X=0.9750E-04	HX=0.9750E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=-.8248E+03
3	X=0.1950E-03	HX=0.9750E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=-.4766E+03
4	X=0.2925E-03	HX=0.9750E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=-.8248E+03
5	X=0.3900E-03	HX=0.9750E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=-.7332E+03
6	X=0.4100E-03	HX=0.2000E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=-.4766E+03
7	X=0.6550E-03	HX=0.2450E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=-.8248E+03
8	X=0.9000E-03	HX=0.2450E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.3055E+03
9	X=0.9024E-03	HX=0.2400E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1619E+04
10	X=0.9035E-03	HX=0.1112E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2206E+04
11	X=0.9046E-03	HX=0.1112E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2694E+04
12	X=0.9048E-03	HX=0.1875E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2603E+04
13	X=0.9050E-03	HX=0.1875E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2426E+04
14	X=0.9070E-03	HX=0.2000E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1943E+04
15	X=0.9092E-03	HX=0.2250E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1619E+04
16	X=0.9208E-03	HX=0.1155E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=-.9165E+02
17	X=0.1260E-02	HX=0.3396E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=-.9165E+02
18	X=0.1600E-02	HX=0.3396E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2138E+03
19	X=0.1617E-02	HX=0.1750E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.5988E+03
20	X=0.1625E-02	HX=0.7375E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1265E+04
21	X=0.1632E-02	HX=0.7375E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1265E+04
22	X=0.1640E-02	HX=0.7375E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1246E+04
23	X=0.1647E-02	HX=0.7375E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1815E+04
24	X=0.1650E-02	HX=0.3500E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1527E+04
25	X=0.1654E-02	HX=0.3500E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1912E+04
26	X=0.1658E-02	HX=0.4000E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1527E+04
27	X=0.1662E-02	HX=0.4000E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1656E+04
28	X=0.1665E-02	HX=0.3500E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1815E+04
29	X=0.1669E-02	HX=0.3500E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1619E+04
30	X=0.1673E-02	HX=0.3625E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1362E+04
31	X=0.1676E-02	HX=0.3625E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1246E+04
32	X=0.1706E-02	HX=0.2937E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.5988E+03
33	X=0.1735E-02	HX=0.2937E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1246E+04
34	X=0.1758E-02	HX=0.2300E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2206E+04
35	X=0.1780E-02	HX=0.2200E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.3996E+04
36	X=0.2170E-02	HX=0.3900E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1970E+06
37	X=0.2580E-02	HX=0.4100E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2021E+06
38	X=0.2990E-02	HX=0.4100E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2022E+06
39	X=0.3010E-02	HX=0.2000E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2024E+06
40	X=0.3270E-02	HX=0.2600E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2022E+06
41	X=0.3530E-02	HX=0.2600E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2022E+06
42	X=0.3790E-02	HX=0.2600E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2025E+06
43	X=0.3810E-02	HX=0.2000E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2022E+06
44	X=0.4273E-02	HX=0.4633E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2022E+06
45	X=0.4737E-02	HX=0.4633E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2024E+06
46	X=0.5200E-02	HX=0.4633E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1953E+06
47	X=0.5291E-02	HX=0.9100E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1122E+06
48	X=0.5291E-02	HX=0.5000E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1129E+06
49	X=0.5292E-02	HX=0.5000E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1134E+06

50	X=0.5293E-02	HX=0.6400E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1140E+06
51	X=0.5293E-02	HX=0.3600E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1143E+06
52	X=0.5294E-02	HX=0.6700E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1143E+06
53	X=0.5294E-02	HX=0.6660E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1147E+06
54	X=0.5295E-02	HX=0.3711E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1153E+06
55	X=0.5295E-02	HX=0.3711E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1154E+06
56	X=0.5295E-02	HX=0.3711E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1154E+06
57	X=0.5296E-02	HX=0.3711E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1162E+06
58	X=0.5296E-02	HX=0.3711E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1167E+06
59	X=0.5297E-02	HX=0.3711E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1171E+06
60	X=0.5297E-02	HX=0.2187E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1172E+06
61	X=0.5297E-02	HX=0.2187E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1175E+06
62	X=0.5299E-02	HX=0.2000E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1192E+06
63	X=0.5320E-02	HX=0.2100E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1494E+06
64	X=0.5350E-02	HX=0.3000E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1912E+06
65	X=0.5790E-02	HX=0.4400E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2022E+06
66	X=0.5810E-02	HX=0.2000E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2021E+06
67	X=0.5940E-02	HX=0.1300E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2026E+06
68	X=0.6070E-02	HX=0.1300E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2022E+06
69	X=0.6200E-02	HX=0.1300E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2026E+06

1 *** TABLE OF COMPUTED POTENTIAL ***

Y-MESH LINE NUMBER 48 Y= 0.60000E-03

1	X=0.0000E+00	HX=0.9750E-04	DOP=0.3280E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8008E+07
2	X=0.9750E-04	HX=0.9750E-04	DOP=0.3280E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8008E+07
3	X=0.1950E-03	HX=0.9750E-04	DOP=0.3280E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8008E+07
4	X=0.2925E-03	HX=0.9750E-04	DOP=0.3280E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8008E+07
5	X=0.3900E-03	HX=0.9750E-04	DOP=0.3280E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8008E+07
6	X=0.4100E-03	HX=0.2000E-04	DOP=0.3280E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8311E+17
7	X=0.6550E-03	HX=0.2450E-03	DOP=0.3280E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8311E+17
8	X=0.9000E-03	HX=0.2450E-03	DOP=0.3280E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8393E+17
9	X=0.9024E-03	HX=0.2400E-05	DOP=0.3907E+19	PSIG=0.6659E-01	GAMMA=0.5000E+00	PSI=0.4720E+00	RHO=0.1580E+18
10	X=0.9035E-03	HX=0.1112E-05	DOP=0.4822E+18	PSIG=0.2968E-01	GAMMA=0.5000E+00	PSI=0.4326E+00	RHO=0.7763E+17
11	X=0.9046E-03	HX=0.1112E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.3924E+00	RHO=-.4806E+17
12	X=0.9048E-03	HX=0.1875E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.3872E+00	RHO=-.3912E+17
13	X=0.9050E-03	HX=0.1875E-06	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.3823E+00	RHO=-.3229E+17
14	X=0.9070E-03	HX=0.2000E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.3500E+00	RHO=-.8712E+16
15	X=0.9092E-03	HX=0.2250E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.3274E+00	RHO=-.3147E+16
16	X=0.9208E-03	HX=0.1155E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2891E+00	RHO=-.7153E+14
17	X=0.1260E-02	HX=0.3396E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=-.8143E+11
18	X=0.1600E-02	HX=0.3396E-03	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=-.1632E+09
19	X=0.1617E-02	HX=0.1750E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.3135E+09
20	X=0.1625E-02	HX=0.7375E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.6890E+09
21	X=0.1632E-02	HX=0.7375E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1299E+10
22	X=0.1640E-02	HX=0.7375E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2356E+10
23	X=0.1647E-02	HX=0.7375E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.4226E+10
24	X=0.1650E-02	HX=0.3500E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.5638E+10
25	X=0.1654E-02	HX=0.3500E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.7501E+10
26	X=0.1658E-02	HX=0.4000E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1036E+11
27	X=0.1662E-02	HX=0.4000E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1429E+11
28	X=0.1665E-02	HX=0.3500E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.1896E+11
29	X=0.1669E-02	HX=0.3500E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.2513E+11
30	X=0.1673E-02	HX=0.3625E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.3362E+11
31	X=0.1676E-02	HX=0.3625E-05	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2870E+00	RHO=0.4495E+11
32	X=0.1706E-02	HX=0.2937E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2869E+00	RHO=0.2732E+12
33	X=0.1735E-02	HX=0.2937E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2869E+00	RHO=0.1959E+13
34	X=0.1758E-02	HX=0.2300E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2866E+00	RHO=0.1034E+14
35	X=0.1780E-02	HX=0.2200E-04	DOP=0.8400E+15	PSIG=0.4682E-03	GAMMA=0.5000E+00	PSI=0.2855E+00	RHO=0.4724E+14
36	X=0.2170E-02	HX=0.3900E-03	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3831E+00	RHO=0.2536E+17
37	X=0.2580E-02	HX=0.4100E-03	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3831E+00	RHO=0.2538E+17
38	X=0.2990E-02	HX=0.4100E-03	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3831E+00	RHO=0.2536E+17
39	X=0.3010E-02	HX=0.2000E-04	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3487E+00	RHO=-.1536E+04
40	X=0.3270E-02	HX=0.2600E-03	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3487E+00	RHO=-.1536E+04
41	X=0.3530E-02	HX=0.2600E-03	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3487E+00	RHO=-.1536E+04
42	X=0.3790E-02	HX=0.2600E-03	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3487E+00	RHO=-.1536E+04
43	X=0.3810E-02	HX=0.2000E-04	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3831E+00	RHO=0.2536E+17
44	X=0.4273E-02	HX=0.4633E-03	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3831E+00	RHO=0.2538E+17
45	X=0.4737E-02	HX=0.4633E-03	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3831E+00	RHO=0.2538E+17
46	X=0.5200E-02	HX=0.4633E-03	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3831E+00	RHO=0.2538E+17
47	X=0.5291E-02	HX=0.9100E-04	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3792E+00	RHO=0.2056E+17
48	X=0.5291E-02	HX=0.5000E-06	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3496E+00	RHO=0.3211E+15
49	X=0.5292E-02	HX=0.5000E-06	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.3180E+00	RHO=-.6354E+16
50	X=0.5293E-02	HX=0.6400E-06	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.2731E+00	RHO=-.8663E+16
51	X=0.5293E-02	HX=0.3600E-06	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.2447E+00	RHO=-.8993E+16
52	X=0.5294E-02	HX=0.6700E-06	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.1849E+00	RHO=-.9143E+16
53	X=0.5294E-02	HX=0.6660E-06	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.1139E+00	RHO=-.9159E+16
54	X=0.5295E-02	HX=0.3711E-06	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.6803E-01	RHO=-.9160E+16
55	X=0.5295E-02	HX=0.3711E-06	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=-.1689E-01	RHO=-.9160E+16
56	X=0.5295E-02	HX=0.3711E-06	DOP=-.9160E+16	PSIG=0.9882E-03	GAMMA=0.5000E+00	PSI=0.4025E-01	RHO=-.9160E+16
57	X=0.5296E-02	HX=0.3711E-06	DOP=0.3875E+17	PSIG=0.2112E-02	GAMMA=0.5000E+00	PSI=0.1044E+00	RHO=0.3875E+17
58	X=0.5296E-02	HX=0.3711E-06	DOP=0.2248E+18	PSIG=0.1697E-01	GAMMA=0.5000E+00	PSI=0.1758E+00	RHO=0.2248E+18
59	X=0.5297E-02	HX=0.3711E-06	DOP=0.5460E+18	PSIG=0.3183E-01	GAMMA=0.5000E+00	PSI=0.2519E+00	RHO=0.5456E+18
60	X=0.5297E-02	HX=0.2187E-06	DOP=0.8379E+18	PSIG=0.3929E-01	GAMMA=0.5000E+00	PSI=0.2966E+00	RHO=0.8354E+18
61	X=0.5297E-02	HX=0.2187E-06	DOP=0.1271E+19	PSIG=0.4663E-01	GAMMA=0.5000E+00	PSI=0.3393E+00	RHO=0.1256E+19
62	X=0.5299E-02	HX=0.2000E-05	DOP=0.2499E+20	PSIG=0.9979E-01	GAMMA=0.5000E+00	PSI=0.5045E+00	RHO=0.1305E+18
63	X=0.5320E-02	HX=0.2100E-04	DOP=0.3279E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8326E+17
64	X=0.5350E-02	HX=0.3000E-04	DOP=0.3279E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8320E+17
65	X=0.5790E-02	HX=0.4400E-03	DOP=0.3279E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8320E+17
66	X=0.5810E-02	HX=0.2000E-04	DOP=0.3279E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8409E+07
67	X=0.5940E-02	HX=0.1300E-03	DOP=0.3279E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8409E+07
68	X=0.6070E-02	HX=0.1300E-03	DOP=0.3279E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8409E+07
69	X=0.6200E-02	HX=0.1300E-03	DOP=0.3279E+20	PSIG=0.1047E+00	GAMMA=0.5000E+00	PSI=0.5092E+00	RHO=0.8409E+07

```
 ***** ENTER FINDMX
1******************************************************* PROBLEM SUMMARY *******************************************************

     DATE:   09/22/87     TIME:   04.21.46

     VNOR= 0.25950E-01  XNOR= 0.35914E-02  CARNOR= 0.13121E+11  TEMP=      301.150 DEG K
     CURNOR= 0.58530E-06 GRNOR= 0.10173E+16 TIMNOR= 0.12898E-04
     DEVICE WIDTH= 0.62000E+02  DEVICE THICKNESS= 0.60000E+01

      SPREADING RESISTANCE RUN SPLIT AT THE CONTACTS  DIRECT SOLUTION
     SLOTBOOM BANDGAP NARROWING MODEL USED

     BULK DOPING DENSITY =    0.840E+15 PER CM3
     MAXIMUM CHANGE IN POTENTIAL BETWEEN MESH POINTS IN THE X-DIRECTION =      28.07541 (IN UNITS OF KT/Q)
     MAXIMUM CHANGE IN POTENTIAL BETWEEN MESH POINTS IN THE Y-DIRECTION =       9.01315 (IN UNITS OF KT/Q)
        69 NODES IN X-DIRECTION         48 NODES IN Y-DIRECTION
     RELAXATION FACTOR=      1.700
*********************************************************************************************************************************
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```
 ***** ENTER FINDMX
1******************************************************* PROBLEM SUMMARY *******************************************************

     DATE:   09/22/87     TIME:   04.21.46

     VNOR= 0.25950E-01  XNOR= 0.35914E-02  CARNOR= 0.13121E+11  TEMP=      301.150 DEG K
     CURNOR= 0.58530E-06 GRNOR= 0.10173E+16 TIMNOR= 0.12898E-04
     DEVICE WIDTH= 0.62000E+02  DEVICE THICKNESS= 0.60000E+01

      SPREADING RESISTANCE RUN SPLIT AT THE CONTACTS  DIRECT SOLUTION
     SLOTBOOM BANDGAP NARROWING MODEL USED

     BULK DOPING DENSITY =    0.840E+15 PER CM3
     MAXIMUM CHANGE IN POTENTIAL BETWEEN MESH POINTS IN THE X-DIRECTION =      28.07541 (IN UNITS OF KT/Q)
     MAXIMUM CHANGE IN POTENTIAL BETWEEN MESH POINTS IN THE Y-DIRECTION =       9.01315 (IN UNITS OF KT/Q)
        69 NODES IN X-DIRECTION         48 NODES IN Y-DIRECTION
     RELAXATION FACTOR=      1.700
*********************************************************************************************************************************
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          *****  DEVICE PLOT  *********

CCCCC000000000000000000000000000000000BBBB00000000000000000000000EEEE
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 ***** ENTER TAPEQ
#eor
 ***** ENTER READ2D
 ***** ENTER DUMP2D
 XLINE=0.800000E+01 X=0.000000E+00 II= 1 JJ= 1
 XLINE=0.800000E+01 X=0.975000E+00 II= 1 JJ= 2
 XLINE=0.800000E+01 X=0.195000E+01 II= 1 JJ= 3
 XLINE=0.800000E+01 X=0.292500E+01 II= 1 JJ= 4
 XLINE=0.800000E+01 X=0.390000E+01 II= 1 JJ= 5
 XLINE=0.800000E+01 X=0.410000E+01 II= 1 JJ= 6
 XLINE=0.800000E+01 X=0.655000E+01 II= 1 JJ= 7
 XLINE=0.800000E+01 X=0.900000E+01 II= 1 JJ= 8
 XLINE=0.420000E+02 X=0.000000E+00 II= 2 JJ= 1
 XLINE=0.420000E+02 X=0.975000E+00 II= 2 JJ= 2
 XLINE=0.420000E+02 X=0.195000E+01 II= 2 JJ= 3
 XLINE=0.420000E+02 X=0.292500E+01 II= 2 JJ= 4
 XLINE=0.420000E+02 X=0.390000E+01 II= 2 JJ= 5
 XLINE=0.420000E+02 X=0.410000E+01 II= 2 JJ= 6
 XLINE=0.420000E+02 X=0.655000E+01 II= 2 JJ= 7
 XLINE=0.420000E+02 X=0.900000E+01 II= 2 JJ= 8
 XLINE=0.420000E+02 X=0.902400E+01 II= 2 JJ= 9
 XLINE=0.420000E+02 X=0.903512E+01 II= 2 JJ=10
 XLINE=0.420000E+02 X=0.904625E+01 II= 2 JJ=11
 XLINE=0.420000E+02 X=0.904812E+01 II= 2 JJ=12
 XLINE=0.420000E+02 X=0.905000E+01 II= 2 JJ=13
 XLINE=0.420000E+02 X=0.907000E+01 II= 2 JJ=14
 XLINE=0.420000E+02 X=0.909250E+01 II= 2 JJ=15
 XLINE=0.420000E+02 X=0.920800E+01 II= 2 JJ=16
 XLINE=0.420000E+02 X=0.126040E+02 II= 2 JJ=17
 XLINE=0.420000E+02 X=0.160000E+02 II= 2 JJ=18
 XLINE=0.420000E+02 X=0.161750E+02 II= 2 JJ=19
 XLINE=0.420000E+02 X=0.162487E+02 II= 2 JJ=20
 XLINE=0.420000E+02 X=0.163225E+02 II= 2 JJ=21
 XLINE=0.420000E+02 X=0.163962E+02 II= 2 JJ=22
 XLINE=0.420000E+02 X=0.164700E+02 II= 2 JJ=23
 XLINE=0.420000E+02 X=0.165050E+02 II= 2 JJ=24
 XLINE=0.420000E+02 X=0.165400E+02 II= 2 JJ=25
 XLINE=0.420000E+02 X=0.165800E+02 II= 2 JJ=26
 XLINE=0.420000E+02 X=0.166200E+02 II= 2 JJ=27
 XLINE=0.420000E+02 X=0.166550E+02 II= 2 JJ=28
 XLINE=0.420000E+02 X=0.166900E+02 II= 2 JJ=29
 XLINE=0.420000E+02 X=0.167262E+02 II= 2 JJ=30
 XLINE=0.420000E+02 X=0.167625E+02 II= 2 JJ=31
 XLINE=0.420000E+02 X=0.170562E+02 II= 2 JJ=32
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 XLINE=0.420000E+02 X=0.299000E+02 II= 2 JJ=38
 XLINE=0.420000E+02 X=0.301000E+02 II= 2 JJ=39
 XLINE=0.420000E+02 X=0.327000E+02 II= 2 JJ=40
 XLINE=0.420000E+02 X=0.353000E+02 II= 2 JJ=41
 XLINE=0.420000E+02 X=0.379000E+02 II= 2 JJ=42
 XLINE=0.420000E+02 X=0.381000E+02 II= 2 JJ=43
 XLINE=0.420000E+02 X=0.427333E+02 II= 2 JJ=44
 XLINE=0.700000E+02 X=0.000000E+00 II= 3 JJ= 1
 XLINE=0.700000E+02 X=0.975000E+00 II= 3 JJ= 2
 XLINE=0.700000E+02 X=0.195000E+01 II= 3 JJ= 3
 XLINE=0.700000E+02 X=0.292500E+01 II= 3 JJ= 4
 XLINE=0.700000E+02 X=0.390000E+01 II= 3 JJ= 5
 XLINE=0.700000E+02 X=0.410000E+01 II= 3 JJ= 6
 XLINE=0.700000E+02 X=0.655000E+01 II= 3 JJ= 7
 XLINE=0.700000E+02 X=0.900000E+01 II= 3 JJ= 8
 XLINE=0.700000E+02 X=0.902400E+01 II= 3 JJ= 9
 XLINE=0.700000E+02 X=0.903512E+01 II= 3 JJ=10
 XLINE=0.700000E+02 X=0.904625E+01 II= 3 JJ=11
 XLINE=0.700000E+02 X=0.904812E+01 II= 3 JJ=12
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 XLINE=0.700000E+02 X=0.909250E+01 II= 3 JJ=15
 XLINE=0.700000E+02 X=0.920800E+01 II= 3 JJ=16
 XLINE=0.700000E+02 X=0.126040E+02 II= 3 JJ=17
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 XLINE=0.700000E+02 X=0.161750E+02 II= 3 JJ=19
 XLINE=0.700000E+02 X=0.162487E+02 II= 3 JJ=20
 XLINE=0.700000E+02 X=0.163225E+02 II= 3 JJ=21
 XLINE=0.700000E+02 X=0.163962E+02 II= 3 JJ=22
 XLINE=0.700000E+02 X=0.164700E+02 II= 3 JJ=23
 XLINE=0.700000E+02 X=0.165050E+02 II= 3 JJ=24
 XLINE=0.700000E+02 X=0.165400E+02 II= 3 JJ=25
 XLINE=0.700000E+02 X=0.165800E+02 II= 3 JJ=26
 XLINE=0.700000E+02 X=0.166200E+02 II= 3 JJ=27
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 XLINE=0.700000E+02 X=0.166550E+02 II= 3 JJ=28
 XLINE=0.700000E+02 X=0.166900E+02 II= 3 JJ=29
 XLINE=0.700000E+02 X=0.167262E+02 II= 3 JJ=30
 XLINE=0.700000E+02 X=0.167625E+02 II= 3 JJ=31
 XLINE=0.700000E+02 X=0.170562E+02 II= 3 JJ=32
 XLINE=0.700000E+02 X=0.173500E+02 II= 3 JJ=33
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 XLINE=0.700000E+02 X=0.381000E+02 II= 3 JJ=43
 XLINE=0.700000E+02 X=0.427333E+02 II= 3 JJ=44
 XLINE=0.700000E+02 X=0.473667E+02 II= 3 JJ=45
 XLINE=0.700000E+02 X=0.520000E+02 II= 3 JJ=46
 XLINE=0.700000E+02 X=0.529100E+02 II= 3 JJ=47
 XLINE=0.700000E+02 X=0.529150E+02 II= 3 JJ=48
 XLINE=0.700000E+02 X=0.529200E+02 II= 3 JJ=49
 XLINE=0.700000E+02 X=0.529264E+02 II= 3 JJ=50
 XLINE=0.700000E+02 X=0.529300E+02 II= 3 JJ=51
 XLINE=0.700000E+02 X=0.529367E+02 II= 3 JJ=52
 XLINE=0.700000E+02 X=0.529434E+02 II= 3 JJ=53
 XLINE=0.700000E+02 X=0.529471E+02 II= 3 JJ=54
 XLINE=0.700000E+02 X=0.529508E+02 II= 3 JJ=55
 XLINE=0.700000E+02 X=0.529545E+02 II= 3 JJ=56
 XLINE=0.700000E+02 X=0.529582E+02 II= 3 JJ=57
 XLINE=0.700000E+02 X=0.529619E+02 II= 3 JJ=58
 XLINE=0.700000E+02 X=0.529656E+02 II= 3 JJ=59
 XLINE=0.700000E+02 X=0.529678E+02 II= 3 JJ=60
 XLINE=0.700000E+02 X=0.529700E+02 II= 3 JJ=61
 XLINE=0.700000E+02 X=0.529900E+02 II= 3 JJ=62
 XLINE=0.700000E+02 X=0.532000E+02 II= 3 JJ=63
 XLINE=0.700000E+02 X=0.535000E+02 II= 3 JJ=64
 XLINE=0.700000E+02 X=0.579000E+02 II= 3 JJ=65
 XLINE=0.700000E+02 X=0.581000E+02 II= 3 JJ=66
 XLINE=0.700000E+02 X=0.594000E+02 II= 3 JJ=67
 XLINE=0.700000E+02 X=0.607000E+02 II= 3 JJ=68
 XLINE=0.700000E+02 X=0.620000E+02 II= 3 JJ=69
 &PROBLM
 NUM2D = 2223
 POS = 0
 TAPE = T
 ERR = F
 INFO = 5
 IVGSS = 0
 &END

 COMMENT:  SPREADING RESISTANCE RUN SPLIT AT THE CONTACTS  DIRECT SOLUTION
 &NEWTON
 ITMAX = 40
 DELTST = 1.0000000000000E-0004
 GTEST = 9.9999999999999E+0049
 LTEST = 9.9999999999999E+0049
 MTEST = 0.0000000000000
 MTMX = 3
 NDAMP = 1
 KMAX = 5
 REDUCE = 2.0000000000000
 IDVRG = 5
 &END
 &RECOMB
 A0 = 0.0000000000000
 AP = 9.9000000000000E-0032
 AN = 5.0000000000000E-0032
 TAUP = 1.0000000000000E-0006
 TAUN = 1.0000000000000E-0006
 ET = 0.0000000000000
 NC = 7.1000000000000E+0015
 &END
 &GENRAT
 IGEN = 'DARK
 ISHADE = 1
 CONCEN = 0.0000000000000
 WL = 0.7000000000000
 BSR = 0.0000000000000
 XSHAD = 0.0000000000000
 REFL = 0.0000000000000
 &END
 &MOBLTY
 MODEL = 'ARORA-CCS
 &END
 &BC
 QSSTOP = 0.0000000000000
 SPTOP = 0.0000000000000
 SNTOP = 0.0000000000000
 QSSBOT = 0.0000000000000
 SPBOT = 0.0000000000000
 SNBOT = 0.0000000000000
 QSSLEF = 0.0000000000000
 SPLEF = 0.0000000000000
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SNLEF = 0.0000000000000
QSSRIT = 0.0000000000000
SPRIT = 0.0000000000000
SNRIT = 0.0000000000000
ETS = 0.0000000000000
IDEAL = F
SPP = 10000000.000000
SNP = 9900000.0000000
SPN = 0.0000000000000
SNN = 10000000.000000
&END
&TABLES
XLINE = 8.0000000000000 42.000000000000 70.000000000000 -1.0000000000000 -1.0000000000000 -1.0000000000000 -1.0000000000000
-1.0000000000000 -1.0000000000000 -1.0000000000000
YLINE = 0.0000000000000 5.5000000000000 6.0000000000000 -1.0000000000000 -1.0000000000000 -1.0000000000000 -1.0000000000000
-1.0000000000000 -1.0000000000000 -1.0000000000000
VEES = 0.0000000000000 999.00000000000 999.00000000000 999.00000000000 999.00000000000 999.00000000000 999.00000000000 999.00000000000
999.00000000000 999.00000000000 999.00000000000 999.00000000000 999.00000000000 999.00000000000 999.00000000000 999.00000000000
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999.00000000000
&END
1
***** ENTER DUMP2D
&OPTON5
VBE = 0.6600000000000
VCE = 2.6000000000000
DVBE = 0.05000000000000
DVCE = 0.5000000000000
XAI = 22.000000000000
XBI = 52.000000000000
YA = 5.8750000000000
YB = 5.9200000000000
DELJB = 1.0000000000000E-0004
&END
XAI=22.000000000000
XBI=52.000000000000
YA=5.8750000000000
YB=5.9200000000000
NODXAI=36
NODXBI=46
NODYA=31
NODYB=35
1
NXAI=36 NXBI=46 NYA=31 NYB=35

DEFINITION OF BOUNDARIES WHERE CURRENT IS CALCULATED
      ***** INDICATES BOUNDARY

                                           A          B
          SSSSSNNNNN-------------------------P*PPSSSSPPPP*PPPPPPPPPPNNNNNNNNNNSSSS
          NNNNNNNNNN-------------------------P*PPPPPPPPPP*PPPPPPPPPPNNNNNNNNNNNNNN
          NNNNNNNNNN-------------------------P*PPPPPPPPPP*PPPPPPPPPPNNNNNNNNNNNNNN
          NNNNNNNNNN-------------------------P*PPPPPPPPPP*PPPPPPPPPPNNNNNNNNNNNNNN
          NNNNNNNNNN-------------------------P*PPPPPPPPPP*PPPPPPPPPPPNNNNNNNNNNNNN
          NNNNNNNNNN-------------------------P*PPPPPPPPPP*PPPPPPPPPPPPNNNNNNNNNNNN
          NNNNNNNNN--------------------------P*PPPPPPPPPP*PPPPPPPPPPPPPPNNNNNNNNNN
          NNNNNNNN---------------------------P*PPPPPPPPPP*PPPPPPPPPPPPPPNNNNNNNNNN
          NNNNNNNN---------------------------P*PPPPPPPPPP*PPPPPPPPPPPPPPPPPPPPPPPP
          -----------------------------------P*PPPPPPPPPP*PPPPPPPPPPPPPPPPPPPPPPPP
          -----------------------------------P*PPPPPPPPPP*PPPPPPPPPPPPPPPPPPPPPPPP
          -----------------------------------P*PPPPPPPPPP*PPPPPPPPPPPPPPPPPPPPPPPP
          -----------------------------------P*PPPPPPPPPP*PPPPPPPPPPPPPPPPPPPPPPPP
          -----------------------------------P*PPPPPPPPPP*************************
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          -----------------------------------P*PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
          -----------------------------------P*PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
          -----------------------------------P*PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
          -----------------------------------P************************************
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 1INITIAL NORM =0.659E+19   V =  0.0000 VOLTS
    P-LOCAL =0.217E+26   P-GLOBAL =0.167E+20
    N-LOCAL =0.489E+23   N-GLOBAL =0.310E+19
    V-LOCAL =0.613E+03   V-GLOBAL =0.533E-01

 0ITERATION =     1

  GLOBAL NORM(0) =0.236E+14
    P-LOCAL =0.640E+18   P-GLOBAL =0.324E+13
    N-LOCAL =0.179E+19   N-GLOBAL =0.676E+14
    V-LOCAL =0.128E+04   V-GLOBAL =0.233E+00

      MAX CHANGE IN FP =   0.184E-05 KT AT (I,J) = ( 59, 32)
      MAX CHANGE IN FN =   0.245E-06 KT AT (I,J) = ( 54, 29)
      MAX CHANGE IN V  =   0.103E+01 KT AT (I,J) = ( 54, 20)
 0ITERATION =     2

  GLOBAL NORM(0) =0.162E+14
    P-LOCAL =0.818E+20   P-GLOBAL =0.191E+14
    N-LOCAL =0.413E+18   N-GLOBAL =0.296E+14
    V-LOCAL =0.709E+03   V-GLOBAL =0.130E+00

      MAX CHANGE IN FP =   0.172E-05 KT AT (I,J) = ( 61, 19)
      MAX CHANGE IN FN =   0.413E-06 KT AT (I,J) = ( 61, 19)
      MAX CHANGE IN V  =   0.132E+00 KT AT (I,J) = ( 54, 20)
 0ITERATION =     3

  GLOBAL NORM(0) =0.460E+14
    P-LOCAL =0.512E+19   P-GLOBAL =0.105E+15
    N-LOCAL =0.476E+18   N-GLOBAL =0.328E+14
    V-LOCAL =0.492E+03   V-GLOBAL =0.695E-01

      MAX CHANGE IN FP =   0.121E-06 KT AT (I,J) = ( 50, 19)
      MAX CHANGE IN FN =   0.165E-06 KT AT (I,J) = ( 61, 19)
      MAX CHANGE IN V  =   0.821E-04 KT AT (I,J) = ( 47, 19)
  FINAL NORM =0.460E+14
  TIME FOR SOLUTION =       14.6


 1INITIAL NORM =0.168E+26   V =  0.0000 VOLTS
    P-LOCAL =0.512E+19   P-GLOBAL =0.105E+15
    N-LOCAL =0.126E+31   N-GLOBAL =0.505E+26
    V-LOCAL =0.518E+03   V-GLOBAL =0.900E-01

 0ITERATION =     1

  GLOBAL NORM(0) =0.253E+20
    P-LOCAL =0.294E+13   P-GLOBAL =0.145E+08
    N-LOCAL =0.535E+25   N-GLOBAL =0.760E+20
    V-LOCAL =0.515E+06   V-GLOBAL =0.527E+04

      MAX CHANGE IN FP =   0.129E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.365E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.365E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =     2

  GLOBAL NORM(0) =0.172E+20
    P-LOCAL =0.334E+14   P-GLOBAL =0.277E+08
    N-LOCAL =0.362E+25   N-GLOBAL =0.515E+20
    V-LOCAL =0.418E+06   V-GLOBAL =0.546E+04

      MAX CHANGE IN FP =   0.259E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.355E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.355E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =     3

  GLOBAL NORM(0) =0.117E+20
    P-LOCAL =0.203E+14   P-GLOBAL =0.272E+08
    N-LOCAL =0.246E+25   N-GLOBAL =0.350E+20
    V-LOCAL =0.246E+06   V-GLOBAL =0.302E+04

      MAX CHANGE IN FP =   0.268E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.345E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.345E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =     4

  GLOBAL NORM(0) =0.792E+19
    P-LOCAL =0.635E+13   P-GLOBAL =0.174E+08
    N-LOCAL =0.167E+25   N-GLOBAL =0.238E+20
    V-LOCAL =0.452E+06   V-GLOBAL =0.441E+04

      MAX CHANGE IN FP =   0.257E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.352E+01 KT AT (I,J) = ( 43, 34)
      MAX CHANGE IN V  =   0.333E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =     5

  GLOBAL NORM(0) =0.535E+19
    P-LOCAL =0.467E+13   P-GLOBAL =0.129E+08
    N-LOCAL =0.112E+25   N-GLOBAL =0.160E+20
    V-LOCAL =0.910E+06   V-GLOBAL =0.787E+04

      MAX CHANGE IN FP =   0.252E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.320E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.320E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =     6

  GLOBAL NORM(0) =0.357E+19
    P-LOCAL =0.319E+13   P-GLOBAL =0.922E+07
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```
  N-LOCAL =0.749E+24   N-GLOBAL =0.107E+20
  V-LOCAL =0.168E+07   V-GLOBAL =0.132E+05

    MAX CHANGE IN FP =   0.259E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN FN =   0.306E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.306E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     7

 GLOBAL NORM(0) =0.234E+19
  P-LOCAL =0.197E+13   P-GLOBAL =0.614E+07
  N-LOCAL =0.491E+24   N-GLOBAL =0.703E+19
  V-LOCAL =0.252E+07   V-GLOBAL =0.169E+05

    MAX CHANGE IN FP =   0.270E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN FN =   0.291E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.291E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     8

 GLOBAL NORM(0) =0.150E+19
  P-LOCAL =0.100E+13   P-GLOBAL =0.374E+07
  N-LOCAL =0.314E+24   N-GLOBAL =0.450E+19
  V-LOCAL =0.241E+08   V-GLOBAL =0.106E+06

    MAX CHANGE IN FP =   0.269E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN FN =   0.274E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.274E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     9

 GLOBAL NORM(0) =0.930E+18
  P-LOCAL =0.319E+12   P-GLOBAL =0.198E+07
  N-LOCAL =0.195E+24   N-GLOBAL =0.279E+19
  V-LOCAL =0.232E+08   V-GLOBAL =0.117E+06

    MAX CHANGE IN FP =   0.256E+01 KT AT (I,J) = (  1, 46)
    MAX CHANGE IN FN =   0.254E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.254E+01 KT AT (I,J) = (  1, 47)
0ITERATION =    10

 GLOBAL NORM(0) =0.560E+18
  P-LOCAL =0.796E+11   P-GLOBAL =0.105E+07
  N-LOCAL =0.117E+24   N-GLOBAL =0.168E+19
  V-LOCAL =0.117E+09   V-GLOBAL =0.498E+06

    MAX CHANGE IN FP =   0.236E+01 KT AT (I,J) = (  1, 45)
    MAX CHANGE IN FN =   0.232E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.232E+01 KT AT (I,J) = (  1, 47)
0ITERATION =    11

 GLOBAL NORM(0) =0.350E+18
  P-LOCAL =0.521E+11   P-GLOBAL =0.493E+06
  N-LOCAL =0.730E+23   N-GLOBAL =0.105E+19
  V-LOCAL =0.111E+05   V-GLOBAL =0.287E+01

    MAX CHANGE IN FP =   0.212E+01 KT AT (I,J) = (  1, 45)
    MAX CHANGE IN FN =   0.206E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.206E+01 KT AT (I,J) = (  1, 47)
0ITERATION =    12

 GLOBAL NORM(0) =0.356E+18
  P-LOCAL =0.468E+10   P-GLOBAL =0.532E+06
  N-LOCAL =0.747E+23   N-GLOBAL =0.107E+19
  V-LOCAL =0.767E+03   V-GLOBAL =0.194E+00

    MAX CHANGE IN FP =   0.182E+01 KT AT (I,J) = (  1, 45)
    MAX CHANGE IN FN =   0.176E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.176E+01 KT AT (I,J) = (  1, 47)
0ITERATION =    13

 GLOBAL NORM(0) =0.102E+18
  P-LOCAL =0.285E+10   P-GLOBAL =0.466E+06
  N-LOCAL =0.210E+23   N-GLOBAL =0.305E+18
  V-LOCAL =0.187E+04   V-GLOBAL =0.150E+00

    MAX CHANGE IN FP =   0.147E+01 KT AT (I,J) = (  1, 45)
    MAX CHANGE IN FN =   0.139E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.139E+01 KT AT (I,J) = (  1, 47)
0ITERATION =    14

 GLOBAL NORM(0) =0.121E+17
  P-LOCAL =0.229E+10   P-GLOBAL =0.396E+06
  N-LOCAL =0.229E+22   N-GLOBAL =0.364E+17
  V-LOCAL =0.373E+04   V-GLOBAL =0.105E+00

    MAX CHANGE IN FP =   0.125E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN FN =   0.121E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.121E+01 KT AT (I,J) = (  1, 47)
0ITERATION =    15

 GLOBAL NORM(0) =0.128E+16
  P-LOCAL =0.236E+10   P-GLOBAL =0.439E+06
  N-LOCAL =0.210E+21   N-GLOBAL =0.383E+16
  V-LOCAL =0.847E+03   V-GLOBAL =0.569E-01

    MAX CHANGE IN FP =   0.117E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN FN =   0.106E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.106E+01 KT AT (I,J) = (  1, 47)
0ITERATION =    16

 GLOBAL NORM(0) =0.345E+13
  P-LOCAL =0.433E+10   P-GLOBAL =0.461E+06
  N-LOCAL =0.435E+18   N-GLOBAL =0.103E+14
  V-LOCAL =0.428E+04   V-GLOBAL =0.893E-01

    MAX CHANGE IN FP =   0.105E+01 KT AT (I,J) = (  1, 47)
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     MAX CHANGE IN FN =    0.279E+00 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =    0.280E+00 KT AT (I,J) = (  1, 47)
0ITERATION =     17

 GLOBAL NORM(0) =0.718E+11
   P-LOCAL =0.302E+10    P-GLOBAL =0.449E+06
   N-LOCAL =0.126E+16    N-GLOBAL =0.215E+12
   V-LOCAL =0.124E+04    V-GLOBAL =0.152E+00

     MAX CHANGE IN FP =    0.971E+00 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =    0.227E-01 KT AT (I,J) = (  1, 29)
     MAX CHANGE IN V  =    0.123E-01 KT AT (I,J) = (  1, 28)
0ITERATION =     18

 GLOBAL NORM(0) =0.776E+11
   P-LOCAL =0.398E+10    P-GLOBAL =0.547E+06
   N-LOCAL =0.125E+16    N-GLOBAL =0.233E+12
   V-LOCAL =0.110E+04    V-GLOBAL =0.729E-01

     MAX CHANGE IN FP =    0.922E+00 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =    0.525E-04 KT AT (I,J) = (  1, 29)
     MAX CHANGE IN V  =    0.639E-05 KT AT (I,J) = (  1, 32)
0ITERATION =     19

 GLOBAL NORM(0) =0.760E+11
   P-LOCAL =0.208E+10    P-GLOBAL =0.440E+06
   N-LOCAL =0.126E+16    N-GLOBAL =0.228E+12
   V-LOCAL =0.204E+04    V-GLOBAL =0.609E-01

     MAX CHANGE IN FP =    0.804E+00 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =    0.173E-08 KT AT (I,J) = (  1, 29)
     MAX CHANGE IN V  =    0.396E-10 KT AT (I,J) = ( 58,  4)
0ITERATION =     20

 GLOBAL NORM(0) =0.757E+11
   P-LOCAL =0.351E+10    P-GLOBAL =0.455E+06
   N-LOCAL =0.126E+16    N-GLOBAL =0.227E+12
   V-LOCAL =0.110E+04    V-GLOBAL =0.116E+00

     MAX CHANGE IN FP =    0.563E+00 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =    0.135E-10 KT AT (I,J) = (  1, 45)
     MAX CHANGE IN V  =    0.295E-10 KT AT (I,J) = ( 59,  3)
0ITERATION =     21

 GLOBAL NORM(0) =0.760E+11
   P-LOCAL =0.324E+10    P-GLOBAL =0.497E+06
   N-LOCAL =0.125E+16    N-GLOBAL =0.228E+12
   V-LOCAL =0.546E+04    V-GLOBAL =0.111E+00

     MAX CHANGE IN FP =    0.232E+00 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =    0.769E-11 KT AT (I,J) = ( 61, 26)
     MAX CHANGE IN V  =    0.386E-10 KT AT (I,J) = ( 17, 48)
0ITERATION =     22

 GLOBAL NORM(0) =0.697E+11
   P-LOCAL =0.212E+10    P-GLOBAL =0.436E+06
   N-LOCAL =0.126E+16    N-GLOBAL =0.209E+12
   V-LOCAL =0.936E+04    V-GLOBAL =0.239E+00

     MAX CHANGE IN FP =    0.316E-01 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =    0.622E-11 KT AT (I,J) = (  1, 24)
     MAX CHANGE IN V  =    0.363E-10 KT AT (I,J) = ( 35, 48)
0ITERATION =     23

 GLOBAL NORM(0) =0.780E+11
   P-LOCAL =0.165E+10    P-GLOBAL =0.389E+06
   N-LOCAL =0.125E+16    N-GLOBAL =0.234E+12
   V-LOCAL =0.263E+04    V-GLOBAL =0.952E-01

     MAX CHANGE IN FP =    0.509E-03 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =    0.890E-11 KT AT (I,J) = (  1, 24)
     MAX CHANGE IN V  =    0.404E-10 KT AT (I,J) = ( 33, 48)
0ITERATION =     24

 GLOBAL NORM(0) =0.749E+11
   P-LOCAL =0.370E+10    P-GLOBAL =0.638E+06
   N-LOCAL =0.126E+16    N-GLOBAL =0.225E+12
   V-LOCAL =0.173E+04    V-GLOBAL =0.130E+00

     MAX CHANGE IN FP =    0.130E-06 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =    0.519E-11 KT AT (I,J) = (  1, 26)
     MAX CHANGE IN V  =    0.261E-10 KT AT (I,J) = ( 35, 47)
 FINAL NORM =0.749E+11
 TIME FOR SOLUTION =       129.6


 JB= -0.2046023E-09   JC=  0.7073797E+00   JE= -0.6741427E-10
 VCE=0.5000000000000 VOLTS

 JE=  0.4385538E-12
 JC= -0.2033284E-09
 JB= -0.2028898E-09

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.19123E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.49625E+00 (IN VOLTS)
     AT NODE:     36   20      X= 0.217E-02  Y= 0.550E-03

  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = -.326926E-07
 RSSUM = -.695799E-41     0.0000
 RSSUMB = -.322691E-43     0.0000
 RSSUMT = -.570271E-44     0.0000
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 RSSUML = -.305020E-44    0.0000
 RSSUMR = -.691697E-41    0.0000
 RBSUM = -.326925E-07    99.9031
 RASUM = -.627941E-13     0.0002
 RDSUM = -.455537E-13     0.0001
 JMBSUM = 0.000000E+00    0.0000
 JMTSUM = -.315866E-10    0.0965
 JMLSUM = -.380155E-17    0.0000
 JMRSUM = -.601987E-26    0.0000
 JTOT = -.327242E-07  JREC = -.327242E-07
 ***** ENTER DUMP2D
1INITIAL NORM =0.188E+18   V =  0.0000 VOLTS
   P-LOCAL =0.370E+10   P-GLOBAL =0.638E+06
   N-LOCAL =0.143E+23   N-GLOBAL =0.563E+18
   V-LOCAL =0.173E+04   V-GLOBAL =0.151E+00

0ITERATION =     1

 GLOBAL NORM(0) =0.165E+18
   P-LOCAL =0.898E+13   P-GLOBAL =0.247E+08
   N-LOCAL =0.130E+23   N-GLOBAL =0.496E+18
   V-LOCAL =0.171E+06   V-GLOBAL =0.393E+04

     MAX CHANGE IN FP =   0.365E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.365E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.365E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     2

 GLOBAL NORM(0) =0.144E+18
   P-LOCAL =0.771E+13   P-GLOBAL =0.198E+08
   N-LOCAL =0.117E+23   N-GLOBAL =0.432E+18
   V-LOCAL =0.244E+06   V-GLOBAL =0.606E+04

     MAX CHANGE IN FP =   0.355E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.355E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.355E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     3

 GLOBAL NORM(0) =0.123E+18
   P-LOCAL =0.606E+13   P-GLOBAL =0.153E+08
   N-LOCAL =0.104E+23   N-GLOBAL =0.370E+18
   V-LOCAL =0.424E+06   V-GLOBAL =0.904E+04

     MAX CHANGE IN FP =   0.345E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.345E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.345E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     4

 GLOBAL NORM(0) =0.104E+18
   P-LOCAL =0.452E+13   P-GLOBAL =0.117E+08
   N-LOCAL =0.915E+22   N-GLOBAL =0.313E+18
   V-LOCAL =0.665E+06   V-GLOBAL =0.119E+05

     MAX CHANGE IN FP =   0.333E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.333E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.333E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     5

 GLOBAL NORM(0) =0.862E+17
   P-LOCAL =0.319E+13   P-GLOBAL =0.866E+07
   N-LOCAL =0.796E+22   N-GLOBAL =0.259E+18
   V-LOCAL =0.101E+07   V-GLOBAL =0.172E+05

     MAX CHANGE IN FP =   0.320E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.320E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.320E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     6

 GLOBAL NORM(0) =0.699E+17
   P-LOCAL =0.212E+13   P-GLOBAL =0.622E+07
   N-LOCAL =0.683E+22   N-GLOBAL =0.210E+18
   V-LOCAL =0.163E+07   V-GLOBAL =0.235E+05

     MAX CHANGE IN FP =   0.306E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.306E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.306E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     7

 GLOBAL NORM(0) =0.554E+17
   P-LOCAL =0.117E+13   P-GLOBAL =0.408E+07
   N-LOCAL =0.575E+22   N-GLOBAL =0.166E+18
   V-LOCAL =0.268E+07   V-GLOBAL =0.310E+05

     MAX CHANGE IN FP =   0.291E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.291E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.291E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     8

 GLOBAL NORM(0) =0.423E+17
   P-LOCAL =0.466E+12   P-GLOBAL =0.258E+07
   N-LOCAL =0.473E+22   N-GLOBAL =0.127E+18
   V-LOCAL =0.136E+08   V-GLOBAL =0.699E+05

     MAX CHANGE IN FP =   0.274E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.274E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.274E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     9

 GLOBAL NORM(0) =0.303E+17
   P-LOCAL =0.260E+12   P-GLOBAL =0.164E+07
   N-LOCAL =0.379E+22   N-GLOBAL =0.909E+17
   V-LOCAL =0.115E+08   V-GLOBAL =0.938E+05
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      MAX CHANGE IN FP =   0.254E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.254E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.254E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    10

  GLOBAL NORM(0) =0.212E+17
    P-LOCAL =0.669E+11   P-GLOBAL =0.802E+06
    N-LOCAL =0.292E+22   N-GLOBAL =0.637E+17
    V-LOCAL =0.983E+08   V-GLOBAL =0.471E+06

      MAX CHANGE IN FP =   0.232E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.232E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.232E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    11

  GLOBAL NORM(0) =0.157E+17
    P-LOCAL =0.394E+11   P-GLOBAL =0.578E+06
    N-LOCAL =0.216E+22   N-GLOBAL =0.470E+17
    V-LOCAL =0.209E+04   V-GLOBAL =0.828E+00

      MAX CHANGE IN FP =   0.206E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.206E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.206E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    12

  GLOBAL NORM(0) =0.109E+17
    P-LOCAL =0.249E+10   P-GLOBAL =0.499E+06
    N-LOCAL =0.150E+22   N-GLOBAL =0.327E+17
    V-LOCAL =0.209E+04   V-GLOBAL =0.781E-01

      MAX CHANGE IN FP =   0.176E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.176E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.176E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    13

  GLOBAL NORM(0) =0.712E+16
    P-LOCAL =0.270E+10   P-GLOBAL =0.337E+06
    N-LOCAL =0.981E+21   N-GLOBAL =0.214E+17
    V-LOCAL =0.158E+04   V-GLOBAL =0.189E+00

      MAX CHANGE IN FP =   0.139E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.139E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.139E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    14

  GLOBAL NORM(0) =0.379E+16
    P-LOCAL =0.211E+10   P-GLOBAL =0.356E+06
    N-LOCAL =0.520E+21   N-GLOBAL =0.114E+17
    V-LOCAL =0.170E+04   V-GLOBAL =0.533E-01

      MAX CHANGE IN FP =   0.121E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.121E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.121E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    15

  GLOBAL NORM(0) =0.800E+15
    P-LOCAL =0.233E+10   P-GLOBAL =0.482E+06
    N-LOCAL =0.109E+21   N-GLOBAL =0.240E+16
    V-LOCAL =0.143E+05   V-GLOBAL =0.244E+00

      MAX CHANGE IN FP =   0.106E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.106E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.106E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    16

  GLOBAL NORM(0) =0.336E+13
    P-LOCAL =0.179E+10   P-GLOBAL =0.246E+06
    N-LOCAL =0.352E+18   N-GLOBAL =0.101E+14
    V-LOCAL =0.826E+04   V-GLOBAL =0.834E+00

      MAX CHANGE IN FP =   0.272E+00 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =   0.278E+00 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =   0.279E+00 KT AT (I,J) = (  1, 47)
 0ITERATION =    17

  GLOBAL NORM(0) =0.810E+11
    P-LOCAL =0.386E+10   P-GLOBAL =0.579E+06
    N-LOCAL =0.772E+15   N-GLOBAL =0.243E+12
    V-LOCAL =0.526E+04   V-GLOBAL =0.166E+00

      MAX CHANGE IN FP =   0.149E-01 KT AT (I,J) = (  1, 48)
      MAX CHANGE IN FN =   0.164E-01 KT AT (I,J) = (  1, 32)
      MAX CHANGE IN V  =   0.731E-02 KT AT (I,J) = (  1, 31)
 0ITERATION =    18

  GLOBAL NORM(0) =0.668E+11
    P-LOCAL =0.353E+10   P-GLOBAL =0.514E+06
    N-LOCAL =0.876E+15   N-GLOBAL =0.200E+12
    V-LOCAL =0.965E+04   V-GLOBAL =0.310E+00

      MAX CHANGE IN FP =   0.106E-03 KT AT (I,J) = (  1, 48)
      MAX CHANGE IN FN =   0.416E-04 KT AT (I,J) = (  1, 32)
      MAX CHANGE IN V  =   0.187E-05 KT AT (I,J) = (  1, 35)
 0ITERATION =    19

  GLOBAL NORM(0) =0.751E+11
    P-LOCAL =0.521E+10   P-GLOBAL =0.456E+06
    N-LOCAL =0.773E+15   N-GLOBAL =0.225E+12
    V-LOCAL =0.108E+04   V-GLOBAL =0.390E-01

      MAX CHANGE IN FP =   0.561E-08 KT AT (I,J) = (  1, 48)
      MAX CHANGE IN FN =   0.941E-09 KT AT (I,J) = (  1, 32)
      MAX CHANGE IN V  =   0.998E-10 KT AT (I,J) = ( 56,  3)
  FINAL NORM =0.751E+11
```

```
 TIME FOR SOLUTION =       103.6


 JB= -0.4025066E-09   JC=  0.1416554E+01   JE= -0.6737368E-10
 VCE=1.0000000000000 VOLTS

 JE=  0.4443518E-12
 JC= -0.3990638E-09
 JB= -0.3986195E-09
 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.25024E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.64937E+00 (IN VOLTS)
     AT NODE:      36    20      X= 0.217E-02  Y= 0.550E-03
  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = -.642617E-07
 RSSUM = -.136418E-40     0.0000
 RSSUMB = -.324809E-43     0.0000
 RSSUMT = -.576734E-44     0.0000
 RSSUML = -.310840E-44     0.0000
 RSSUMR = -.136004E-40     0.0000
 RBSUM = -.642616E-07    99.9504
 RASUM = -.636221E-13     0.0001
 RDSUM = -.434126E-13     0.0001
 JMBSUM = 0.000000E+00     0.0000
 JMTSUM = -.317859E-10     0.0494
 JMLSUM = -.737607E-17     0.0000
 JMRSUM = -.120841E-25     0.0000
 JTOT = -.642935E-07  JREC = -.642935E-07
 ***** ENTER DUMP2D
1INITIAL NORM =0.194E+18   V =  0.0000 VOLTS
   P-LOCAL =0.521E+10   P-GLOBAL =0.456E+06
   N-LOCAL =0.143E+23   N-GLOBAL =0.581E+18
   V-LOCAL =0.108E+04   V-GLOBAL =0.598E-01

0ITERATION =      1

 GLOBAL NORM(0) =0.170E+18
   P-LOCAL =0.781E+13   P-GLOBAL =0.207E+08
   N-LOCAL =0.130E+23   N-GLOBAL =0.511E+18
   V-LOCAL =0.442E+06   V-GLOBAL =0.429E+04

     MAX CHANGE IN FP =   0.365E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.365E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.365E+01 KT AT (I,J) = (  1, 47)
0ITERATION =      2

 GLOBAL NORM(0) =0.148E+18
   P-LOCAL =0.628E+13   P-GLOBAL =0.140E+08
   N-LOCAL =0.117E+23   N-GLOBAL =0.444E+18
   V-LOCAL =0.817E+06   V-GLOBAL =0.963E+04

     MAX CHANGE IN FP =   0.355E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.355E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.355E+01 KT AT (I,J) = (  1, 47)
0ITERATION =      3

 GLOBAL NORM(0) =0.127E+18
   P-LOCAL =0.484E+13   P-GLOBAL =0.107E+08
   N-LOCAL =0.104E+23   N-GLOBAL =0.381E+18
   V-LOCAL =0.123E+07   V-GLOBAL =0.152E+05

     MAX CHANGE IN FP =   0.345E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.345E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.345E+01 KT AT (I,J) = (  1, 47)
0ITERATION =      4

 GLOBAL NORM(0) =0.107E+18
   P-LOCAL =0.352E+13   P-GLOBAL =0.783E+07
   N-LOCAL =0.917E+22   N-GLOBAL =0.321E+18
   V-LOCAL =0.206E+07   V-GLOBAL =0.298E+05

     MAX CHANGE IN FP =   0.333E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.333E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.333E+01 KT AT (I,J) = (  1, 47)
0ITERATION =      5

 GLOBAL NORM(0) =0.884E+17
   P-LOCAL =0.244E+13   P-GLOBAL =0.578E+07
   N-LOCAL =0.798E+22   N-GLOBAL =0.265E+18
   V-LOCAL =0.147E+08   V-GLOBAL =0.871E+05

     MAX CHANGE IN FP =   0.320E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.320E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.320E+01 KT AT (I,J) = (  1, 47)
0ITERATION =      6

 GLOBAL NORM(0) =0.714E+17
   P-LOCAL =0.151E+13   P-GLOBAL =0.414E+07
   N-LOCAL =0.684E+22   N-GLOBAL =0.214E+18
   V-LOCAL =0.319E+07   V-GLOBAL =0.442E+05

     MAX CHANGE IN FP =   0.306E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.306E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.306E+01 KT AT (I,J) = (  1, 47)
0ITERATION =      7

 GLOBAL NORM(0) =0.564E+17
   P-LOCAL =0.716E+12   P-GLOBAL =0.279E+07
   N-LOCAL =0.576E+22   N-GLOBAL =0.169E+18
   V-LOCAL =0.237E+08   V-GLOBAL =0.181E+06
```

```
      MAX CHANGE IN FP =    0.291E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =    0.291E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =    0.291E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =     8

 GLOBAL NORM(0) =0.430E+17
    P-LOCAL =0.385E+12   P-GLOBAL =0.170E+07
    N-LOCAL =0.474E+22   N-GLOBAL =0.129E+18
    V-LOCAL =0.413E+08   V-GLOBAL =0.369E+06

      MAX CHANGE IN FP =    0.274E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =    0.274E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =    0.274E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =     9

 GLOBAL NORM(0) =0.306E+17
    P-LOCAL =0.213E+12   P-GLOBAL =0.128E+07
    N-LOCAL =0.379E+22   N-GLOBAL =0.917E+17
    V-LOCAL =0.690E+07   V-GLOBAL =0.949E+05

      MAX CHANGE IN FP =    0.254E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =    0.254E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =    0.254E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    10

 GLOBAL NORM(0) =0.213E+17
    P-LOCAL =0.653E+11   P-GLOBAL =0.890E+06
    N-LOCAL =0.293E+22   N-GLOBAL =0.638E+17
    V-LOCAL =0.393E+09   V-GLOBAL =0.152E+07

      MAX CHANGE IN FP =    0.232E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =    0.232E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =    0.232E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    11

 GLOBAL NORM(0) =0.157E+17
    P-LOCAL =0.219E+11   P-GLOBAL =0.458E+06
    N-LOCAL =0.216E+22   N-GLOBAL =0.471E+17
    V-LOCAL =0.832E+03   V-GLOBAL =0.254E+00

      MAX CHANGE IN FP =    0.206E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =    0.206E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =    0.206E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    12

 GLOBAL NORM(0) =0.109E+17
    P-LOCAL =0.343E+10   P-GLOBAL =0.416E+06
    N-LOCAL =0.151E+22   N-GLOBAL =0.328E+17
    V-LOCAL =0.605E+03   V-GLOBAL =0.561E-01

      MAX CHANGE IN FP =    0.176E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =    0.176E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =    0.176E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    13

 GLOBAL NORM(0) =0.713E+16
    P-LOCAL =0.396E+10   P-GLOBAL =0.396E+06
    N-LOCAL =0.982E+21   N-GLOBAL =0.214E+17
    V-LOCAL =0.948E+03   V-GLOBAL =0.516E-01

      MAX CHANGE IN FP =    0.139E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =    0.139E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =    0.139E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    14

 GLOBAL NORM(0) =0.379E+16
    P-LOCAL =0.228E+10   P-GLOBAL =0.468E+06
    N-LOCAL =0.521E+21   N-GLOBAL =0.114E+17
    V-LOCAL =0.529E+04   V-GLOBAL =0.207E+00

      MAX CHANGE IN FP =    0.121E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =    0.121E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =    0.121E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    15

 GLOBAL NORM(0) =0.798E+15
    P-LOCAL =0.296E+10   P-GLOBAL =0.510E+06
    N-LOCAL =0.109E+21   N-GLOBAL =0.239E+16
    V-LOCAL =0.133E+05   V-GLOBAL =0.189E+00

      MAX CHANGE IN FP =    0.106E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =    0.106E+01 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =    0.106E+01 KT AT (I,J) = (  1, 47)
 0ITERATION =    16

 GLOBAL NORM(0) =0.355E+13
    P-LOCAL =0.359E+10   P-GLOBAL =0.483E+06
    N-LOCAL =0.357E+18   N-GLOBAL =0.106E+14
    V-LOCAL =0.102E+04   V-GLOBAL =0.161E+00

      MAX CHANGE IN FP =    0.272E+00 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN FN =    0.278E+00 KT AT (I,J) = (  1, 47)
      MAX CHANGE IN V  =    0.279E+00 KT AT (I,J) = (  1, 47)
 0ITERATION =    17

 GLOBAL NORM(0) =0.439E+11
    P-LOCAL =0.374E+10   P-GLOBAL =0.528E+06
    N-LOCAL =0.764E+15   N-GLOBAL =0.132E+12
    V-LOCAL =0.376E+03   V-GLOBAL =0.363E-01

      MAX CHANGE IN FP =    0.144E-01 KT AT (I,J) = (  1, 48)
      MAX CHANGE IN FN =    0.112E-01 KT AT (I,J) = (  1, 34)
      MAX CHANGE IN V  =    0.474E-02 KT AT (I,J) = (  1, 33)
 0ITERATION =    18
```

```
GLOBAL NORM(0) =0.419E+11
  P-LOCAL =0.327E+10   P-GLOBAL =0.483E+06
  N-LOCAL =0.530E+15   N-GLOBAL =0.126E+12
  V-LOCAL =0.259E+04   V-GLOBAL =0.932E-01

    MAX CHANGE IN FP =   0.980E-04 KT AT (I,J) = (  1, 48)
    MAX CHANGE IN FN =   0.220E-04 KT AT (I,J) = (  1, 34)
    MAX CHANGE IN V  =   0.589E-06 KT AT (I,J) = (  1, 36)
FINAL NORM =0.419E+11
TIME FOR SOLUTION =       98.3


JB= -0.5277697E-09   JC=  0.2127560E+01   JE=  0.3303515E-09
VCE=1.5000000000000 VOLTS

JE=  0.4494936E-12
JC= -0.5230792E-09
JB= -0.5226297E-09

MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.26509E+02 (IN UNITS OF KB*T/Q)
    MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.68791E+00 (IN VOLTS)
    AT NODE:     36   21     X= 0.217E-02  Y= 0.553E-03

 REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

 RGSUM = -.842631E-07
RSSUM = -.178950E-40     0.0000
RSSUMB = -.326135E-43     0.0000
RSSUMT = -.583183E-44     0.0000
RSSUML = -.311703E-44     0.0000
RSSUMR = -.178534E-40     0.0000
RBSUM = -.842630E-07    99.9620
RASUM = -.645313E-13     0.0001
RDSUM = -.410458E-13     0.0000
JMBSUM = 0.000000E+00     0.0000
JMTSUM = -.319604E-10     0.0379
JMLSUM = -.107518E-16     0.0000
JMRSUM = -.161294E-25     0.0000
JTOT = -.842951E-07  JREC = -.842951E-07
***** ENTER DUMP2D
1INITIAL NORM =0.201E+18   V =  0.0000 VOLTS
  P-LOCAL =0.327E+10   P-GLOBAL =0.483E+06
  N-LOCAL =0.144E+23   N-GLOBAL =0.603E+18
  V-LOCAL =0.259E+04   V-GLOBAL =0.114E+00

0ITERATION =     1

 GLOBAL NORM(0) =0.177E+18
  P-LOCAL =0.693E+13   P-GLOBAL =0.165E+08
  N-LOCAL =0.130E+23   N-GLOBAL =0.531E+18
  V-LOCAL =0.123E+06   V-GLOBAL =0.219E+04

    MAX CHANGE IN FP =   0.365E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN FN =   0.365E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.365E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     2

 GLOBAL NORM(0) =0.154E+18
  P-LOCAL =0.463E+13   P-GLOBAL =0.125E+08
  N-LOCAL =0.117E+23   N-GLOBAL =0.461E+18
  V-LOCAL =0.348E+06   V-GLOBAL =0.462E+04

    MAX CHANGE IN FP =   0.355E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN FN =   0.355E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.355E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     3

 GLOBAL NORM(0) =0.131E+18
  P-LOCAL =0.358E+13   P-GLOBAL =0.899E+07
  N-LOCAL =0.104E+23   N-GLOBAL =0.394E+18
  V-LOCAL =0.924E+06   V-GLOBAL =0.100E+05

    MAX CHANGE IN FP =   0.345E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN FN =   0.345E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.345E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     4

 GLOBAL NORM(0) =0.111E+18
  P-LOCAL =0.266E+13   P-GLOBAL =0.662E+07
  N-LOCAL =0.918E+22   N-GLOBAL =0.332E+18
  V-LOCAL =0.119E+07   V-GLOBAL =0.108E+05

    MAX CHANGE IN FP =   0.333E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN FN =   0.333E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.333E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     5

 GLOBAL NORM(0) =0.911E+17
  P-LOCAL =0.189E+13   P-GLOBAL =0.491E+07
  N-LOCAL =0.799E+22   N-GLOBAL =0.273E+18
  V-LOCAL =0.540E+06   V-GLOBAL =0.117E+05

    MAX CHANGE IN FP =   0.320E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN FN =   0.320E+01 KT AT (I,J) = (  1, 47)
    MAX CHANGE IN V  =   0.320E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     6

 GLOBAL NORM(0) =0.735E+17
  P-LOCAL =0.120E+13   P-GLOBAL =0.350E+07
  N-LOCAL =0.685E+22   N-GLOBAL =0.220E+18
  V-LOCAL =0.734E+06   V-GLOBAL =0.171E+05
```

```
      MAX CHANGE IN FP =    0.306E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.306E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.306E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      7

  GLOBAL NORM(0) =0.578E+17
    P-LOCAL =0.606E+12    P-GLOBAL =0.238E+07
    N-LOCAL =0.577E+22    N-GLOBAL =0.174E+18
    V-LOCAL =0.137E+08    V-GLOBAL =0.578E+05

      MAX CHANGE IN FP =    0.291E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.291E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.291E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      8

  GLOBAL NORM(0) =0.438E+17
    P-LOCAL =0.364E+12    P-GLOBAL =0.152E+07
    N-LOCAL =0.475E+22    N-GLOBAL =0.131E+18
    V-LOCAL =0.118E+08    V-GLOBAL =0.747E+05

      MAX CHANGE IN FP =    0.274E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.274E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.274E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      9

  GLOBAL NORM(0) =0.309E+17
    P-LOCAL =0.207E+12    P-GLOBAL =0.105E+07
    N-LOCAL =0.380E+22    N-GLOBAL =0.926E+17
    V-LOCAL =0.108E+08    V-GLOBAL =0.495E+05

      MAX CHANGE IN FP =    0.254E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.254E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.254E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     10

  GLOBAL NORM(0) =0.213E+17
    P-LOCAL =0.687E+11    P-GLOBAL =0.684E+06
    N-LOCAL =0.293E+22    N-GLOBAL =0.639E+17
    V-LOCAL =0.396E+08    V-GLOBAL =0.181E+06

      MAX CHANGE IN FP =    0.232E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.232E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.232E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     11

  GLOBAL NORM(0) =0.157E+17
    P-LOCAL =0.112E+11    P-GLOBAL =0.535E+06
    N-LOCAL =0.217E+22    N-GLOBAL =0.471E+17
    V-LOCAL =0.171E+05    V-GLOBAL =0.964E+00

      MAX CHANGE IN FP =    0.206E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.206E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.206E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     12

  GLOBAL NORM(0) =0.109E+17
    P-LOCAL =0.253E+10    P-GLOBAL =0.450E+06
    N-LOCAL =0.151E+22    N-GLOBAL =0.328E+17
    V-LOCAL =0.454E+04    V-GLOBAL =0.246E+00

      MAX CHANGE IN FP =    0.176E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.176E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.176E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     13

  GLOBAL NORM(0) =0.714E+16
    P-LOCAL =0.289E+10    P-GLOBAL =0.480E+06
    N-LOCAL =0.984E+21    N-GLOBAL =0.214E+17
    V-LOCAL =0.989E+04    V-GLOBAL =0.531E+00

      MAX CHANGE IN FP =    0.139E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.139E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.139E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     14

  GLOBAL NORM(0) =0.379E+16
    P-LOCAL =0.409E+10    P-GLOBAL =0.443E+06
    N-LOCAL =0.522E+21    N-GLOBAL =0.114E+17
    V-LOCAL =0.269E+05    V-GLOBAL =0.340E+00

      MAX CHANGE IN FP =    0.121E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.121E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.121E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     15

  GLOBAL NORM(0) =0.796E+15
    P-LOCAL =0.131E+10    P-GLOBAL =0.310E+06
    N-LOCAL =0.109E+21    N-GLOBAL =0.239E+16
    V-LOCAL =0.276E+04    V-GLOBAL =0.809E-01

      MAX CHANGE IN FP =    0.106E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.106E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.106E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     16

  GLOBAL NORM(0) =0.360E+13
    P-LOCAL =0.241E+10    P-GLOBAL =0.380E+06
    N-LOCAL =0.361E+18    N-GLOBAL =0.108E+14
    V-LOCAL =0.694E+03    V-GLOBAL =0.286E-01

      MAX CHANGE IN FP =    0.271E+00 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.277E+00 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.278E+00 KT AT (I,J) = (   1, 47)
 0ITERATION =     17
```

```
 GLOBAL NORM(0) =0.376E+11
   P-LOCAL =0.252E+10   P-GLOBAL =0.610E+06
   N-LOCAL =0.405E+15   N-GLOBAL =0.113E+12
   V-LOCAL =0.196E+04   V-GLOBAL =0.105E+00

     MAX CHANGE IN FP =   0.139E-01 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =   0.806E-02 KT AT (I,J) = (  1, 35)
     MAX CHANGE IN V  =   0.324E-02 KT AT (I,J) = (  1, 34)
0ITERATION =    18

 GLOBAL NORM(0) =0.332E+11
   P-LOCAL =0.360E+10   P-GLOBAL =0.521E+06
   N-LOCAL =0.469E+15   N-GLOBAL =0.997E+11
   V-LOCAL =0.569E+03   V-GLOBAL =0.509E-01

     MAX CHANGE IN FP =   0.913E-04 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =   0.120E-04 KT AT (I,J) = (  1, 35)
     MAX CHANGE IN V  =   0.214E-06 KT AT (I,J) = (  1, 37)
 FINAL NORM =0.332E+11
 TIME FOR SOLUTION =       98.1


 JB= -0.6366732E-09   JC=  0.2840440E+01   JE=  0.3303515E-09
 VCE=2.0000000000000 VOLTS

 JE=  0.4543407E-12
 JC= -0.6303292E-09
 JB= -0.6298748E-09
 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.26839E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.69647E+00 (IN VOLTS)
     AT NODE:     36    22     X= 0.217E-02  Y= 0.557E-03
  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = -.101561E-06
 RSSUM = -.215560E-40    0.0000
 RSSUMB = -.327070E-43    0.0000
 RSSUMT = -.589918E-44    0.0000
 RSSUML = -.311276E-44    0.0000
 RSSUMR = -.215142E-40    0.0000
 RBSUM = -.101560E-06   99.9683
 RASUM = -.655403E-13    0.0001
 RDSUM = -.383946E-13    0.0000
 JMBSUM = 0.000000E+00    0.0000
 JMTSUM = -.321232E-10    0.0316
 JMLSUM = -.139448E-16    0.0000
 JMRSUM = -.197421E-25    0.0000
 JTOT = -.101593E-06  JREC = -.101593E-06
  ***** ENTER DUMP2D
 1INITIAL NORM =0.211E+18   V =  0.0000 VOLTS
   P-LOCAL =0.360E+10   P-GLOBAL =0.521E+06
   N-LOCAL =0.144E+23   N-GLOBAL =0.634E+18
   V-LOCAL =0.569E+03   V-GLOBAL =0.719E-01

0ITERATION =     1

 GLOBAL NORM(0) =0.186E+18
   P-LOCAL =0.668E+13   P-GLOBAL =0.153E+08
   N-LOCAL =0.131E+23   N-GLOBAL =0.557E+18
   V-LOCAL =0.751E+05   V-GLOBAL =0.130E+04

     MAX CHANGE IN FP =   0.365E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.365E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.365E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     2

 GLOBAL NORM(0) =0.161E+18
   P-LOCAL =0.434E+13   P-GLOBAL =0.113E+08
   N-LOCAL =0.117E+23   N-GLOBAL =0.483E+18
   V-LOCAL =0.174E+06   V-GLOBAL =0.257E+04

     MAX CHANGE IN FP =   0.355E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.355E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.355E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     3

 GLOBAL NORM(0) =0.137E+18
   P-LOCAL =0.334E+13   P-GLOBAL =0.847E+07
   N-LOCAL =0.104E+23   N-GLOBAL =0.412E+18
   V-LOCAL =0.531E+06   V-GLOBAL =0.486E+04

     MAX CHANGE IN FP =   0.345E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.345E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.345E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     4

 GLOBAL NORM(0) =0.115E+18
   P-LOCAL =0.247E+13   P-GLOBAL =0.635E+07
   N-LOCAL =0.920E+22   N-GLOBAL =0.346E+18
   V-LOCAL =0.609E+06   V-GLOBAL =0.739E+04

     MAX CHANGE IN FP =   0.333E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.333E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.333E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     5

 GLOBAL NORM(0) =0.949E+17
   P-LOCAL =0.174E+13   P-GLOBAL =0.471E+07
   N-LOCAL =0.800E+22   N-GLOBAL =0.285E+18
   V-LOCAL =0.183E+07   V-GLOBAL =0.134E+05
```

```
      MAX CHANGE IN FP =    0.320E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.320E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.320E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      6

  GLOBAL NORM(0) =0.762E+17
    P-LOCAL =0.108E+13    P-GLOBAL =0.329E+07
    N-LOCAL =0.686E+22    N-GLOBAL =0.229E+18
    V-LOCAL =0.114E+07    V-GLOBAL =0.128E+05

      MAX CHANGE IN FP =    0.306E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.306E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.306E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      7

  GLOBAL NORM(0) =0.597E+17
    P-LOCAL =0.556E+12    P-GLOBAL =0.214E+07
    N-LOCAL =0.578E+22    N-GLOBAL =0.179E+18
    V-LOCAL =0.170E+07    V-GLOBAL =0.161E+05

      MAX CHANGE IN FP =    0.291E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.291E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.291E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      8

  GLOBAL NORM(0) =0.450E+17
    P-LOCAL =0.333E+12    P-GLOBAL =0.162E+07
    N-LOCAL =0.475E+22    N-GLOBAL =0.135E+18
    V-LOCAL =0.197E+08    V-GLOBAL =0.644E+05

      MAX CHANGE IN FP =    0.274E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.274E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.274E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      9

  GLOBAL NORM(0) =0.313E+17
    P-LOCAL =0.186E+12    P-GLOBAL =0.112E+07
    N-LOCAL =0.381E+22    N-GLOBAL =0.939E+17
    V-LOCAL =0.183E+08    V-GLOBAL =0.633E+05

      MAX CHANGE IN FP =    0.254E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.254E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.254E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     10

  GLOBAL NORM(0) =0.213E+17
    P-LOCAL =0.644E+11    P-GLOBAL =0.695E+06
    N-LOCAL =0.294E+22    N-GLOBAL =0.640E+17
    V-LOCAL =0.169E+08    V-GLOBAL =0.162E+06

      MAX CHANGE IN FP =    0.232E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.232E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.232E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     11

  GLOBAL NORM(0) =0.157E+17
    P-LOCAL =0.115E+11    P-GLOBAL =0.568E+06
    N-LOCAL =0.217E+22    N-GLOBAL =0.472E+17
    V-LOCAL =0.188E+04    V-GLOBAL =0.117E+00

      MAX CHANGE IN FP =    0.206E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.206E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.206E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     12

  GLOBAL NORM(0) =0.110E+17
    P-LOCAL =0.308E+10    P-GLOBAL =0.532E+06
    N-LOCAL =0.151E+22    N-GLOBAL =0.329E+17
    V-LOCAL =0.409E+04    V-GLOBAL =0.256E+00

      MAX CHANGE IN FP =    0.176E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.176E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.176E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     13

  GLOBAL NORM(0) =0.715E+16
    P-LOCAL =0.501E+10    P-GLOBAL =0.511E+06
    N-LOCAL =0.986E+21    N-GLOBAL =0.214E+17
    V-LOCAL =0.747E+03    V-GLOBAL =0.196E-01

      MAX CHANGE IN FP =    0.139E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.139E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.139E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     14

  GLOBAL NORM(0) =0.379E+16
    P-LOCAL =0.223E+10    P-GLOBAL =0.483E+06
    N-LOCAL =0.523E+21    N-GLOBAL =0.114E+17
    V-LOCAL =0.381E+04    V-GLOBAL =0.813E-01

      MAX CHANGE IN FP =    0.121E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.121E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.121E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     15

  GLOBAL NORM(0) =0.794E+15
    P-LOCAL =0.295E+10    P-GLOBAL =0.507E+06
    N-LOCAL =0.109E+21    N-GLOBAL =0.238E+16
    V-LOCAL =0.122E+04    V-GLOBAL =0.306E-01

      MAX CHANGE IN FP =    0.106E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.106E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.106E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     16
```

```
 GLOBAL NORM(0) =0.355E+13
   P-LOCAL =0.187E+10   P-GLOBAL =0.418E+06
   N-LOCAL =0.366E+18   N-GLOBAL =0.106E+14
   V-LOCAL =0.355E+03   V-GLOBAL =0.225E-01

     MAX CHANGE IN FP =   0.271E+00 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.276E+00 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.277E+00 KT AT (I,J) = (  1, 47)
0ITERATION =    17

 GLOBAL NORM(0) =0.286E+11
   P-LOCAL =0.276E+10   P-GLOBAL =0.391E+06
   N-LOCAL =0.307E+15   N-GLOBAL =0.858E+11
   V-LOCAL =0.362E+03   V-GLOBAL =0.185E-01

     MAX CHANGE IN FP =   0.134E-01 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =   0.605E-02 KT AT (I,J) = (  1, 36)
     MAX CHANGE IN V  =   0.249E-02 KT AT (I,J) = (  1, 35)
0ITERATION =    18

 GLOBAL NORM(0) =0.282E+11
   P-LOCAL =0.332E+10   P-GLOBAL =0.470E+06
   N-LOCAL =0.307E+15   N-GLOBAL =0.845E+11
   V-LOCAL =0.332E+04   V-GLOBAL =0.127E+00

     MAX CHANGE IN FP =   0.852E-04 KT AT (I,J) = (  1, 48)
     MAX CHANGE IN FN =   0.652E-05 KT AT (I,J) = (  1, 36)
     MAX CHANGE IN V  =   0.110E-06 KT AT (I,J) = (  1, 38)
 FINAL NORM =0.282E+11
 TIME FOR SOLUTION =       98.1


 JB= -0.7171060E-09   JC=  0.3555232E+01   JE=  0.3303515E-09
 VCE=2.5000000000000 VOLTS

 JE=  0.4590958E-12
 JC= -0.7087839E-09
 JB= -0.7083248E-09

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27065E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70235E+00 (IN VOLTS)
     AT NODE:     36   23     X= 0.217E-02  Y= 0.560E-03

  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = -.114214E-06
 RSSUM = -.242350E-40    0.0000
 RSSUMB = -.327816E-43    0.0000
 RSSUMT = -.597197E-44    0.0000
 RSSUML = -.310445E-44    0.0000
 RSSUMR = -.241932E-40    0.0000
 RBSUM = -.114214E-06   99.9717
 RASUM = -.667000E-13    0.0001
 RDSUM = -.354262E-13    0.0000
 JMBSUM = 0.000000E+00    0.0000
 JMTSUM = -.322811E-10    0.0283
 JMLSUM = -.169687E-16    0.0000
 JMRSUM = -.225162E-25    0.0000
 JTOT = -.114246E-06  JREC = -.114246E-06
 ***** ENTER DUMP2D
1INITIAL NORM =0.225E+18   V =  0.0000 VOLTS
   P-LOCAL =0.332E+10   P-GLOBAL =0.470E+06
   N-LOCAL =0.144E+23   N-GLOBAL =0.676E+18
   V-LOCAL =0.332E+04   V-GLOBAL =0.148E+00

0ITERATION =     1

 GLOBAL NORM(0) =0.198E+18
   P-LOCAL =0.522E+13   P-GLOBAL =0.139E+08
   N-LOCAL =0.131E+23   N-GLOBAL =0.593E+18
   V-LOCAL =0.665E+06   V-GLOBAL =0.127E+04

     MAX CHANGE IN FP =   0.365E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.365E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.365E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     2

 GLOBAL NORM(0) =0.171E+18
   P-LOCAL =0.363E+13   P-GLOBAL =0.104E+08
   N-LOCAL =0.117E+23   N-GLOBAL =0.513E+18
   V-LOCAL =0.491E+06   V-GLOBAL =0.316E+04

     MAX CHANGE IN FP =   0.355E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.355E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.355E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     3

 GLOBAL NORM(0) =0.146E+18
   P-LOCAL =0.277E+13   P-GLOBAL =0.796E+07
   N-LOCAL =0.105E+23   N-GLOBAL =0.438E+18
   V-LOCAL =0.556E+06   V-GLOBAL =0.439E+04

     MAX CHANGE IN FP =   0.345E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN FN =   0.345E+01 KT AT (I,J) = (  1, 47)
     MAX CHANGE IN V  =   0.345E+01 KT AT (I,J) = (  1, 47)
0ITERATION =     4

 GLOBAL NORM(0) =0.122E+18
   P-LOCAL =0.202E+13   P-GLOBAL =0.585E+07
   N-LOCAL =0.922E+22   N-GLOBAL =0.366E+18
   V-LOCAL =0.923E+06   V-GLOBAL =0.753E+04
```

```
      MAX CHANGE IN FP =    0.333E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.333E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.333E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      5

 GLOBAL NORM(0) =0.100E+18
   P-LOCAL =0.138E+13   P-GLOBAL =0.427E+07
   N-LOCAL =0.802E+22   N-GLOBAL =0.300E+18
   V-LOCAL =0.148E+07   V-GLOBAL =0.128E+05

      MAX CHANGE IN FP =    0.320E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.320E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.320E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      6

 GLOBAL NORM(0) =0.801E+17
   P-LOCAL =0.807E+12   P-GLOBAL =0.302E+07
   N-LOCAL =0.687E+22   N-GLOBAL =0.240E+18
   V-LOCAL =0.457E+07   V-GLOBAL =0.347E+05

      MAX CHANGE IN FP =    0.306E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.306E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.306E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      7

 GLOBAL NORM(0) =0.625E+17
   P-LOCAL =0.415E+12   P-GLOBAL =0.205E+07
   N-LOCAL =0.579E+22   N-GLOBAL =0.187E+18
   V-LOCAL =0.535E+07   V-GLOBAL =0.440E+05

      MAX CHANGE IN FP =    0.291E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.291E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.291E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      8

 GLOBAL NORM(0) =0.466E+17
   P-LOCAL =0.228E+12   P-GLOBAL =0.147E+07
   N-LOCAL =0.476E+22   N-GLOBAL =0.140E+18
   V-LOCAL =0.435E+08   V-GLOBAL =0.143E+06

      MAX CHANGE IN FP =    0.274E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.274E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.274E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =      9

 GLOBAL NORM(0) =0.319E+17
   P-LOCAL =0.133E+12   P-GLOBAL =0.109E+07
   N-LOCAL =0.381E+22   N-GLOBAL =0.957E+17
   V-LOCAL =0.418E+08   V-GLOBAL =0.134E+06

      MAX CHANGE IN FP =    0.254E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.254E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.254E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     10

 GLOBAL NORM(0) =0.214E+17
   P-LOCAL =0.307E+11   P-GLOBAL =0.509E+06
   N-LOCAL =0.294E+22   N-GLOBAL =0.641E+17
   V-LOCAL =0.366E+08   V-GLOBAL =0.216E+06

      MAX CHANGE IN FP =    0.232E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.232E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.232E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     11

 GLOBAL NORM(0) =0.157E+17
   P-LOCAL =0.425E+11   P-GLOBAL =0.615E+06
   N-LOCAL =0.217E+22   N-GLOBAL =0.472E+17
   V-LOCAL =0.320E+04   V-GLOBAL =0.114E+00

      MAX CHANGE IN FP =    0.206E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.206E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.206E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     12

 GLOBAL NORM(0) =0.110E+17
   P-LOCAL =0.367E+10   P-GLOBAL =0.435E+06
   N-LOCAL =0.151E+22   N-GLOBAL =0.329E+17
   V-LOCAL =0.503E+03   V-GLOBAL =0.221E-01

      MAX CHANGE IN FP =    0.176E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.176E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.176E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     13

 GLOBAL NORM(0) =0.716E+16
   P-LOCAL =0.272E+10   P-GLOBAL =0.455E+06
   N-LOCAL =0.988E+21   N-GLOBAL =0.215E+17
   V-LOCAL =0.126E+04   V-GLOBAL =0.338E-01

      MAX CHANGE IN FP =    0.139E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.139E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.139E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     14

 GLOBAL NORM(0) =0.380E+16
   P-LOCAL =0.307E+10   P-GLOBAL =0.428E+06
   N-LOCAL =0.524E+21   N-GLOBAL =0.114E+17
   V-LOCAL =0.222E+04   V-GLOBAL =0.518E-01

      MAX CHANGE IN FP =    0.121E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN FN =    0.121E+01 KT AT (I,J) = (   1, 47)
      MAX CHANGE IN V  =    0.121E+01 KT AT (I,J) = (   1, 47)
 0ITERATION =     15
```

```
 GLOBAL NORM(0) =0.794E+15
   P-LOCAL =0.281E+10    P-GLOBAL =0.529E+06
   N-LOCAL =0.109E+21    N-GLOBAL =0.238E+16
   V-LOCAL =0.538E+03    V-GLOBAL =0.197E-01

     MAX CHANGE IN FP =    0.106E+01 KT AT (I,J) = (   1, 47)
     MAX CHANGE IN FN =    0.106E+01 KT AT (I,J) = (   1, 47)
     MAX CHANGE IN V  =    0.106E+01 KT AT (I,J) = (   1, 47)
0ITERATION =     16

 GLOBAL NORM(0) =0.332E+13
   P-LOCAL =0.546E+10    P-GLOBAL =0.681E+06
   N-LOCAL =0.370E+18    N-GLOBAL =0.997E+13
   V-LOCAL =0.470E+03    V-GLOBAL =0.201E-01

     MAX CHANGE IN FP =    0.271E+00 KT AT (I,J) = (   1, 47)
     MAX CHANGE IN FN =    0.275E+00 KT AT (I,J) = (   1, 47)
     MAX CHANGE IN V  =    0.277E+00 KT AT (I,J) = (   1, 47)
0ITERATION =     17

 GLOBAL NORM(0) =0.259E+11
   P-LOCAL =0.381E+10    P-GLOBAL =0.361E+06
   N-LOCAL =0.216E+15    N-GLOBAL =0.777E+11
   V-LOCAL =0.863E+03    V-GLOBAL =0.268E-01

     MAX CHANGE IN FP =    0.130E-01 KT AT (I,J) = (   1, 48)
     MAX CHANGE IN FN =    0.445E-02 KT AT (I,J) = (   1, 37)
     MAX CHANGE IN V  =    0.206E-02 KT AT (I,J) = (   1, 36)
0ITERATION =     18

 GLOBAL NORM(0) =0.250E+11
   P-LOCAL =0.236E+10    P-GLOBAL =0.443E+06
   N-LOCAL =0.253E+15    N-GLOBAL =0.750E+11
   V-LOCAL =0.183E+04    V-GLOBAL =0.405E-01

     MAX CHANGE IN FP =    0.796E-04 KT AT (I,J) = (   1, 48)
     MAX CHANGE IN FN =    0.296E-05 KT AT (I,J) = (   1, 37)
     MAX CHANGE IN V  =    0.670E-07 KT AT (I,J) = (   1, 38)
 FINAL NORM =0.250E+11
 TIME FOR SOLUTION =        98.2


 JB= -0.7851063E-09   JC=  0.4271979E+01   JE=  0.3303515E-09
 VCE=3.0000000000000 VOLTS

 JE=  0.4635560E-12
 JC= -0.7758600E-09
 JB= -0.7753964E-09

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27136E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70418E+00 (IN VOLTS)
     AT NODE:      36    23     X= 0.217E-02  Y= 0.560E-03

  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = -.125032E-06
 RSSUM = -.265382E-40     0.0000
 RSSUMB = -.328515E-43    0.0000
 RSSUMT = -.605404E-44    0.0000
 RSSUML = -.309480E-44    0.0000
 RSSUMR = -.264962E-40    0.0000
 RBSUM = -.125031E-06    99.9740
 RASUM = -.679569E-13     0.0001
 RDSUM = -.321490E-13     0.0000
 JMBSUM = 0.000000E+00    0.0000
 JMTSUM = -.324278E-10    0.0259
 JMLSUM = -.198355E-16    0.0000
 JMRSUM = -.249812E-25    0.0000
 JTOT = -.125064E-06  JREC = -.125064E-06
 ***** ENTER DUMP2D
1INITIAL NORM =0.720E+17   V =  0.0000 VOLTS
   P-LOCAL =0.194E+22    P-GLOBAL =0.216E+18
   N-LOCAL =0.253E+15    N-GLOBAL =0.750E+11
   V-LOCAL =0.183E+04    V-GLOBAL =0.224E+00

0ITERATION =      1

 GLOBAL NORM(0) =0.826E+17
   P-LOCAL =0.268E+22    P-GLOBAL =0.248E+18
   N-LOCAL =0.518E+11    N-GLOBAL =0.556E+07
   V-LOCAL =0.262E+04    V-GLOBAL =0.123E+00

     MAX CHANGE IN FP =    0.116E+01 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =    0.116E+01 KT AT (I,J) = ( 36, 36)
     MAX CHANGE IN V  =    0.116E+01 KT AT (I,J) = ( 43, 37)
0ITERATION =      2

 GLOBAL NORM(0) =0.654E+15
   P-LOCAL =0.178E+20    P-GLOBAL =0.196E+16
   N-LOCAL =0.407E+11    N-GLOBAL =0.332E+07
   V-LOCAL =0.151E+04    V-GLOBAL =0.472E-01

     MAX CHANGE IN FP =    0.781E+00 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =    0.794E+00 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN V  =    0.785E+00 KT AT (I,J) = ( 42, 47)
0ITERATION =      3

 GLOBAL NORM(0) =0.299E+13
   P-LOCAL =0.806E+17    P-GLOBAL =0.898E+13
   N-LOCAL =0.287E+11    N-GLOBAL =0.254E+07
   V-LOCAL =0.285E+05    V-GLOBAL =0.291E+00
```

```
      MAX CHANGE IN FP =   0.136E-01 KT AT (I,J) = ( 38, 48)
      MAX CHANGE IN FN =   0.344E+00 KT AT (I,J) = ( 46, 28)
      MAX CHANGE IN V  =   0.136E-01 KT AT (I,J) = ( 38, 37)
 0ITERATION =     4

 GLOBAL NORM(0) =0.967E+08
   P-LOCAL =0.258E+13   P-GLOBAL =0.288E+09
   N-LOCAL =0.277E+11   N-GLOBAL =0.217E+07
   V-LOCAL =0.698E+04   V-GLOBAL =0.100E+00

      MAX CHANGE IN FP =   0.758E-04 KT AT (I,J) = ( 66, 37)
      MAX CHANGE IN FN =   0.812E-01 KT AT (I,J) = ( 46, 28)
      MAX CHANGE IN V  =   0.757E-04 KT AT (I,J) = ( 47, 35)
 0ITERATION =     5

 GLOBAL NORM(0) =0.100E+07
   P-LOCAL =0.173E+11   P-GLOBAL =0.298E+06
   N-LOCAL =0.276E+11   N-GLOBAL =0.272E+07
   V-LOCAL =0.999E+03   V-GLOBAL =0.317E-01

      MAX CHANGE IN FP =   0.388E-08 KT AT (I,J) = ( 69, 38)
      MAX CHANGE IN FN =   0.348E-02 KT AT (I,J) = ( 46, 28)
      MAX CHANGE IN V  =   0.387E-08 KT AT (I,J) = ( 69, 33)
 0ITERATION =     6

 GLOBAL NORM(0) =0.866E+06
   P-LOCAL =0.504E+10   P-GLOBAL =0.245E+06
   N-LOCAL =0.393E+11   N-GLOBAL =0.235E+07
   V-LOCAL =0.417E+03   V-GLOBAL =0.373E-01

      MAX CHANGE IN FP =   0.137E-09 KT AT (I,J) = ( 37, 15)
      MAX CHANGE IN FN =   0.609E-05 KT AT (I,J) = ( 46, 28)
      MAX CHANGE IN V  =   0.271E-09 KT AT (I,J) = ( 35, 48)
 FINAL NORM =0.866E+06
 TIME FOR SOLUTION =       32.9


 VBE=0.05000000000000 VOLTS
 JB= -0.7411476E-09   JC=  0.4271979E+01   JE=  0.3268203E-09

 JE=  0.3811193E-10
 JC= -0.7709414E-09
 JB= -0.7328294E-09

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27133E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70410E+00 (IN VOLTS)
     AT NODE:     36   23     X= 0.217E-02  Y= 0.560E-03

  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = -.118166E-06
 RSSUM = -.259505E-40     0.0000
 RSSUMB = -.328472E-43     0.0000
 RSSUMT = 0.176952E-42     0.0000
 RSSUML = -.309480E-44     0.0000
 RSSUMR = -.260915E-40     0.0000
 RBSUM = -.123818E-06   104.7541
 RASUM = 0.563325E-08    -4.7659
 RDSUM = 0.183960E-10    -0.0156
 JMBSUM = 0.000000E+00     0.0000
 JMTSUM = -.323921E-10     0.0274
 JMLSUM = -.198355E-16     0.0000
 JMRSUM = -.129086E-24     0.0000
 JTOT = -.118198E-06  JREC = -.118198E-06
 ***** ENTER DUMP2D
1INITIAL NORM =0.720E+17   V =  0.0000 VOLTS
   P-LOCAL =0.194E+22   P-GLOBAL =0.216E+18
   N-LOCAL =0.393E+11   N-GLOBAL =0.330E+07
   V-LOCAL =0.158E+04   V-GLOBAL =0.220E+00

0ITERATION =     1

 GLOBAL NORM(0) =0.825E+17
   P-LOCAL =0.267E+22   P-GLOBAL =0.248E+18
   N-LOCAL =0.322E+11   N-GLOBAL =0.413E+07
   V-LOCAL =0.749E+05   V-GLOBAL =0.511E+00

      MAX CHANGE IN FP =   0.116E+01 KT AT (I,J) = ( 43, 48)
      MAX CHANGE IN FN =   0.116E+01 KT AT (I,J) = ( 36, 36)
      MAX CHANGE IN V  =   0.116E+01 KT AT (I,J) = ( 43, 37)
0ITERATION =     2

 GLOBAL NORM(0) =0.654E+15
   P-LOCAL =0.178E+20   P-GLOBAL =0.196E+16
   N-LOCAL =0.360E+11   N-GLOBAL =0.235E+07
   V-LOCAL =0.265E+03   V-GLOBAL =0.270E-01

      MAX CHANGE IN FP =   0.781E+00 KT AT (I,J) = ( 38, 48)
      MAX CHANGE IN FN =   0.101E+01 KT AT (I,J) = ( 47, 26)
      MAX CHANGE IN V  =   0.785E+00 KT AT (I,J) = ( 39, 47)
0ITERATION =     3

 GLOBAL NORM(0) =0.299E+13
   P-LOCAL =0.806E+17   P-GLOBAL =0.898E+13
   N-LOCAL =0.440E+11   N-GLOBAL =0.320E+07
   V-LOCAL =0.687E+04   V-GLOBAL =0.863E-01

      MAX CHANGE IN FP =   0.136E-01 KT AT (I,J) = ( 38, 48)
      MAX CHANGE IN FN =   0.399E+00 KT AT (I,J) = ( 48, 26)
      MAX CHANGE IN V  =   0.136E-01 KT AT (I,J) = ( 43, 37)
0ITERATION =     4
```

```
 GLOBAL NORM(0) =0.968E+08
   P-LOCAL =0.258E+13   P-GLOBAL =0.288E+09
   N-LOCAL =0.396E+11   N-GLOBAL =0.253E+07
   V-LOCAL =0.227E+04   V-GLOBAL =0.316E-01

     MAX CHANGE IN FP =   0.757E-04 KT AT (I,J) = ( 42, 40)
     MAX CHANGE IN FN =   0.112E+00 KT AT (I,J) = ( 48, 26)
     MAX CHANGE IN V  =   0.757E-04 KT AT (I,J) = ( 36, 37)
0ITERATION =     5

 GLOBAL NORM(0) =0.112E+07
   P-LOCAL =0.184E+10   P-GLOBAL =0.293E+06
   N-LOCAL =0.324E+11   N-GLOBAL =0.308E+07
   V-LOCAL =0.123E+04   V-GLOBAL =0.826E-01

     MAX CHANGE IN FP =   0.475E-08 KT AT (I,J) = ( 69, 38)
     MAX CHANGE IN FN =   0.680E-02 KT AT (I,J) = ( 48, 26)
     MAX CHANGE IN V  =   0.474E-08 KT AT (I,J) = ( 69, 33)
0ITERATION =     6

 GLOBAL NORM(0) =0.903E+06
   P-LOCAL =0.145E+10   P-GLOBAL =0.370E+06
   N-LOCAL =0.310E+11   N-GLOBAL =0.234E+07
   V-LOCAL =0.161E+04   V-GLOBAL =0.432E-01

     MAX CHANGE IN FP =   0.233E-09 KT AT (I,J) = ( 51, 19)
     MAX CHANGE IN FN =   0.232E-04 KT AT (I,J) = ( 48, 26)
     MAX CHANGE IN V  =   0.243E-09 KT AT (I,J) = ( 54, 19)
 FINAL NORM =0.903E+06
 TIME FOR SOLUTION =      32.9


 VBE=0.1000000000000 VOLTS
 JB= -0.6577235E-09   JC=  0.4271979E+01   JE= -0.7987538E-10

 JE=  0.1304410E-09
 JC= -0.7812644E-09
 JB= -0.6508234E-09

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27129E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70401E+00 (IN VOLTS)
     AT NODE:     36   23     X= 0.217E-02  Y= 0.560E-03
  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = -.104939E-06
 RSSUM = -.249050E-40    0.0000
 RSSUMB = -.328431E-43    0.0000
 RSSUMT = 0.660617E-42    0.0000
 RSSUML = -.309480E-44    0.0000
 RSSUMR = -.255296E-40    0.0000
 RBSUM = -.122696E-06  116.8848
 RASUM = 0.176708E-07  -16.8339
 RDSUM = 0.856788E-10   -0.0816
 JMBSUM = 0.000000E+00    0.0000
 JMTSUM = -.322236E-10    0.0307
 JMLSUM = -.198355E-16    0.0000
 JMRSUM = -.344578E-24    0.0000
 JTOT = -.104971E-06  JREC = -.104971E-06
 ***** ENTER DUMP2D
1INITIAL NORM =0.720E+17   V =  0.0000 VOLTS
   P-LOCAL =0.194E+22   P-GLOBAL =0.216E+18
   N-LOCAL =0.310E+11   N-GLOBAL =0.328E+07
   V-LOCAL =0.161E+04   V-GLOBAL =0.226E+00
0ITERATION =     1
 GLOBAL NORM(0) =0.824E+17
   P-LOCAL =0.267E+22   P-GLOBAL =0.247E+18
   N-LOCAL =0.333E+11   N-GLOBAL =0.435E+07
   V-LOCAL =0.224E+04   V-GLOBAL =0.131E+00

     MAX CHANGE IN FP =   0.116E+01 KT AT (I,J) = ( 43, 48)
     MAX CHANGE IN FN =   0.116E+01 KT AT (I,J) = ( 36, 36)
     MAX CHANGE IN V  =   0.116E+01 KT AT (I,J) = ( 43, 37)
0ITERATION =     2
 GLOBAL NORM(0) =0.654E+15
   P-LOCAL =0.178E+20   P-GLOBAL =0.196E+16
   N-LOCAL =0.269E+11   N-GLOBAL =0.243E+07
   V-LOCAL =0.135E+04   V-GLOBAL =0.467E-01

     MAX CHANGE IN FP =   0.781E+00 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =   0.100E+01 KT AT (I,J) = ( 45, 31)
     MAX CHANGE IN V  =   0.785E+00 KT AT (I,J) = ( 42, 47)
0ITERATION =     3
 GLOBAL NORM(0) =0.299E+13
   P-LOCAL =0.807E+17   P-GLOBAL =0.898E+13
   N-LOCAL =0.236E+11   N-GLOBAL =0.217E+07
   V-LOCAL =0.619E+05   V-GLOBAL =0.125E+01

     MAX CHANGE IN FP =   0.136E-01 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =   0.426E+00 KT AT (I,J) = ( 45, 31)
     MAX CHANGE IN V  =   0.136E-01 KT AT (I,J) = ( 43, 37)
0ITERATION =     4
 GLOBAL NORM(0) =0.970E+08
   P-LOCAL =0.258E+13   P-GLOBAL =0.288E+09
   N-LOCAL =0.320E+11   N-GLOBAL =0.289E+07
   V-LOCAL =0.243E+04   V-GLOBAL =0.540E-01
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```
      MAX CHANGE IN FP =    0.759E-04 KT AT (I,J) = ( 69, 38)
      MAX CHANGE IN FN =    0.130E+00 KT AT (I,J) = ( 45, 31)
      MAX CHANGE IN V  =    0.758E-04 KT AT (I,J) = ( 47, 35)
 0ITERATION =      5

 GLOBAL NORM(0) =0.965E+06
    P-LOCAL =0.119E+10   P-GLOBAL =0.298E+06
    N-LOCAL =0.408E+11   N-GLOBAL =0.260E+07
    V-LOCAL =0.178E+04   V-GLOBAL =0.506E-01

      MAX CHANGE IN FP =    0.529E-08 KT AT (I,J) = ( 69, 39)
      MAX CHANGE IN FN =    0.927E-02 KT AT (I,J) = ( 45, 31)
      MAX CHANGE IN V  =    0.528E-08 KT AT (I,J) = ( 69, 33)
 0ITERATION =      6

 GLOBAL NORM(0) =0.693E+06
    P-LOCAL =0.186E+10   P-GLOBAL =0.303E+06
    N-LOCAL =0.352E+11   N-GLOBAL =0.178E+07
    V-LOCAL =0.132E+04   V-GLOBAL =0.317E-01

      MAX CHANGE IN FP =    0.933E-10 KT AT (I,J) = (  1, 29)
      MAX CHANGE IN FN =    0.432E-04 KT AT (I,J) = ( 45, 31)
      MAX CHANGE IN V  =    0.173E-09 KT AT (I,J) = ( 16, 48)
 FINAL NORM =0.693E+06
 TIME FOR SOLUTION =        33.0


 VBE=0.1500000000000 VOLTS
 JB= -0.4688491E-09   JC=  0.4271979E+01   JE= -0.1087389E-09

 JE=  0.4233011E-09
 JC= -0.8888847E-09
 JB= -0.4655836E-09

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27126E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70392E+00 (IN VOLTS)
     AT NODE:     36   23     X= 0.217E-02  Y= 0.560E-03
  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = -.750619E-07
 RSSUM = -.225143E-40     0.0000
 RSSUMB = -.328390E-43     0.0000
 RSSUMT = 0.200553E-41     0.0000
 RSSUML = -.309480E-44     0.0000
 RSSUMR = -.244839E-40     0.0000
 RBSUM = -.121583E-06   161.9095
 RASUM = 0.461637E-07   -61.4753
 RDSUM = 0.357144E-09    -0.4756
 JMBSUM = 0.000000E+00     0.0000
 JMTSUM = -.311459E-10     0.0415
 JMLSUM = -.198355E-16     0.0000
 JMRSUM = 0.573902E-23     0.0000
 JTOT = -.750931E-07  JREC = -.750931E-07
 ***** ENTER DUMP2D
 1INITIAL NORM =0.721E+17   V =  0.0000 VOLTS
    P-LOCAL =0.194E+22   P-GLOBAL =0.216E+18
    N-LOCAL =0.352E+11   N-GLOBAL =0.272E+07
    V-LOCAL =0.158E+04   V-GLOBAL =0.215E+00

 0ITERATION =      1

 GLOBAL NORM(0) =0.823E+17
    P-LOCAL =0.267E+22   P-GLOBAL =0.247E+18
    N-LOCAL =0.405E+11   N-GLOBAL =0.385E+07
    V-LOCAL =0.895E+03   V-GLOBAL =0.100E+00

      MAX CHANGE IN FP =    0.116E+01 KT AT (I,J) = ( 43, 48)
      MAX CHANGE IN FN =    0.116E+01 KT AT (I,J) = ( 36, 36)
      MAX CHANGE IN V  =    0.116E+01 KT AT (I,J) = ( 43, 37)
 0ITERATION =      2

 GLOBAL NORM(0) =0.655E+15
    P-LOCAL =0.178E+20   P-GLOBAL =0.196E+16
    N-LOCAL =0.355E+11   N-GLOBAL =0.271E+07
    V-LOCAL =0.142E+04   V-GLOBAL =0.430E+00

      MAX CHANGE IN FP =    0.781E+00 KT AT (I,J) = ( 38, 48)
      MAX CHANGE IN FN =    0.941E+00 KT AT (I,J) = ( 45, 29)
      MAX CHANGE IN V  =    0.785E+00 KT AT (I,J) = ( 39, 47)
 0ITERATION =      3

 GLOBAL NORM(0) =0.300E+13
    P-LOCAL =0.807E+17   P-GLOBAL =0.899E+13
    N-LOCAL =0.387E+11   N-GLOBAL =0.235E+07
    V-LOCAL =0.298E+03   V-GLOBAL =0.221E-01

      MAX CHANGE IN FP =    0.136E-01 KT AT (I,J) = ( 38, 48)
      MAX CHANGE IN FN =    0.395E+00 KT AT (I,J) = ( 45, 29)
      MAX CHANGE IN V  =    0.136E-01 KT AT (I,J) = ( 43, 37)
 0ITERATION =      4

 GLOBAL NORM(0) =0.969E+08
    P-LOCAL =0.258E+13   P-GLOBAL =0.288E+09
    N-LOCAL =0.304E+11   N-GLOBAL =0.262E+07
    V-LOCAL =0.146E+03   V-GLOBAL =0.322E-01

      MAX CHANGE IN FP =    0.758E-04 KT AT (I,J) = ( 69, 38)
      MAX CHANGE IN FN =    0.110E+00 KT AT (I,J) = ( 45, 29)
      MAX CHANGE IN V  =    0.757E-04 KT AT (I,J) = ( 36, 37)
 0ITERATION =      5
```

```
 GLOBAL NORM(0) =0.965E+06
   P-LOCAL =0.139E+10   P-GLOBAL =0.228E+06
   N-LOCAL =0.518E+11   N-GLOBAL =0.267E+07
   V-LOCAL =0.953E+04   V-GLOBAL =0.188E+00

     MAX CHANGE IN FP =   0.464E-08 KT AT (I,J) = ( 69, 39)
     MAX CHANGE IN FN =   0.653E-02 KT AT (I,J) = ( 45, 29)
     MAX CHANGE IN V  =   0.463E-08 KT AT (I,J) = ( 69, 33)
0ITERATION =     6

 GLOBAL NORM(0) =0.126E+07
   P-LOCAL =0.154E+10   P-GLOBAL =0.246E+06
   N-LOCAL =0.363E+11   N-GLOBAL =0.355E+07
   V-LOCAL =0.468E+04   V-GLOBAL =0.901E-01

     MAX CHANGE IN FP =   0.976E-10 KT AT (I,J) = ( 54, 12)
     MAX CHANGE IN FN =   0.214E-04 KT AT (I,J) = ( 45, 29)
     MAX CHANGE IN V  =   0.184E-09 KT AT (I,J) = ( 55,  5)
 FINAL NORM =0.126E+07
 TIME FOR SOLUTION =       33.1


 VBE=0.2000000000000 VOLTS
 JB= -0.9132326E-11   JC=  0.4271979E+01   JE= -0.1024122E-08

 JE=  0.1629256E-08
 JC= -0.1641018E-08
 JB= -0.1176163E-10

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27121E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70380E+00 (IN VOLTS)
     AT NODE:     36    23     X= 0.217E-02  Y= 0.560E-03

  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = -.186605E-08
 RSSUM = -.163450E-40     0.0000
 RSSUMB = -.328351E-43     0.0000
 RSSUMT = 0.578770E-41     0.0000
 RSSUML = -.309480E-44     0.0000
 RSSUMR = -.220967E-40     0.0000
 RBSUM = -.120452E-06 6373.5233
 RASUM = 0.117103E-06-6196.2913
 RDSUM = 0.148342E-08  -78.4928
 JMBSUM = 0.000000E+00     0.0000
 JMTSUM = -.238275E-10     1.2608
 JMLSUM = -.198355E-16     0.0000
 JMRSUM = 0.171266E-21     0.0000
 JTOT = -.188988E-08  JREC = -.188988E-08
 ***** ENTER DUMP2D
1INITIAL NORM =0.721E+17   V =  0.0000 VOLTS
   P-LOCAL =0.194E+22   P-GLOBAL =0.216E+18
   N-LOCAL =0.363E+11   N-GLOBAL =0.449E+07
   V-LOCAL =0.468E+04   V-GLOBAL =0.273E+00

0ITERATION =     1

 GLOBAL NORM(0) =0.822E+17
   P-LOCAL =0.266E+22   P-GLOBAL =0.247E+18
   N-LOCAL =0.320E+11   N-GLOBAL =0.384E+07
   V-LOCAL =0.106E+04   V-GLOBAL =0.104E+00

     MAX CHANGE IN FP =   0.116E+01 KT AT (I,J) = ( 43, 48)
     MAX CHANGE IN FN =   0.116E+01 KT AT (I,J) = ( 36, 36)
     MAX CHANGE IN V  =   0.116E+01 KT AT (I,J) = ( 43, 37)
0ITERATION =     2

 GLOBAL NORM(0) =0.655E+15
   P-LOCAL =0.178E+20   P-GLOBAL =0.197E+16
   N-LOCAL =0.439E+11   N-GLOBAL =0.300E+07
   V-LOCAL =0.129E+05   V-GLOBAL =0.211E+00

     MAX CHANGE IN FP =   0.781E+00 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =   0.827E+00 KT AT (I,J) = ( 46, 25)
     MAX CHANGE IN V  =   0.785E+00 KT AT (I,J) = ( 39, 47)
0ITERATION =     3

 GLOBAL NORM(0) =0.300E+13
   P-LOCAL =0.808E+17   P-GLOBAL =0.899E+13
   N-LOCAL =0.500E+11   N-GLOBAL =0.310E+07
   V-LOCAL =0.130E+04   V-GLOBAL =0.422E-01

     MAX CHANGE IN FP =   0.136E-01 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =   0.319E+00 KT AT (I,J) = ( 46, 25)
     MAX CHANGE IN V  =   0.136E-01 KT AT (I,J) = ( 43, 37)
0ITERATION =     4

 GLOBAL NORM(0) =0.966E+08
   P-LOCAL =0.258E+13   P-GLOBAL =0.288E+09
   N-LOCAL =0.369E+11   N-GLOBAL =0.162E+07
   V-LOCAL =0.759E+03   V-GLOBAL =0.277E-01

     MAX CHANGE IN FP =   0.760E-04 KT AT (I,J) = ( 66, 36)
     MAX CHANGE IN FN =   0.688E-01 KT AT (I,J) = ( 46, 25)
     MAX CHANGE IN V  =   0.759E-04 KT AT (I,J) = ( 47, 35)
0ITERATION =     5

 GLOBAL NORM(0) =0.102E+07
   P-LOCAL =0.737E+09   P-GLOBAL =0.117E+06
   N-LOCAL =0.364E+11   N-GLOBAL =0.294E+07
   V-LOCAL =0.812E+03   V-GLOBAL =0.406E-01
```

```
      MAX CHANGE IN FP =    0.595E-08 KT AT (I,J) = ( 69,  1)
      MAX CHANGE IN FN =    0.248E-02 KT AT (I,J) = ( 46, 25)
      MAX CHANGE IN V  =    0.607E-08 KT AT (I,J) = ( 69,  3)
0ITERATION =      6

 GLOBAL NORM(0) =0.933E+06
   P-LOCAL =0.112E+10    P-GLOBAL =0.155E+06
   N-LOCAL =0.253E+11    N-GLOBAL =0.264E+07
   V-LOCAL =0.182E+04    V-GLOBAL =0.511E-01

      MAX CHANGE IN FP =    0.139E-09 KT AT (I,J) = (  1, 14)
      MAX CHANGE IN FN =    0.309E-05 KT AT (I,J) = ( 46, 25)
      MAX CHANGE IN V  =    0.161E-09 KT AT (I,J) = ( 35, 48)
 FINAL NORM =0.933E+06
 TIME FOR SOLUTION =        33.2


 VBE=0.2500000000000 VOLTS
 JB=  0.1174743E-08   JC=  0.4271979E+01   JE= -0.6548347E-08

 JE=  0.7821899E-08
 JC= -0.6667816E-08
 JB=  0.1154083E-08

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27115E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70365E+00 (IN VOLTS)
     AT NODE:      36    23      X= 0.217E-02  Y= 0.560E-03

  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = 0.186165E-06
 RSSUM = 0.633368E-42     0.0000
 RSSUMB = -.328312E-43     0.0000
 RSSUMT = 0.166374E-40     0.0000
 RSSUML = -.309480E-44     0.0000
 RSSUMR = -.159681E-40     0.0000
 RBSUM = -.119322E-06   -64.0859
 RASUM = 0.299209E-06   160.6997
 RDSUM = 0.627844E-08     3.3720
 JMBSUM = 0.000000E+00     0.0000
 JMTSUM = 0.263437E-10     0.0141
 JMLSUM = -.198355E-16     0.0000
 JMRSUM = 0.342895E-20     0.0000
 JTOT = 0.186192E-06  JREC = 0.186192E-06
 ***** ENTER DUMP2D
1INITIAL NORM =0.721E+17    V =  0.0000 VOLTS
   P-LOCAL =0.194E+22    P-GLOBAL =0.216E+18
   N-LOCAL =0.253E+11    N-GLOBAL =0.359E+07
   V-LOCAL =0.182E+04    V-GLOBAL =0.234E+00
0ITERATION =      1

 GLOBAL NORM(0) =0.821E+17
   P-LOCAL =0.266E+22    P-GLOBAL =0.246E+18
   N-LOCAL =0.329E+11    N-GLOBAL =0.378E+07
   V-LOCAL =0.116E+04    V-GLOBAL =0.938E-01

      MAX CHANGE IN FP =    0.116E+01 KT AT (I,J) = ( 43, 48)
      MAX CHANGE IN FN =    0.116E+01 KT AT (I,J) = ( 36, 36)
      MAX CHANGE IN V  =    0.116E+01 KT AT (I,J) = ( 43, 37)
0ITERATION =      2

 GLOBAL NORM(0) =0.655E+15
   P-LOCAL =0.178E+20    P-GLOBAL =0.197E+16
   N-LOCAL =0.406E+11    N-GLOBAL =0.267E+07
   V-LOCAL =0.383E+04    V-GLOBAL =0.726E-01

      MAX CHANGE IN FP =    0.781E+00 KT AT (I,J) = ( 43, 48)
      MAX CHANGE IN FN =    0.102E+01 KT AT (I,J) = ( 44, 48)
      MAX CHANGE IN V  =    0.785E+00 KT AT (I,J) = ( 42, 47)
0ITERATION =      3

 GLOBAL NORM(0) =0.300E+13
   P-LOCAL =0.808E+17    P-GLOBAL =0.900E+13
   N-LOCAL =0.375E+11    N-GLOBAL =0.230E+07
   V-LOCAL =0.329E+04    V-GLOBAL =0.563E-01

      MAX CHANGE IN FP =    0.136E-01 KT AT (I,J) = ( 43, 48)
      MAX CHANGE IN FN =    0.437E+00 KT AT (I,J) = ( 44, 37)
      MAX CHANGE IN V  =    0.136E-01 KT AT (I,J) = ( 43, 37)
0ITERATION =      4

 GLOBAL NORM(0) =0.973E+08
   P-LOCAL =0.259E+13    P-GLOBAL =0.288E+09
   N-LOCAL =0.345E+11    N-GLOBAL =0.358E+07
   V-LOCAL =0.619E+04    V-GLOBAL =0.313E+00

      MAX CHANGE IN FP =    0.761E-04 KT AT (I,J) = ( 69, 38)
      MAX CHANGE IN FN =    0.138E+00 KT AT (I,J) = ( 44, 37)
      MAX CHANGE IN V  =    0.759E-04 KT AT (I,J) = ( 47, 35)
0ITERATION =      5

 GLOBAL NORM(0) =0.976E+06
   P-LOCAL =0.664E+09    P-GLOBAL =0.178E+06
   N-LOCAL =0.474E+11    N-GLOBAL =0.275E+07
   V-LOCAL =0.129E+04    V-GLOBAL =0.442E-01

      MAX CHANGE IN FP =    0.257E-07 KT AT (I,J) = ( 48,  7)
      MAX CHANGE IN FN =    0.104E-01 KT AT (I,J) = ( 44, 37)
      MAX CHANGE IN V  =    0.256E-07 KT AT (I,J) = ( 69,  3)
0ITERATION =      6
```

```
 GLOBAL NORM(0) =0.926E+06
   P-LOCAL =0.125E+10   P-GLOBAL =0.151E+06
   N-LOCAL =0.394E+11   N-GLOBAL =0.263E+07
   V-LOCAL =0.205E+04   V-GLOBAL =0.359E-01

     MAX CHANGE IN FP =   0.167E-09 KT AT (I,J) = ( 65, 12)
     MAX CHANGE IN FN =   0.543E-04 KT AT (I,J) = ( 44, 37)
     MAX CHANGE IN V  =   0.286E-09 KT AT (I,J) = ( 59,  2)
 FINAL NORM =0.926E+06
 TIME FOR SOLUTION =       33.4


 VBE=0.3000000000000 VOLTS
 JB=  0.4332651E-08   JC=  0.4271979E+01   JE= -0.4427184E-07

 JE=  0.4431566E-07
 JC= -0.4005004E-07
 JB=  0.4265615E-08

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27108E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70347E+00 (IN VOLTS)
     AT NODE:     36   23     X= 0.217E-02  Y= 0.560E-03

  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = 0.687969E-06
 RSSUM = 0.494276E-40     0.0000
 RSSUMB = -.328275E-43     0.0000
 RSSUMT = 0.486485E-40     0.0000
 RSSUML = -.309480E-44     0.0000
 RSSUMR = 0.815090E-42     0.0000
 RBSUM = -.118222E-06   -17.1750
 RASUM = 0.778690E-06   113.1257
 RDSUM = 0.275019E-07     3.9954
 JMBSUM = 0.000000E+00     0.0000
 JMTSUM = 0.370779E-09     0.0539
 JMLSUM = -.198355E-16     0.0000
 JMRSUM = 0.635439E-19     0.0000
 JTOT = 0.688340E-06  JREC = 0.688340E-06
 ***** ENTER DUMP2D
1INITIAL NORM =0.722E+17   V =  0.0000 VOLTS
   P-LOCAL =0.194E+22   P-GLOBAL =0.216E+18
   N-LOCAL =0.394E+11   N-GLOBAL =0.357E+07
   V-LOCAL =0.205E+04   V-GLOBAL =0.219E+00

0ITERATION =      1

 GLOBAL NORM(0) =0.820E+17
   P-LOCAL =0.265E+22   P-GLOBAL =0.246E+18
   N-LOCAL =0.316E+11   N-GLOBAL =0.436E+07
   V-LOCAL =0.712E+03   V-GLOBAL =0.930E-01

     MAX CHANGE IN FP =   0.116E+01 KT AT (I,J) = ( 43, 48)
     MAX CHANGE IN FN =   0.116E+01 KT AT (I,J) = ( 36, 36)
     MAX CHANGE IN V  =   0.116E+01 KT AT (I,J) = ( 43, 37)
0ITERATION =      2

 GLOBAL NORM(0) =0.656E+15
   P-LOCAL =0.178E+20   P-GLOBAL =0.197E+16
   N-LOCAL =0.432E+11   N-GLOBAL =0.240E+07
   V-LOCAL =0.509E+03   V-GLOBAL =0.493E-01

     MAX CHANGE IN FP =   0.781E+00 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =   0.828E+00 KT AT (I,J) = ( 44, 29)
     MAX CHANGE IN V  =   0.785E+00 KT AT (I,J) = ( 39, 47)
0ITERATION =      3

 GLOBAL NORM(0) =0.300E+13
   P-LOCAL =0.808E+17   P-GLOBAL =0.900E+13
   N-LOCAL =0.387E+11   N-GLOBAL =0.329E+07
   V-LOCAL =0.265E+04   V-GLOBAL =0.651E-01

     MAX CHANGE IN FP =   0.136E-01 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =   0.363E+00 KT AT (I,J) = ( 44, 29)
     MAX CHANGE IN V  =   0.136E-01 KT AT (I,J) = ( 43, 37)
0ITERATION =      4

 GLOBAL NORM(0) =0.969E+08
   P-LOCAL =0.259E+13   P-GLOBAL =0.288E+09
   N-LOCAL =0.291E+11   N-GLOBAL =0.228E+07
   V-LOCAL =0.442E+03   V-GLOBAL =0.380E-01

     MAX CHANGE IN FP =   0.770E-04 KT AT (I,J) = ( 69, 33)
     MAX CHANGE IN FN =   0.911E-01 KT AT (I,J) = ( 44, 29)
     MAX CHANGE IN V  =   0.767E-04 KT AT (I,J) = ( 47, 35)
0ITERATION =      5

 GLOBAL NORM(0) =0.110E+07
   P-LOCAL =0.666E+09   P-GLOBAL =0.105E+06
   N-LOCAL =0.427E+11   N-GLOBAL =0.320E+07
   V-LOCAL =0.243E+04   V-GLOBAL =0.608E-01

     MAX CHANGE IN FP =   0.515E-07 KT AT (I,J) = ( 69,  1)
     MAX CHANGE IN FN =   0.442E-02 KT AT (I,J) = ( 44, 29)
     MAX CHANGE IN V  =   0.520E-07 KT AT (I,J) = ( 69,  1)
0ITERATION =      6

 GLOBAL NORM(0) =0.795E+06
   P-LOCAL =0.449E+09   P-GLOBAL =0.847E+05
   N-LOCAL =0.345E+11   N-GLOBAL =0.230E+07
   V-LOCAL =0.990E+03   V-GLOBAL =0.608E-01
```

```
     MAX CHANGE IN FP =    0.327E-09 KT AT (I,J) = ( 69,  1)
     MAX CHANGE IN FN =    0.979E-05 KT AT (I,J) = ( 44, 29)
     MAX CHANGE IN V  =    0.524E-09 KT AT (I,J) = ( 58,  3)
 FINAL NORM =0.795E+06
 TIME FOR SOLUTION =        33.6


 VBE=0.3500000000000 VOLTS
 JB=  0.1311009E-07   JC=  0.4271979E+01   JE= -0.2734213E-06

 JE=  0.2744610E-06
 JC= -0.2615534E-06
 JB=  0.1290768E-07

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27100E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70325E+00 (IN VOLTS)
     AT NODE:     36   23     X= 0.217E-02  Y= 0.560E-03

  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = 0.208147E-05
 RSSUM = 0.195386E-39    0.0000
 RSSUMB = -.328239E-43    0.0000
 RSSUMT = 0.146961E-39    0.0000
 RSSUML = -.309479E-44    0.0000
 RSSUMR = 0.484617E-40    0.0000
 RBSUM = -.117117E-06   -5.6193
 RASUM = 0.207176E-05   99.4030
 RDSUM = 0.126823E-06    6.0850
 JMBSUM = 0.000000E+00    0.0000
 JMTSUM = 0.273588E-08    0.1313
 JMLSUM = -.198355E-16    0.0000
 JMRSUM = 0.117521E-17    0.0000
 JTOT = 0.208420E-05  JREC = 0.208420E-05
 ***** ENTER DUMP2D
1INITIAL NORM =0.722E+17   V =  0.0000 VOLTS
   P-LOCAL =0.195E+22   P-GLOBAL =0.217E+18
   N-LOCAL =0.345E+11   N-GLOBAL =0.325E+07
   V-LOCAL =0.158E+04   V-GLOBAL =0.244E+00

0ITERATION =     1

 GLOBAL NORM(0) =0.819E+17
   P-LOCAL =0.265E+22   P-GLOBAL =0.246E+18
   N-LOCAL =0.361E+11   N-GLOBAL =0.522E+07
   V-LOCAL =0.163E+04   V-GLOBAL =0.109E+00

     MAX CHANGE IN FP =    0.116E+01 KT AT (I,J) = ( 43, 48)
     MAX CHANGE IN FN =    0.116E+01 KT AT (I,J) = ( 36, 36)
     MAX CHANGE IN V  =    0.116E+01 KT AT (I,J) = ( 43, 37)
0ITERATION =     2

 GLOBAL NORM(0) =0.656E+15
   P-LOCAL =0.178E+20   P-GLOBAL =0.197E+16
   N-LOCAL =0.287E+11   N-GLOBAL =0.282E+07
   V-LOCAL =0.627E+03   V-GLOBAL =0.445E-01

     MAX CHANGE IN FP =    0.781E+00 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =    0.101E+01 KT AT (I,J) = ( 44, 28)
     MAX CHANGE IN V  =    0.785E+00 KT AT (I,J) = ( 39, 47)
0ITERATION =     3

 GLOBAL NORM(0) =0.300E+13
   P-LOCAL =0.809E+17   P-GLOBAL =0.900E+13
   N-LOCAL =0.183E+11   N-GLOBAL =0.211E+07
   V-LOCAL =0.170E+04   V-GLOBAL =0.448E-01

     MAX CHANGE IN FP =    0.150E-01 KT AT (I,J) = ( 65, 22)
     MAX CHANGE IN FN =    0.412E+00 KT AT (I,J) = ( 44, 28)
     MAX CHANGE IN V  =    0.136E-01 KT AT (I,J) = ( 38, 37)
0ITERATION =     4

 GLOBAL NORM(0) =0.970E+08
   P-LOCAL =0.259E+13   P-GLOBAL =0.289E+09
   N-LOCAL =0.263E+11   N-GLOBAL =0.250E+07
   V-LOCAL =0.806E+04   V-GLOBAL =0.124E+00

     MAX CHANGE IN FP =    0.785E-04 KT AT (I,J) = ( 69, 36)
     MAX CHANGE IN FN =    0.120E+00 KT AT (I,J) = ( 44, 28)
     MAX CHANGE IN V  =    0.783E-04 KT AT (I,J) = ( 69, 33)
0ITERATION =     5

 GLOBAL NORM(0) =0.894E+06
   P-LOCAL =0.566E+09   P-GLOBAL =0.888E+05
   N-LOCAL =0.348E+11   N-GLOBAL =0.259E+07
   V-LOCAL =0.747E+03   V-GLOBAL =0.599E-01

     MAX CHANGE IN FP =    0.271E-06 KT AT (I,J) = ( 64, 13)
     MAX CHANGE IN FN =    0.785E-02 KT AT (I,J) = ( 44, 28)
     MAX CHANGE IN V  =    0.225E-06 KT AT (I,J) = ( 58,  4)
0ITERATION =     6

 GLOBAL NORM(0) =0.671E+06
   P-LOCAL =0.545E+09   P-GLOBAL =0.665E+05
   N-LOCAL =0.319E+11   N-GLOBAL =0.195E+07
   V-LOCAL =0.983E+03   V-GLOBAL =0.337E-01

     MAX CHANGE IN FP =    0.152E-08 KT AT (I,J) = ( 55,  4)
     MAX CHANGE IN FN =    0.309E-04 KT AT (I,J) = ( 44, 28)
     MAX CHANGE IN V  =    0.162E-08 KT AT (I,J) = ( 59,  5)
 FINAL NORM =0.671E+06
```

```
 TIME FOR SOLUTION =       34.0


 VBE=0.4000000000000 VOLTS
 JB=  0.3877419E-07   JC=  0.4271981E+01   JE= -0.1770719E-05

 JE=  0.1769057E-05
 JC= -0.1730870E-05
 JB=  0.3818702E-07
 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27090E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70300E+00 (IN VOLTS)
     AT NODE:     36    23     X= 0.217E-02  Y= 0.560E-03
  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = 0.615614E-05
 RSSUM = 0.656399E-39     0.0000
 RSSUMB = -.328204E-43     0.0000
 RSSUMT = 0.469625E-39     0.0000
 RSSUML = -.309479E-44     0.0000
 RSSUMR = 0.186810E-39     0.0000
 RBSUM = -.115628E-06    -1.8725
 RASUM = 0.564666E-05    91.4422
 RDSUM = 0.625107E-06    10.1230
 JMBSUM = 0.000000E+00     0.0000
 JMTSUM = 0.189763E-07     0.3073
 JMLSUM = -.198355E-16     0.0000
 JMRSUM = 0.224416E-16     0.0000
 JTOT = 0.617512E-05  JREC = 0.617512E-05
 ***** ENTER DUMP2D
1INITIAL NORM =0.722E+17    V =  0.0000 VOLTS
    P-LOCAL =0.195E+22    P-GLOBAL =0.217E+18
    N-LOCAL =0.319E+11    N-GLOBAL =0.289E+07
    V-LOCAL =0.158E+04    V-GLOBAL =0.217E+00
0ITERATION =      1
 GLOBAL NORM(0) =0.818E+17
    P-LOCAL =0.265E+22    P-GLOBAL =0.245E+18
    N-LOCAL =0.303E+11    N-GLOBAL =0.764E+07
    V-LOCAL =0.142E+04    V-GLOBAL =0.129E+00
      MAX CHANGE IN FP =    0.116E+01 KT AT (I,J) = ( 38, 48)
      MAX CHANGE IN FN =    0.116E+01 KT AT (I,J) = ( 36, 36)
      MAX CHANGE IN V  =    0.116E+01 KT AT (I,J) = ( 38, 37)
0ITERATION =      2
 GLOBAL NORM(0) =0.657E+15
    P-LOCAL =0.178E+20    P-GLOBAL =0.197E+16
    N-LOCAL =0.176E+11    N-GLOBAL =0.277E+07
    V-LOCAL =0.627E+03    V-GLOBAL =0.480E-01
      MAX CHANGE IN FP =    0.781E+00 KT AT (I,J) = ( 38, 48)
      MAX CHANGE IN FN =    0.794E+00 KT AT (I,J) = ( 38, 48)
      MAX CHANGE IN V  =    0.785E+00 KT AT (I,J) = ( 39, 47)
0ITERATION =      3
 GLOBAL NORM(0) =0.300E+13
    P-LOCAL =0.809E+17    P-GLOBAL =0.901E+13
    N-LOCAL =0.367E+11    N-GLOBAL =0.309E+07
    V-LOCAL =0.175E+04    V-GLOBAL =0.118E+00
      MAX CHANGE IN FP =    0.371E-01 KT AT (I,J) = ( 69, 19)
      MAX CHANGE IN FN =    0.326E+00 KT AT (I,J) = ( 44, 27)
      MAX CHANGE IN V  =    0.136E-01 KT AT (I,J) = ( 38, 37)
0ITERATION =      4
 GLOBAL NORM(0) =0.975E+08
    P-LOCAL =0.259E+13    P-GLOBAL =0.289E+09
    N-LOCAL =0.434E+11    N-GLOBAL =0.364E+07
    V-LOCAL =0.223E+04    V-GLOBAL =0.426E-01
      MAX CHANGE IN FP =    0.287E-03 KT AT (I,J) = ( 66, 10)
      MAX CHANGE IN FN =    0.723E-01 KT AT (I,J) = ( 44, 27)
      MAX CHANGE IN V  =    0.810E-04 KT AT (I,J) = ( 69, 33)
0ITERATION =      5
 GLOBAL NORM(0) =0.725E+06
    P-LOCAL =0.509E+09    P-GLOBAL =0.101E+06
    N-LOCAL =0.245E+11    N-GLOBAL =0.207E+07
    V-LOCAL =0.409E+04    V-GLOBAL =0.910E-01
      MAX CHANGE IN FP =    0.572E-05 KT AT (I,J) = ( 69, 13)
      MAX CHANGE IN FN =    0.275E-02 KT AT (I,J) = ( 44, 27)
      MAX CHANGE IN V  =    0.441E-06 KT AT (I,J) = ( 60,  2)
0ITERATION =      6
 GLOBAL NORM(0) =0.102E+07
    P-LOCAL =0.617E+09    P-GLOBAL =0.927E+05
    N-LOCAL =0.270E+11    N-GLOBAL =0.297E+07
    V-LOCAL =0.164E+04    V-GLOBAL =0.731E-01
      MAX CHANGE IN FP =    0.307E-08 KT AT (I,J) = ( 58,  1)
      MAX CHANGE IN FN =    0.379E-05 KT AT (I,J) = ( 44, 27)
      MAX CHANGE IN V  =    0.318E-08 KT AT (I,J) = ( 55,  3)
 FINAL NORM =0.102E+07
 TIME FOR SOLUTION =       34.5


 VBE=0.4500000000000 VOLTS
```

```
 JB=  0.1198804E-06   JC=  0.4271991E+01   JE= -0.1160902E-04

 JE=  0.1158773E-04
 JC= -0.1146958E-04
 JB=  0.1181461E-06
 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27079E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70271E+00 (IN VOLTS)
     AT NODE:     36   23     X= 0.217E-02  Y= 0.560E-03

  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = 0.190346E-04
 RSSUM = 0.224590E-38     0.0000
 RSSUMB = -.328174E-43     0.0000
 RSSUMT = 0.165016E-38     0.0000
 RSSUML = -.309480E-44     0.0000
 RSSUMR = 0.595777E-39     0.0000
 RBSUM = -.111592E-06    -0.5823
 RASUM = 0.158288E-04    82.5916
 RDSUM = 0.331745E-05    17.3098
 JMBSUM = 0.000000E+00     0.0000
 JMTSUM = 0.130490E-06     0.6809
 JMLSUM = -.198355E-16     0.0000
 JMRSUM = 0.456232E-15     0.0000
 JTOT = 0.191651E-04  JREC = 0.191651E-04
 ***** ENTER DUMP2D
1INITIAL NORM =0.723E+17    V =  0.0000 VOLTS
   P-LOCAL =0.195E+22    P-GLOBAL =0.217E+18
   N-LOCAL =0.270E+11    N-GLOBAL =0.392E+07
   V-LOCAL =0.164E+04    V-GLOBAL =0.256E+00
0ITERATION =      1
 GLOBAL NORM(0) =0.817E+17
   P-LOCAL =0.264E+22    P-GLOBAL =0.245E+18
   N-LOCAL =0.112E+12    N-GLOBAL =0.276E+08
   V-LOCAL =0.452E+04    V-GLOBAL =0.175E+00
     MAX CHANGE IN FP =    0.116E+01 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =    0.116E+01 KT AT (I,J) = ( 36, 36)
     MAX CHANGE IN V  =    0.116E+01 KT AT (I,J) = ( 38, 37)
0ITERATION =      2
 GLOBAL NORM(0) =0.657E+15
   P-LOCAL =0.179E+20    P-GLOBAL =0.197E+16
   N-LOCAL =0.147E+12    N-GLOBAL =0.728E+07
   V-LOCAL =0.103E+04    V-GLOBAL =0.109E+00
     MAX CHANGE IN FP =    0.781E+00 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =    0.794E+00 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN V  =    0.785E+00 KT AT (I,J) = ( 39, 47)
0ITERATION =      3
 GLOBAL NORM(0) =0.301E+13
   P-LOCAL =0.810E+17    P-GLOBAL =0.902E+13
   N-LOCAL =0.578E+11    N-GLOBAL =0.278E+07
   V-LOCAL =0.146E+03    V-GLOBAL =0.203E-01
     MAX CHANGE IN FP =    0.167E+00 KT AT (I,J) = ( 69, 20)
     MAX CHANGE IN FN =    0.224E+00 KT AT (I,J) = ( 47, 12)
     MAX CHANGE IN V  =    0.345E-01 KT AT (I,J) = ( 69,  4)
0ITERATION =      4
 GLOBAL NORM(0) =0.973E+08
   P-LOCAL =0.259E+13    P-GLOBAL =0.289E+09
   N-LOCAL =0.441E+11    N-GLOBAL =0.297E+07
   V-LOCAL =0.563E+04    V-GLOBAL =0.115E+00
     MAX CHANGE IN FP =    0.643E-02 KT AT (I,J) = ( 69, 20)
     MAX CHANGE IN FN =    0.171E-01 KT AT (I,J) = ( 47, 12)
     MAX CHANGE IN V  =    0.801E-04 KT AT (I,J) = ( 69, 33)
0ITERATION =      5
 GLOBAL NORM(0) =0.101E+07
   P-LOCAL =0.402E+09    P-GLOBAL =0.893E+05
   N-LOCAL =0.260E+11    N-GLOBAL =0.295E+07
   V-LOCAL =0.124E+04    V-GLOBAL =0.390E-01
     MAX CHANGE IN FP =    0.707E-04 KT AT (I,J) = ( 67, 14)
     MAX CHANGE IN FN =    0.149E-03 KT AT (I,J) = ( 47, 12)
     MAX CHANGE IN V  =    0.285E-07 KT AT (I,J) = ( 69, 33)
0ITERATION =      6
 GLOBAL NORM(0) =0.790E+06
   P-LOCAL =0.866E+09    P-GLOBAL =0.992E+05
   N-LOCAL =0.204E+11    N-GLOBAL =0.227E+07
   V-LOCAL =0.176E+04    V-GLOBAL =0.679E-01
     MAX CHANGE IN FP =    0.234E-08 KT AT (I,J) = ( 60, 14)
     MAX CHANGE IN FN =    0.113E-07 KT AT (I,J) = ( 47, 12)
     MAX CHANGE IN V  =    0.459E-09 KT AT (I,J) = ( 60,  5)
 FINAL NORM =0.790E+06
 TIME FOR SOLUTION =        35.1


 VBE=0.5000000000000 VOLTS
 JB=  0.4085030E-06   JC=  0.4272055E+01   JE= -0.7643781E-04

 JE=  0.7629415E-04
 JC= -0.7589110E-04
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 JB=  0.4030480E-06
 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27066E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70237E+00 (IN VOLTS)
     AT NODE:     36   23     X= 0.217E-02  Y= 0.560E-03
  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = 0.648622E-04
 RSSUM = 0.849068E-38    0.0000
 RSSUMB = -.328167E-43    0.0000
 RSSUMT = 0.666590E-38    0.0000
 RSSUML = -.309480E-44    0.0000
 RSSUMR = 0.182481E-38    0.0000
 RBSUM = -.980964E-07   -0.1492
 RASUM = 0.460781E-04   70.0721
 RDSUM = 0.188821E-04   28.7144
 JMBSUM = 0.000000E+00    0.0000
 JMTSUM = 0.896070E-06    1.3627
 JMLSUM = -.198355E-16    0.0000
 JMRSUM = 0.102813E-13    0.0000
 JTOT = 0.657582E-04  JREC = 0.657582E-04
 ***** ENTER DUMP2D
1INITIAL NORM =0.723E+17   V =  0.0000 VOLTS
   P-LOCAL =0.195E+22   P-GLOBAL =0.217E+18
   N-LOCAL =0.204E+11   N-GLOBAL =0.322E+07
   V-LOCAL =0.176E+04   V-GLOBAL =0.251E+00
0ITERATION =     1
 GLOBAL NORM(0) =0.815E+17
   P-LOCAL =0.262E+22   P-GLOBAL =0.244E+18
   N-LOCAL =0.101E+13   N-GLOBAL =0.183E+09
   V-LOCAL =0.138E+04   V-GLOBAL =0.149E+00
     MAX CHANGE IN FP =   0.116E+01 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =   0.116E+01 KT AT (I,J) = ( 36, 36)
     MAX CHANGE IN V  =   0.116E+01 KT AT (I,J) = ( 38, 37)
0ITERATION =     2
 GLOBAL NORM(0) =0.658E+15
   P-LOCAL =0.179E+20   P-GLOBAL =0.197E+16
   N-LOCAL =0.130E+13   N-GLOBAL =0.247E+08
   V-LOCAL =0.903E+03   V-GLOBAL =0.272E-01
     MAX CHANGE IN FP =   0.781E+00 KT AT (I,J) = ( 38, 48)
     MAX CHANGE IN FN =   0.881E+00 KT AT (I,J) = ( 69,  9)
     MAX CHANGE IN V  =   0.785E+00 KT AT (I,J) = ( 39, 47)
0ITERATION =     3
 GLOBAL NORM(0) =0.301E+13
   P-LOCAL =0.810E+17   P-GLOBAL =0.904E+13
   N-LOCAL =0.457E+12   N-GLOBAL =0.920E+07
   V-LOCAL =0.279E+04   V-GLOBAL =0.611E-01
     MAX CHANGE IN FP =   0.357E+00 KT AT (I,J) = ( 62, 22)
     MAX CHANGE IN FN =   0.335E+00 KT AT (I,J) = ( 69, 16)
     MAX CHANGE IN V  =   0.223E+00 KT AT (I,J) = ( 69,  4)
0ITERATION =     4
 GLOBAL NORM(0) =0.974E+08
   P-LOCAL =0.259E+13   P-GLOBAL =0.290E+09
   N-LOCAL =0.287E+11   N-GLOBAL =0.268E+07
   V-LOCAL =0.113E+04   V-GLOBAL =0.495E-01
     MAX CHANGE IN FP =   0.450E-01 KT AT (I,J) = ( 62, 22)
     MAX CHANGE IN FN =   0.521E-01 KT AT (I,J) = ( 44, 26)
     MAX CHANGE IN V  =   0.213E-03 KT AT (I,J) = ( 69,  5)
0ITERATION =     5
 GLOBAL NORM(0) =0.112E+07
   P-LOCAL =0.594E+09   P-GLOBAL =0.150E+06
   N-LOCAL =0.497E+11   N-GLOBAL =0.320E+07
   V-LOCAL =0.152E+04   V-GLOBAL =0.703E-01
     MAX CHANGE IN FP =   0.937E-03 KT AT (I,J) = ( 62, 22)
     MAX CHANGE IN FN =   0.141E-02 KT AT (I,J) = ( 44, 26)
     MAX CHANGE IN V  =   0.387E-06 KT AT (I,J) = ( 69,  4)
0ITERATION =     6
 GLOBAL NORM(0) =0.818E+06
   P-LOCAL =0.114E+10   P-GLOBAL =0.156E+06
   N-LOCAL =0.433E+11   N-GLOBAL =0.230E+07
   V-LOCAL =0.159E+04   V-GLOBAL =0.114E+00
     MAX CHANGE IN FP =   0.435E-06 KT AT (I,J) = ( 62, 22)
     MAX CHANGE IN FN =   0.993E-06 KT AT (I,J) = ( 44, 26)
     MAX CHANGE IN V  =   0.163E-09 KT AT (I,J) = ( 32, 47)
 FINAL NORM =0.818E+06
 TIME FOR SOLUTION =       35.5


 VBE=0.5500000000000 VOLTS
 JB=  0.1610036E-05   JC=  0.4272480E+01   JE= -0.5024551E-03

 JE=  0.5015075E-03
 JC= -0.4999164E-03
 JB=  0.1591175E-05
 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27049E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70193E+00 (IN VOLTS)
     AT NODE:     36   23     X= 0.217E-02  Y= 0.560E-03
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   REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

    RGSUM = 0.255642E-03
   RSSUM = 0.371718E-37     0.0000
   RSSUMB = -.328307E-43     0.0000
   RSSUMT = 0.315687E-37     0.0000
   RSSUML = -.309483E-44     0.0000
   RSSUMR = 0.560304E-38     0.0000
   RBSUM = -.649829E-07    -0.0248
   RASUM = 0.141976E-03    54.2328
   RDSUM = 0.113731E-03    43.4434
   JMBSUM = 0.000000E+00     0.0000
   JMTSUM = 0.614843E-05     2.3486
   JMLSUM = -.198355E-16     0.0000
   JMRSUM = 0.268184E-12     0.0000
   JTOT = 0.261790E-03  JREC = 0.261790E-03
   ***** ENTER DUMP2D
 1INITIAL NORM =0.725E+17   V =  0.0000 VOLTS
    P-LOCAL =0.195E+22   P-GLOBAL =0.217E+18
    N-LOCAL =0.433E+11   N-GLOBAL =0.325E+07
    V-LOCAL =0.159E+04   V-GLOBAL =0.297E+00

 0ITERATION =      1

  GLOBAL NORM(0) =0.806E+17
    P-LOCAL =0.262E+22   P-GLOBAL =0.242E+18
    N-LOCAL =0.275E+14   N-GLOBAL =0.403E+10
    V-LOCAL =0.205E+04   V-GLOBAL =0.110E+02

      MAX CHANGE IN FP =   0.127E+01 KT AT (I,J) = ( 69,  9)
      MAX CHANGE IN FN =   0.133E+01 KT AT (I,J) = ( 69,  9)
      MAX CHANGE IN V  =   0.123E+01 KT AT (I,J) = ( 69,  4)
 0ITERATION =      2

  GLOBAL NORM(0) =0.664E+15
    P-LOCAL =0.179E+20   P-GLOBAL =0.199E+16
    N-LOCAL =0.363E+14   N-GLOBAL =0.994E+10
    V-LOCAL =0.126E+04   V-GLOBAL =0.275E+02

      MAX CHANGE IN FP =   0.179E+01 KT AT (I,J) = ( 69,  9)
      MAX CHANGE IN FN =   0.190E+01 KT AT (I,J) = ( 69,  9)
      MAX CHANGE IN V  =   0.159E+01 KT AT (I,J) = ( 69,  4)
 0ITERATION =      3

  GLOBAL NORM(0) =0.306E+13
    P-LOCAL =0.811E+17   P-GLOBAL =0.915E+13
    N-LOCAL =0.632E+13   N-GLOBAL =0.124E+11
    V-LOCAL =0.583E+04   V-GLOBAL =0.368E+02

      MAX CHANGE IN FP =   0.157E+01 KT AT (I,J) = ( 69,  8)
      MAX CHANGE IN FN =   0.164E+01 KT AT (I,J) = ( 69,  8)
      MAX CHANGE IN V  =   0.155E+01 KT AT (I,J) = ( 69,  4)
 0ITERATION =      4

  GLOBAL NORM(0) =0.369E+10
    P-LOCAL =0.260E+13   P-GLOBAL =0.294E+09
    N-LOCAL =0.469E+12   N-GLOBAL =0.108E+11
    V-LOCAL =0.323E+04   V-GLOBAL =0.337E+02

      MAX CHANGE IN FP =   0.125E+01 KT AT (I,J) = ( 69,  2)
      MAX CHANGE IN FN =   0.127E+01 KT AT (I,J) = ( 69,  7)
      MAX CHANGE IN V  =   0.126E+01 KT AT (I,J) = ( 69,  4)
 0ITERATION =      5

  GLOBAL NORM(0) =0.198E+10
    P-LOCAL =0.732E+09   P-GLOBAL =0.236E+06
    N-LOCAL =0.173E+12   N-GLOBAL =0.594E+10
    V-LOCAL =0.128E+04   V-GLOBAL =0.193E+02

      MAX CHANGE IN FP =   0.135E+01 KT AT (I,J) = ( 69, 20)
      MAX CHANGE IN FN =   0.114E+01 KT AT (I,J) = ( 69,  7)
      MAX CHANGE IN V  =   0.113E+01 KT AT (I,J) = ( 69,  4)
 0ITERATION =      6

  GLOBAL NORM(0) =0.572E+09
    P-LOCAL =0.108E+10   P-GLOBAL =0.240E+06
    N-LOCAL =0.546E+11   N-GLOBAL =0.171E+10
    V-LOCAL =0.411E+03   V-GLOBAL =0.192E-01

      MAX CHANGE IN FP =   0.724E+00 KT AT (I,J) = ( 64, 16)
      MAX CHANGE IN FN =   0.777E+00 KT AT (I,J) = ( 69,  7)
      MAX CHANGE IN V  =   0.706E+00 KT AT (I,J) = ( 69,  4)
 0ITERATION =      7

  GLOBAL NORM(0) =0.905E+07
    P-LOCAL =0.585E+09   P-GLOBAL =0.196E+06
    N-LOCAL =0.200E+11   N-GLOBAL =0.270E+08
    V-LOCAL =0.535E+03   V-GLOBAL =0.211E-01

      MAX CHANGE IN FP =   0.148E+00 KT AT (I,J) = ( 64, 16)
      MAX CHANGE IN FN =   0.632E-01 KT AT (I,J) = ( 69,  8)
      MAX CHANGE IN V  =   0.883E-02 KT AT (I,J) = ( 46,  6)
 0ITERATION =      8

  GLOBAL NORM(0) =0.104E+07
    P-LOCAL =0.984E+09   P-GLOBAL =0.229E+06
    N-LOCAL =0.300E+11   N-GLOBAL =0.289E+07
    V-LOCAL =0.906E+03   V-GLOBAL =0.252E-01

      MAX CHANGE IN FP =   0.110E-01 KT AT (I,J) = ( 64, 16)
      MAX CHANGE IN FN =   0.255E-02 KT AT (I,J) = ( 69,  8)
      MAX CHANGE IN V  =   0.720E-04 KT AT (I,J) = ( 69,  5)
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0ITERATION =      9
 GLOBAL NORM(0) =0.807E+06
   P-LOCAL =0.572E+09    P-GLOBAL =0.178E+06
   N-LOCAL =0.275E+11    N-GLOBAL =0.224E+07
   V-LOCAL =0.191E+05    V-GLOBAL =0.237E+00

     MAX CHANGE IN FP =    0.609E-04 KT AT (I,J) = ( 64,  16)
     MAX CHANGE IN FN =    0.343E-05 KT AT (I,J) = ( 69,   8)
     MAX CHANGE IN V  =    0.291E-08 KT AT (I,J) = ( 69,   5)
 FINAL NORM =0.807E+06
 TIME FOR SOLUTION =        53.9


 VBE=0.6000000000000 VOLTS
 JB=  0.7462373E-05   JC=  0.4275229E+01   JE= -0.3257129E-02

 JE=  0.3250976E-02
 JC= -0.3243587E-02
 JB=  0.7388636E-05

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.27012E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.70096E+00 (IN VOLTS)
     AT NODE:     36   23      X= 0.217E-02  Y= 0.560E-03

  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = 0.118488E-02
 RSSUM = 0.187273E-36     0.0000
 RSSUMB = -.329142E-43     0.0000
 RSSUMT = 0.169456E-36     0.0000
 RSSUML = -.309497E-44     0.0000
 RSSUMR = 0.178170E-37     0.0000
 RBSUM = 0.723337E-07     0.0059
 RASUM = 0.475447E-03    38.7506
 RDSUM = 0.709363E-03    57.8156
 JMBSUM = 0.000000E+00     0.0000
 JMTSUM = 0.420591E-04     3.4280
 JMLSUM = -.198354E-16     0.0000
 JMRSUM = 0.820349E-11     0.0000
 JTOT = 0.122694E-02  JREC = 0.122694E-02
 ***** ENTER DUMP2D
1INITIAL NORM =0.734E+17    V =  0.0000 VOLTS
   P-LOCAL =0.195E+22    P-GLOBAL =0.220E+18
   N-LOCAL =0.275E+11    N-GLOBAL =0.321E+07
   V-LOCAL =0.191E+05    V-GLOBAL =0.420E+00
0ITERATION =      1
 GLOBAL NORM(0) =0.771E+17
   P-LOCAL =0.261E+22    P-GLOBAL =0.231E+18
   N-LOCAL =0.939E+15    N-GLOBAL =0.167E+11
   V-LOCAL =0.209E+10    V-GLOBAL =0.248E+08

     MAX CHANGE IN FP =    0.285E+01 KT AT (I,J) = ( 69,   3)
     MAX CHANGE IN FN =    0.288E+01 KT AT (I,J) = ( 69,   6)
     MAX CHANGE IN V  =    0.287E+01 KT AT (I,J) = ( 69,   4)
0ITERATION =      2
 GLOBAL NORM(0) =0.710E+15
   P-LOCAL =0.227E+20    P-GLOBAL =0.213E+16
   N-LOCAL =0.115E+16    N-GLOBAL =0.367E+11
   V-LOCAL =0.389E+10    V-GLOBAL =0.112E+08

     MAX CHANGE IN FP =    0.351E+01 KT AT (I,J) = ( 69,   3)
     MAX CHANGE IN FN =    0.354E+01 KT AT (I,J) = ( 69,   6)
     MAX CHANGE IN V  =    0.353E+01 KT AT (I,J) = ( 69,   4)
0ITERATION =      3
 GLOBAL NORM(0) =0.347E+13
   P-LOCAL =0.134E+18    P-GLOBAL =0.104E+14
   N-LOCAL =0.165E+15    N-GLOBAL =0.469E+11
   V-LOCAL =0.315E+10    V-GLOBAL =0.163E+08

     MAX CHANGE IN FP =    0.361E+01 KT AT (I,J) = ( 69,   3)
     MAX CHANGE IN FN =    0.364E+01 KT AT (I,J) = ( 69,   6)
     MAX CHANGE IN V  =    0.363E+01 KT AT (I,J) = ( 69,   4)
0ITERATION =      4
 GLOBAL NORM(0) =0.154E+11
   P-LOCAL =0.425E+13    P-GLOBAL =0.342E+09
   N-LOCAL =0.106E+15    N-GLOBAL =0.458E+11
   V-LOCAL =0.230E+10    V-GLOBAL =0.426E+07

     MAX CHANGE IN FP =    0.350E+01 KT AT (I,J) = ( 69,   3)
     MAX CHANGE IN FN =    0.353E+01 KT AT (I,J) = ( 69,   6)
     MAX CHANGE IN V  =    0.352E+01 KT AT (I,J) = ( 69,   4)
0ITERATION =      5
 GLOBAL NORM(0) =0.196E+11
   P-LOCAL =0.419E+11    P-GLOBAL =0.973E+07
   N-LOCAL =0.430E+14    N-GLOBAL =0.589E+11
   V-LOCAL =0.181E+11    V-GLOBAL =0.291E+07

     MAX CHANGE IN FP =    0.338E+01 KT AT (I,J) = ( 69,   3)
     MAX CHANGE IN FN =    0.342E+01 KT AT (I,J) = ( 69,   6)
     MAX CHANGE IN V  =    0.340E+01 KT AT (I,J) = ( 69,   4)
0ITERATION =      6
 GLOBAL NORM(0) =0.172E+11
   P-LOCAL =0.476E+11    P-GLOBAL =0.959E+07
   N-LOCAL =0.149E+13    N-GLOBAL =0.516E+11
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   V-LOCAL =0.373E+06   V-GLOBAL =0.233E+04

     MAX CHANGE IN FP =   0.325E+01 KT AT (I,J) = ( 69,  3)
     MAX CHANGE IN FN =   0.329E+01 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =   0.328E+01 KT AT (I,J) = ( 69,  4)
0ITERATION =     7

 GLOBAL NORM(0) =0.188E+11
   P-LOCAL =0.412E+11   P-GLOBAL =0.797E+07
   N-LOCAL =0.105E+13   N-GLOBAL =0.564E+11
   V-LOCAL =0.127E+05   V-GLOBAL =0.286E+03

     MAX CHANGE IN FP =   0.310E+01 KT AT (I,J) = ( 69,  3)
     MAX CHANGE IN FN =   0.315E+01 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =   0.313E+01 KT AT (I,J) = ( 69,  4)
0ITERATION =     8

 GLOBAL NORM(0) =0.177E+11
   P-LOCAL =0.347E+11   P-GLOBAL =0.650E+07
   N-LOCAL =0.800E+12   N-GLOBAL =0.530E+11
   V-LOCAL =0.805E+04   V-GLOBAL =0.268E+03

     MAX CHANGE IN FP =   0.294E+01 KT AT (I,J) = ( 69,  3)
     MAX CHANGE IN FN =   0.299E+01 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =   0.297E+01 KT AT (I,J) = ( 69,  4)
0ITERATION =     9

 GLOBAL NORM(0) =0.173E+11
   P-LOCAL =0.229E+11   P-GLOBAL =0.419E+07
   N-LOCAL =0.102E+13   N-GLOBAL =0.518E+11
   V-LOCAL =0.119E+05   V-GLOBAL =0.291E+03

     MAX CHANGE IN FP =   0.276E+01 KT AT (I,J) = ( 69,  3)
     MAX CHANGE IN FN =   0.281E+01 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =   0.280E+01 KT AT (I,J) = ( 69,  4)
0ITERATION =    10

 GLOBAL NORM(0) =0.163E+11
   P-LOCAL =0.974E+10   P-GLOBAL =0.211E+07
   N-LOCAL =0.113E+13   N-GLOBAL =0.489E+11
   V-LOCAL =0.191E+05   V-GLOBAL =0.306E+03

     MAX CHANGE IN FP =   0.255E+01 KT AT (I,J) = ( 69,  3)
     MAX CHANGE IN FN =   0.261E+01 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =   0.259E+01 KT AT (I,J) = ( 69,  4)
0ITERATION =    11

 GLOBAL NORM(0) =0.151E+11
   P-LOCAL =0.652E+10   P-GLOBAL =0.134E+07
   N-LOCAL =0.109E+13   N-GLOBAL =0.453E+11
   V-LOCAL =0.163E+05   V-GLOBAL =0.291E+03

     MAX CHANGE IN FP =   0.231E+01 KT AT (I,J) = ( 69,  3)
     MAX CHANGE IN FN =   0.238E+01 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =   0.236E+01 KT AT (I,J) = ( 69,  4)
0ITERATION =    12

 GLOBAL NORM(0) =0.112E+11
   P-LOCAL =0.408E+10   P-GLOBAL =0.988E+06
   N-LOCAL =0.112E+13   N-GLOBAL =0.337E+11
   V-LOCAL =0.322E+05   V-GLOBAL =0.367E+03

     MAX CHANGE IN FP =   0.209E+01 KT AT (I,J) = ( 45, 10)
     MAX CHANGE IN FN =   0.211E+01 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =   0.209E+01 KT AT (I,J) = ( 69,  4)
0ITERATION =    13

 GLOBAL NORM(0) =0.102E+11
   P-LOCAL =0.984E+10   P-GLOBAL =0.105E+07
   N-LOCAL =0.119E+13   N-GLOBAL =0.307E+11
   V-LOCAL =0.276E+05   V-GLOBAL =0.454E+03

     MAX CHANGE IN FP =   0.265E+01 KT AT (I,J) = ( 45, 10)
     MAX CHANGE IN FN =   0.180E+01 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =   0.177E+01 KT AT (I,J) = ( 69,  4)
0ITERATION =    14

 GLOBAL NORM(0) =0.125E+11
   P-LOCAL =0.118E+10   P-GLOBAL =0.292E+06
   N-LOCAL =0.419E+13   N-GLOBAL =0.376E+11
   V-LOCAL =0.167E+05   V-GLOBAL =0.301E+03

     MAX CHANGE IN FP =   0.319E+01 KT AT (I,J) = ( 45, 10)
     MAX CHANGE IN FN =   0.142E+01 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =   0.139E+01 KT AT (I,J) = ( 69,  4)
0ITERATION =    15

 GLOBAL NORM(0) =0.224E+11
   P-LOCAL =0.107E+10   P-GLOBAL =0.295E+06
   N-LOCAL =0.133E+14   N-GLOBAL =0.672E+11
   V-LOCAL =0.248E+05   V-GLOBAL =0.296E+03

     MAX CHANGE IN FP =   0.467E+01 KT AT (I,J) = ( 46, 11)
     MAX CHANGE IN FN =   0.121E+01 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =   0.121E+01 KT AT (I,J) = ( 69,  4)
0ITERATION =    16

 GLOBAL NORM(0) =0.311E+11
   P-LOCAL =0.210E+10   P-GLOBAL =0.282E+06
   N-LOCAL =0.289E+14   N-GLOBAL =0.934E+11
   V-LOCAL =0.905E+05   V-GLOBAL =0.201E+03

     MAX CHANGE IN FP =   0.102E+01 KT AT (I,J) = ( 69,  3)
     MAX CHANGE IN FN =   0.106E+01 KT AT (I,J) = ( 69,  6)
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     MAX CHANGE IN V  =    0.105E+01 KT AT (I,J) = ( 69,  4)
0ITERATION =     17

 GLOBAL NORM(0) =0.209E+10
   P-LOCAL =0.838E+09    P-GLOBAL =0.222E+06
   N-LOCAL =0.145E+13    N-GLOBAL =0.627E+10
   V-LOCAL =0.399E+03    V-GLOBAL =0.118E-01

     MAX CHANGE IN FP =    0.141E+00 KT AT (I,J) = ( 65,  7)
     MAX CHANGE IN FN =    0.273E+00 KT AT (I,J) = ( 69, 11)
     MAX CHANGE IN V  =    0.204E+00 KT AT (I,J) = ( 69,  5)
0ITERATION =     18

 GLOBAL NORM(0) =0.948E+07
   P-LOCAL =0.142E+10    P-GLOBAL =0.309E+06
   N-LOCAL =0.184E+11    N-GLOBAL =0.281E+08
   V-LOCAL =0.481E+03    V-GLOBAL =0.131E-01

     MAX CHANGE IN FP =    0.112E-01 KT AT (I,J) = ( 67,  4)
     MAX CHANGE IN FN =    0.550E-02 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =    0.441E-02 KT AT (I,J) = ( 69,  7)
0ITERATION =     19

 GLOBAL NORM(0) =0.569E+06
   P-LOCAL =0.157E+10    P-GLOBAL =0.354E+06
   N-LOCAL =0.157E+11    N-GLOBAL =0.135E+07
   V-LOCAL =0.764E+03    V-GLOBAL =0.200E-01

     MAX CHANGE IN FP =    0.747E-04 KT AT (I,J) = ( 67,  4)
     MAX CHANGE IN FN =    0.268E-04 KT AT (I,J) = ( 69,  9)
     MAX CHANGE IN V  =    0.217E-04 KT AT (I,J) = ( 69,  8)
 FINAL NORM =0.569E+06
 TIME FOR SOLUTION =       115.4


 VBE=0.6500000000000 VOLTS
 JB=  0.3849913E-04   JC=  0.4291759E+01   JE= -0.1982121E-01

 JE=  0.1978366E-01
 JC= -0.1974547E-01
 JB=  0.3818556E-04

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS=-0.26853E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL=-0.69686E+00 (IN VOLTS)
     AT NODE:     36    22     X= 0.217E-02  Y= 0.557E-03

  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = 0.611298E-02
 RSSUM = 0.988686E-36    0.0000
 RSSUMB = -.330632E-43    0.0000
 RSSUMT = 0.927926E-36    0.0000
 RSSUML = -.309547E-44    0.0000
 RSSUMR = 0.607595E-37    0.0000
 RBSUM = 0.127524E-05     0.0199
 RASUM = 0.174240E-02    27.2415
 RDSUM = 0.436930E-02    68.3119
 JMBSUM = 0.000000E+00    0.0000
 JMTSUM = 0.283134E-03    4.4267
 JMLSUM = -.198353E-16    0.0000
 JMRSUM = 0.275536E-09    0.0000
 JTOT = 0.639611E-02  JREC = 0.639611E-02
 ***** ENTER DUMP2D
1INITIAL NORM =0.828E+17   V =  0.0000 VOLTS
   P-LOCAL =0.319E+22    P-GLOBAL =0.248E+18
   N-LOCAL =0.157E+11    N-GLOBAL =0.244E+07
   V-LOCAL =0.158E+04    V-GLOBAL =0.203E+00

0ITERATION =      1

 GLOBAL NORM(0) =0.688E+17
   P-LOCAL =0.256E+22    P-GLOBAL =0.206E+18
   N-LOCAL =0.286E+17    N-GLOBAL =0.409E+12
   V-LOCAL =0.456E+08    V-GLOBAL =0.246E+07

     MAX CHANGE IN FP =    0.447E+01 KT AT (I,J) = ( 69,  3)
     MAX CHANGE IN FN =    0.450E+01 KT AT (I,J) = ( 69,  6)
     MAX CHANGE IN V  =    0.449E+01 KT AT (I,J) = ( 69,  5)
0ITERATION =      2

 GLOBAL NORM(0) =0.721E+15
   P-LOCAL =0.223E+20    P-GLOBAL =0.216E+16
   N-LOCAL =0.255E+17    N-GLOBAL =0.553E+12
   V-LOCAL =0.666E+09    V-GLOBAL =0.778E+07

     MAX CHANGE IN FP =    0.583E+01 KT AT (I,J) = ( 46, 20)
     MAX CHANGE IN FN =    0.509E+01 KT AT (I,J) = ( 69,  7)
     MAX CHANGE IN V  =    0.509E+01 KT AT (I,J) = ( 69,  5)
0ITERATION =      3

 GLOBAL NORM(0) =0.310E+13
   P-LOCAL =0.841E+17    P-GLOBAL =0.899E+13
   N-LOCAL =0.282E+16    N-GLOBAL =0.323E+12
   V-LOCAL =0.119E+09    V-GLOBAL =0.467E+07

     MAX CHANGE IN FP =    0.613E+01 KT AT (I,J) = ( 44, 20)
     MAX CHANGE IN FN =    0.518E+01 KT AT (I,J) = ( 69,  7)
     MAX CHANGE IN V  =    0.517E+01 KT AT (I,J) = ( 69,  5)
0ITERATION =      4

 GLOBAL NORM(0) =0.518E+11
   P-LOCAL =0.422E+14    P-GLOBAL =0.190E+10
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   N-LOCAL =0.144E+16   N-GLOBAL =0.153E+12
   V-LOCAL =0.208E+11   V-GLOBAL =0.870E+07

     MAX CHANGE IN FP =   0.512E+01 KT AT (I,J) = ( 69,  3)
     MAX CHANGE IN FN =   0.515E+01 KT AT (I,J) = ( 69,  7)
     MAX CHANGE IN V  =   0.514E+01 KT AT (I,J) = ( 69,  5)
0ITERATION =     5

 GLOBAL NORM(0) =0.294E+11
   P-LOCAL =0.314E+14   P-GLOBAL =0.215E+10
   N-LOCAL =0.122E+14   N-GLOBAL =0.859E+11
   V-LOCAL =0.186E+11   V-GLOBAL =0.649E+07

     MAX CHANGE IN FP =   0.803E+01 KT AT (I,J) = ( 69, 19)
     MAX CHANGE IN FN =   0.510E+01 KT AT (I,J) = ( 69,  7)
     MAX CHANGE IN V  =   0.509E+01 KT AT (I,J) = ( 69,  5)
0ITERATION =     6

 GLOBAL NORM(0) =0.338E+11
   P-LOCAL =0.128E+14   P-GLOBAL =0.924E+10
   N-LOCAL =0.118E+15   N-GLOBAL =0.922E+11
   V-LOCAL =0.145E+11   V-GLOBAL =0.655E+07

     MAX CHANGE IN FP =   0.972E+01 KT AT (I,J) = ( 69, 18)
     MAX CHANGE IN FN =   0.509E+01 KT AT (I,J) = ( 69,  7)
     MAX CHANGE IN V  =   0.509E+01 KT AT (I,J) = ( 69,  5)
0ITERATION =     7

 GLOBAL NORM(0) =0.382E+11
   P-LOCAL =0.529E+15   P-GLOBAL =0.166E+11
   N-LOCAL =0.374E+15   N-GLOBAL =0.979E+11
   V-LOCAL =0.120E+09   V-GLOBAL =0.458E+07

     MAX CHANGE IN FP =   0.120E+02 KT AT (I,J) = ( 69,  8)
     MAX CHANGE IN FN =   0.499E+01 KT AT (I,J) = ( 69,  7)
     MAX CHANGE IN V  =   0.499E+01 KT AT (I,J) = ( 69,  5)
0ITERATION =     8

 GLOBAL NORM(0) =0.915E+11
   P-LOCAL =0.265E+15   P-GLOBAL =0.176E+12
   N-LOCAL =0.106E+15   N-GLOBAL =0.984E+11
   V-LOCAL =0.789E+08   V-GLOBAL =0.363E+07

     MAX CHANGE IN FP =   0.107E+02 KT AT (I,J) = ( 63,  7)
     MAX CHANGE IN FN =   0.495E+01 KT AT (I,J) = ( 69,  7)
     MAX CHANGE IN V  =   0.495E+01 KT AT (I,J) = ( 69,  5)
0ITERATION =     9

 GLOBAL NORM(0) =0.704E+11
   P-LOCAL =0.154E+15   P-GLOBAL =0.108E+12
   N-LOCAL =0.597E+15   N-GLOBAL =0.103E+12
   V-LOCAL =0.782E+08   V-GLOBAL =0.349E+07

     MAX CHANGE IN FP =   0.106E+02 KT AT (I,J) = ( 64, 18)
     MAX CHANGE IN FN =   0.498E+01 KT AT (I,J) = ( 69,  7)
     MAX CHANGE IN V  =   0.498E+01 KT AT (I,J) = ( 69,  5)
0ITERATION =    10

 GLOBAL NORM(0) =0.103E+12
   P-LOCAL =0.791E+15   P-GLOBAL =0.196E+11
   N-LOCAL =0.153E+17   N-GLOBAL =0.289E+12
   V-LOCAL =0.540E+09   V-GLOBAL =0.588E+07

     MAX CHANGE IN FP =   0.178E+02 KT AT (I,J) = ( 45, 13)
     MAX CHANGE IN FN =   0.444E+01 KT AT (I,J) = ( 69,  7)
     MAX CHANGE IN V  =   0.444E+01 KT AT (I,J) = ( 69,  5)
0ITERATION =    11

 GLOBAL NORM(0) =0.148E+12
   P-LOCAL =0.402E+13   P-GLOBAL =0.499E+10
   N-LOCAL =0.142E+17   N-GLOBAL =0.440E+12
   V-LOCAL =0.601E+10   V-GLOBAL =0.584E+07

     MAX CHANGE IN FP =   0.992E+01 KT AT (I,J) = ( 44,  4)
     MAX CHANGE IN FN =   0.306E+01 KT AT (I,J) = ( 64,  7)
     MAX CHANGE IN V  =   0.304E+01 KT AT (I,J) = ( 64,  5)
0ITERATION =    12

 GLOBAL NORM(0) =0.982E+11
   P-LOCAL =0.633E+13   P-GLOBAL =0.204E+10
   N-LOCAL =0.139E+17   N-GLOBAL =0.292E+12
   V-LOCAL =0.167E+09   V-GLOBAL =0.154E+06

     MAX CHANGE IN FP =   0.115E+02 KT AT (I,J) = ( 43, 14)
     MAX CHANGE IN FN =   0.429E+01 KT AT (I,J) = ( 67, 18)
     MAX CHANGE IN V  =   0.410E+01 KT AT (I,J) = ( 66, 10)
0ITERATION =    13

 GLOBAL NORM(0) =0.348E+12
   P-LOCAL =0.349E+16   P-GLOBAL =0.560E+12
   N-LOCAL =0.166E+17   N-GLOBAL =0.484E+12
   V-LOCAL =0.133E+09   V-GLOBAL =0.209E+07

     MAX CHANGE IN FP =   0.187E+02 KT AT (I,J) = ( 43, 14)
     MAX CHANGE IN FN =   0.271E+01 KT AT (I,J) = ( 42, 21)
     MAX CHANGE IN V  =   0.249E+01 KT AT (I,J) = ( 38, 18)
0ITERATION =    14

 GLOBAL NORM(0) =0.250E+13
   P-LOCAL =0.495E+17   P-GLOBAL =0.722E+13
   N-LOCAL =0.190E+15   N-GLOBAL =0.291E+12
   V-LOCAL =0.485E+09   V-GLOBAL =0.463E+07

     MAX CHANGE IN FP =   0.365E+02 KT AT (I,J) = ( 43, 15)
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     MAX CHANGE IN FN =   0.318E+01 KT AT (I,J) = ( 42, 24)
     MAX CHANGE IN V  =   0.218E+01 KT AT (I,J) = ( 37, 16)
0ITERATION =    15

 GLOBAL NORM(0) =0.103E+12
   P-LOCAL =0.375E+16   P-GLOBAL =0.113E+12
   N-LOCAL =0.115E+16   N-GLOBAL =0.196E+12
   V-LOCAL =0.477E+09   V-GLOBAL =0.546E+07

     MAX CHANGE IN FP =   0.750E+02 KT AT (I,J) = ( 43, 15)
     MAX CHANGE IN FN =   0.521E+01 KT AT (I,J) = ( 42, 24)
     MAX CHANGE IN V  =   0.242E+01 KT AT (I,J) = ( 37,  7)
0ITERATION =    16

 GLOBAL NORM(0) =0.733E+11
   P-LOCAL =0.118E+16   P-GLOBAL =0.425E+11
   N-LOCAL =0.600E+16   N-GLOBAL =0.177E+12
   V-LOCAL =0.456E+09   V-GLOBAL =0.640E+07

     MAX CHANGE IN FP =   0.151E+03 KT AT (I,J) = ( 43, 15)
     MAX CHANGE IN FN =   0.904E+01 KT AT (I,J) = ( 42, 24)
     MAX CHANGE IN V  =   0.299E+01 KT AT (I,J) = ( 46,  6)
0ITERATION =    17

 GLOBAL NORM(0) =0.514E+11
   P-LOCAL =0.406E+14   P-GLOBAL =0.843E+09
   N-LOCAL =0.747E+15   N-GLOBAL =0.153E+12
   V-LOCAL =0.342E+08   V-GLOBAL =0.141E+07

     MAX CHANGE IN FP =   0.812E+01 KT AT (I,J) = ( 40, 18)
     MAX CHANGE IN FN =   0.189E+01 KT AT (I,J) = ( 46, 18)
     MAX CHANGE IN V  =   0.185E+01 KT AT (I,J) = ( 45, 12)
0ITERATION =    18

 GLOBAL NORM(0) =0.396E+11
   P-LOCAL =0.133E+15   P-GLOBAL =0.208E+10
   N-LOCAL =0.307E+15   N-GLOBAL =0.117E+12
   V-LOCAL =0.107E+07   V-GLOBAL =0.147E+05

     MAX CHANGE IN FP =   0.154E+02 KT AT (I,J) = ( 40, 18)
     MAX CHANGE IN FN =   0.225E+01 KT AT (I,J) = ( 45, 19)
     MAX CHANGE IN V  =   0.228E+01 KT AT (I,J) = ( 45, 12)
0ITERATION =    19

 GLOBAL NORM(0) =0.231E+11
   P-LOCAL =0.107E+12   P-GLOBAL =0.115E+08
   N-LOCAL =0.586E+13   N-GLOBAL =0.693E+11
   V-LOCAL =0.208E+06   V-GLOBAL =0.372E+04

     MAX CHANGE IN FP =   0.211E+02 KT AT (I,J) = ( 39, 18)
     MAX CHANGE IN FN =   0.185E+01 KT AT (I,J) = ( 45, 19)
     MAX CHANGE IN V  =   0.189E+01 KT AT (I,J) = ( 45, 12)
0ITERATION =    20

 GLOBAL NORM(0) =0.183E+11
   P-LOCAL =0.201E+12   P-GLOBAL =0.120E+08
   N-LOCAL =0.340E+14   N-GLOBAL =0.549E+11
   V-LOCAL =0.185E+06   V-GLOBAL =0.273E+04

     MAX CHANGE IN FP =   0.415E+02 KT AT (I,J) = ( 39, 18)
     MAX CHANGE IN FN =   0.184E+01 KT AT (I,J) = ( 45, 19)
     MAX CHANGE IN V  =   0.187E+01 KT AT (I,J) = ( 45, 12)
0ITERATION =    21

 GLOBAL NORM(0) =0.936E+10
   P-LOCAL =0.416E+12   P-GLOBAL =0.863E+07
   N-LOCAL =0.385E+14   N-GLOBAL =0.281E+11
   V-LOCAL =0.880E+03   V-GLOBAL =0.167E+02

     MAX CHANGE IN FP =   0.118E+01 KT AT (I,J) = ( 44,  4)
     MAX CHANGE IN FN =   0.120E+01 KT AT (I,J) = ( 45, 19)
     MAX CHANGE IN V  =   0.122E+01 KT AT (I,J) = ( 45, 12)
0ITERATION =    22

 GLOBAL NORM(0) =0.493E+09
   P-LOCAL =0.616E+11   P-GLOBAL =0.376E+07
   N-LOCAL =0.589E+13   N-GLOBAL =0.147E+10
   V-LOCAL =0.552E+03   V-GLOBAL =0.333E+00

     MAX CHANGE IN FP =   0.880E+00 KT AT (I,J) = ( 43, 20)
     MAX CHANGE IN FN =   0.638E+00 KT AT (I,J) = ( 42, 19)
     MAX CHANGE IN V  =   0.715E+00 KT AT (I,J) = ( 45, 12)
0ITERATION =    23

 GLOBAL NORM(0) =0.820E+07
   P-LOCAL =0.135E+11   P-GLOBAL =0.100E+07
   N-LOCAL =0.239E+11   N-GLOBAL =0.236E+08
   V-LOCAL =0.563E+03   V-GLOBAL =0.162E-01

     MAX CHANGE IN FP =   0.101E+01 KT AT (I,J) = ( 42, 19)
     MAX CHANGE IN FN =   0.112E+00 KT AT (I,J) = ( 41, 23)
     MAX CHANGE IN V  =   0.583E-01 KT AT (I,J) = ( 44, 16)
0ITERATION =    24

 GLOBAL NORM(0) =0.691E+06
   P-LOCAL =0.109E+11   P-GLOBAL =0.710E+06
   N-LOCAL =0.189E+11   N-GLOBAL =0.136E+07
   V-LOCAL =0.654E+03   V-GLOBAL =0.130E-01

     MAX CHANGE IN FP =   0.974E+00 KT AT (I,J) = ( 42, 19)
     MAX CHANGE IN FN =   0.361E-02 KT AT (I,J) = ( 41, 23)
     MAX CHANGE IN V  =   0.107E-02 KT AT (I,J) = ( 44, 16)
0ITERATION =    25
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 GLOBAL NORM(0) =0.739E+06
   P-LOCAL =0.197E+10   P-GLOBAL =0.332E+06
   N-LOCAL =0.231E+11   N-GLOBAL =0.188E+07
   V-LOCAL =0.667E+03   V-GLOBAL =0.192E-01

     MAX CHANGE IN FP =   0.930E+00 KT AT (I,J) = ( 42, 19)
     MAX CHANGE IN FN =   0.208E-04 KT AT (I,J) = ( 43, 10)
     MAX CHANGE IN V  =   0.207E-04 KT AT (I,J) = ( 43,  5)
0ITERATION =    26

 GLOBAL NORM(0) =0.678E+06
   P-LOCAL =0.698E+09   P-GLOBAL =0.179E+06
   N-LOCAL =0.225E+11   N-GLOBAL =0.185E+07
   V-LOCAL =0.140E+04   V-GLOBAL =0.266E-01

     MAX CHANGE IN FP =   0.822E+00 KT AT (I,J) = ( 42, 19)
     MAX CHANGE IN FN =   0.461E-05 KT AT (I,J) = ( 43, 15)
     MAX CHANGE IN V  =   0.458E-05 KT AT (I,J) = ( 43,  7)
0ITERATION =    27

 GLOBAL NORM(0) =0.629E+06
   P-LOCAL =0.221E+10   P-GLOBAL =0.256E+06
   N-LOCAL =0.211E+11   N-GLOBAL =0.163E+07
   V-LOCAL =0.136E+05   V-GLOBAL =0.174E+00

     MAX CHANGE IN FP =   0.596E+00 KT AT (I,J) = ( 42, 19)
     MAX CHANGE IN FN =   0.154E-05 KT AT (I,J) = ( 43, 17)
     MAX CHANGE IN V  =   0.153E-05 KT AT (I,J) = ( 43,  7)
0ITERATION =    28

 GLOBAL NORM(0) =0.496E+06
   P-LOCAL =0.704E+09   P-GLOBAL =0.238E+06
   N-LOCAL =0.113E+11   N-GLOBAL =0.125E+07
   V-LOCAL =0.686E+03   V-GLOBAL =0.166E-01

     MAX CHANGE IN FP =   0.267E+00 KT AT (I,J) = ( 42, 19)
     MAX CHANGE IN FN =   0.255E-06 KT AT (I,J) = ( 43,  4)
     MAX CHANGE IN V  =   0.254E-06 KT AT (I,J) = ( 43,  4)
0ITERATION =    29

 GLOBAL NORM(0) =0.464E+06
   P-LOCAL =0.121E+10   P-GLOBAL =0.238E+06
   N-LOCAL =0.161E+11   N-GLOBAL =0.116E+07
   V-LOCAL =0.659E+03   V-GLOBAL =0.199E-01

     MAX CHANGE IN FP =   0.426E-01 KT AT (I,J) = ( 42, 19)
     MAX CHANGE IN FN =   0.113E-07 KT AT (I,J) = ( 43,  4)
     MAX CHANGE IN V  =   0.112E-07 KT AT (I,J) = ( 43,  4)
0ITERATION =    30

 GLOBAL NORM(0) =0.553E+06
   P-LOCAL =0.146E+10   P-GLOBAL =0.214E+06
   N-LOCAL =0.159E+11   N-GLOBAL =0.145E+07
   V-LOCAL =0.250E+04   V-GLOBAL =0.422E-01

     MAX CHANGE IN FP =   0.933E-03 KT AT (I,J) = ( 42, 19)
     MAX CHANGE IN FN =   0.930E-10 KT AT (I,J) = ( 17, 46)
     MAX CHANGE IN V  =   0.296E-09 KT AT (I,J) = ( 17, 46)
0ITERATION =    31

 GLOBAL NORM(0) =0.494E+06
   P-LOCAL =0.750E+09   P-GLOBAL =0.175E+06
   N-LOCAL =0.202E+11   N-GLOBAL =0.131E+07
   V-LOCAL =0.459E+04   V-GLOBAL =0.822E-01

     MAX CHANGE IN FP =   0.435E-06 KT AT (I,J) = ( 42, 19)
     MAX CHANGE IN FN =   0.612E-10 KT AT (I,J) = (  1, 20)
     MAX CHANGE IN V  =   0.124E-09 KT AT (I,J) = ( 33, 46)
 FINAL NORM =0.494E+06
 TIME FOR SOLUTION =      202.0


 VBE=0.7000000000000 VOLTS
 JB=  0.3882411E-03   JC=  0.4330513E+01   JE= -0.5892601E-01

 JE=  0.5881581E-01
 JC= -0.5843197E-01
 JB=  0.3838352E-03

 MAX SPLIT BETWEEN QUASI-FERMI LEVELS= 0.26769E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL= 0.69466E+00 (IN VOLTS)
     AT NODE:     66   42     X= 0.581E-02  Y= 0.597E-03

 REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

 RGSUM = 0.616470E-01
RSSUM = 0.854753E-34    0.0000
RSSUMB = 0.426833E-34    0.0000
RSSUMT = 0.451195E-35    0.0000
RSSUML = -.309642E-44    0.0000
RSSUMR = 0.382800E-34    0.0000
RBSUM = 0.320120E-01   50.6017
RASUM = 0.730597E-02   11.5486
RDSUM = 0.223289E-01   35.2955
JMBSUM = 0.000000E+00    0.0000
JMTSUM = 0.161581E-02    2.5541
JMLSUM = -.198351E-16    0.0000
JMRSUM = 0.686531E-08    0.0000
JTOT = 0.632628E-01  JREC = 0.632628E-01
***** ENTER DUMP2D
1INITIAL NORM =0.880E+16   V =  0.0000 VOLTS
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   P-LOCAL =0.281E+21   P-GLOBAL =0.264E+17
   N-LOCAL =0.202E+11   N-GLOBAL =0.142E+07
   V-LOCAL =0.459E+04   V-GLOBAL =0.107E+00

0ITERATION =     1

 GLOBAL NORM(0) =0.658E+14
   P-LOCAL =0.212E+19   P-GLOBAL =0.198E+15
   N-LOCAL =0.143E+15   N-GLOBAL =0.853E+10
   V-LOCAL =0.145E+07   V-GLOBAL =0.197E+04

     MAX CHANGE IN FP =   0.123E+01 KT AT (I,J) = ( 42,  1)
     MAX CHANGE IN FN =   0.128E+01 KT AT (I,J) = ( 45,  1)
     MAX CHANGE IN V  =   0.128E+01 KT AT (I,J) = ( 45,  1)
0ITERATION =     2

 GLOBAL NORM(0) =0.505E+11
   P-LOCAL =0.158E+16   P-GLOBAL =0.146E+12
   N-LOCAL =0.321E+13   N-GLOBAL =0.529E+10
   V-LOCAL =0.138E+06   V-GLOBAL =0.160E+04

     MAX CHANGE IN FP =   0.120E+01 KT AT (I,J) = ( 43, 13)
     MAX CHANGE IN FN =   0.109E+01 KT AT (I,J) = ( 44, 19)
     MAX CHANGE IN V  =   0.109E+01 KT AT (I,J) = ( 44,  8)
0ITERATION =     3

 GLOBAL NORM(0) =0.118E+09
   P-LOCAL =0.180E+11   P-GLOBAL =0.139E+07
   N-LOCAL =0.145E+12   N-GLOBAL =0.354E+09
   V-LOCAL =0.178E+04   V-GLOBAL =0.509E-01

     MAX CHANGE IN FP =   0.549E+00 KT AT (I,J) = ( 43,  6)
     MAX CHANGE IN FN =   0.416E+00 KT AT (I,J) = ( 44, 19)
     MAX CHANGE IN V  =   0.403E+00 KT AT (I,J) = ( 44,  8)
0ITERATION =     4

 GLOBAL NORM(0) =0.113E+07
   P-LOCAL =0.181E+10   P-GLOBAL =0.234E+06
   N-LOCAL =0.190E+11   N-GLOBAL =0.316E+07
   V-LOCAL =0.235E+03   V-GLOBAL =0.886E-02

     MAX CHANGE IN FP =   0.112E+00 KT AT (I,J) = ( 42,  9)
     MAX CHANGE IN FN =   0.338E-01 KT AT (I,J) = ( 41, 25)
     MAX CHANGE IN V  =   0.782E-02 KT AT (I,J) = ( 44, 19)
0ITERATION =     5

 GLOBAL NORM(0) =0.448E+06
   P-LOCAL =0.783E+09   P-GLOBAL =0.211E+06
   N-LOCAL =0.119E+11   N-GLOBAL =0.113E+07
   V-LOCAL =0.512E+03   V-GLOBAL =0.166E-01

     MAX CHANGE IN FP =   0.654E-02 KT AT (I,J) = ( 42,  9)
     MAX CHANGE IN FN =   0.542E-03 KT AT (I,J) = ( 41, 25)
     MAX CHANGE IN V  =   0.689E-04 KT AT (I,J) = ( 44, 19)
0ITERATION =     6

 GLOBAL NORM(0) =0.553E+06
   P-LOCAL =0.235E+10   P-GLOBAL =0.283E+06
   N-LOCAL =0.148E+11   N-GLOBAL =0.138E+07
   V-LOCAL =0.124E+04   V-GLOBAL =0.251E-01

     MAX CHANGE IN FP =   0.214E-04 KT AT (I,J) = ( 42,  9)
     MAX CHANGE IN FN =   0.877E-07 KT AT (I,J) = ( 44, 18)
     MAX CHANGE IN V  =   0.876E-07 KT AT (I,J) = ( 44,  7)
 FINAL NORM =0.553E+06
 TIME FOR SOLUTION =       39.8


 VBE=0.7067607901622 VOLTS
 ***** ENTER DUMP2D
 JB=  0.5026388E-03   JC=  0.4332565E+01   JE= -0.6109090E-01

 JE=  0.6097710E-01
 JC= -0.6048026E-01
 JB=  0.4968410E-03
 MAX SPLIT BETWEEN QUASI-FERMI LEVELS= 0.26982E+02 (IN UNITS OF KB*T/Q)
     MAX SPLIT BETWEEN QUASI-FERMI LEVEL= 0.70018E+00 (IN VOLTS)
     AT NODE:     66    42     X= 0.581E-02  Y= 0.597E-03
  REMEMBER THAT THESE CURRENTS ARE NORMALIZED          TO THE LENGTH OF THE DEVICE IN THE X-DIRECTION

  RGSUM = 0.798117E-01
 RSSUM = 0.113034E-33    0.0000
 RSSUMB = 0.594143E-34    0.0000
 RSSUMT = 0.605883E-35    0.0000
 RSSUML = -.309647E-44    0.0000
 RSSUMR = 0.475607E-34    0.0000
 RBSUM = 0.433963E-01   53.0451
 RASUM = 0.906272E-02   11.0778
 RDSUM = 0.273527E-01   33.4344
 JMBSUM = 0.000000E+00    0.0000
 JMTSUM = 0.199840E-02    2.4427
 JMLSUM = -.198351E-16    0.0000
 JMRSUM = 0.875481E-08    0.0000
 JTOT = 0.818101E-01  JREC = 0.818101E-01
 JC= -0.7709414E-09 A/CM    BETA0=   0.0
 JC= -0.7812644E-09 A/CM    BETA0=   0.0
 JC= -0.8888847E-09 A/CM    BETA0=   0.0
 JC= -0.1641018E-08 A/CM    BETA0=   0.0
 JC= -0.6667816E-08 A/CM    BETA0=   5.8
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JC= -0.4005004E-07 A/CM    BETA0=   9.4
JC= -0.2615534E-06 A/CM    BETA0=  20.3
JC= -0.1730870E-05 A/CM    BETA0=  45.3
JC= -0.1146958E-04 A/CM    BETA0=  97.1
JC= -0.7589110E-04 A/CM    BETA0= 188.3
JC= -0.4999164E-03 A/CM    BETA0= 314.2
JC= -0.3243587E-02 A/CM    BETA0= 439.0
JC= -0.1974547E-01 A/CM    BETA0= 517.1
JC= -0.5843197E-01 A/CM    BETA0= 152.2
JC= -0.6048026E-01 A/CM    BETA0= 121.7
1 1 V=   0.000000E+00 X=   0.900000E+01 I=   8
  1 Y=0.0000E+00 P=0.1413E+04 N=0.8400E+15 V=0.3162E+01 VG=0.000468 R=-.2318E+12 UP=0.4546E+03 UN=0.1314E+04
  2 Y=0.1000E+01 P=0.1391E+04 N=0.8400E+15 V=0.3164E+01 VG=0.000468 R=-.2318E+12 UP=0.4546E+03 UN=0.1314E+04
  3 Y=0.2000E+01 P=0.1318E+04 N=0.8400E+15 V=0.3170E+01 VG=0.000468 R=-.2319E+12 UP=0.4546E+03 UN=0.1314E+04
  4 Y=0.3000E+01 P=0.1172E+04 N=0.8400E+15 V=0.3181E+01 VG=0.000468 R=-.2320E+12 UP=0.4546E+03 UN=0.1314E+04
  5 Y=0.4000E+01 P=0.9172E+03 N=0.8400E+15 V=0.3198E+01 VG=0.000468 R=-.2323E+12 UP=0.4546E+03 UN=0.1314E+04
  6 Y=0.4094E+01 P=0.8799E+03 N=0.8400E+15 V=0.3201E+01 VG=0.000468 R=-.2324E+12 UP=0.4546E+03 UN=0.1314E+04
  7 Y=0.4187E+01 P=0.8417E+03 N=0.8400E+15 V=0.3203E+01 VG=0.000468 R=-.2324E+12 UP=0.4546E+03 UN=0.1314E+04
  8 Y=0.4281E+01 P=0.8026E+03 N=0.8400E+15 V=0.3205E+01 VG=0.000468 R=-.2325E+12 UP=0.4546E+03 UN=0.1314E+04
  9 Y=0.4375E+01 P=0.7626E+03 N=0.8400E+15 V=0.3208E+01 VG=0.000468 R=-.2325E+12 UP=0.4546E+03 UN=0.1314E+04
 10 Y=0.4437E+01 P=0.7354E+03 N=0.8400E+15 V=0.3209E+01 VG=0.000468 R=-.2325E+12 UP=0.4546E+03 UN=0.1314E+04
 11 Y=0.4500E+01 P=0.7077E+03 N=0.8400E+15 V=0.3211E+01 VG=0.000468 R=-.2325E+12 UP=0.4546E+03 UN=0.1314E+04
 12 Y=0.4542E+01 P=0.6890E+03 N=0.8401E+15 V=0.3212E+01 VG=0.000468 R=-.2326E+12 UP=0.4546E+03 UN=0.1314E+04
 13 Y=0.4583E+01 P=0.6702E+03 N=0.8401E+15 V=0.3214E+01 VG=0.000468 R=-.2326E+12 UP=0.4546E+03 UN=0.1314E+04
 14 Y=0.4625E+01 P=0.6511E+03 N=0.8401E+15 V=0.3215E+01 VG=0.000468 R=-.2326E+12 UP=0.4546E+03 UN=0.1314E+04
 15 Y=0.4656E+01 P=0.6367E+03 N=0.8401E+15 V=0.3216E+01 VG=0.000468 R=-.2326E+12 UP=0.4546E+03 UN=0.1314E+04
 16 Y=0.4687E+01 P=0.6222E+03 N=0.8402E+15 V=0.3217E+01 VG=0.000468 R=-.2326E+12 UP=0.4546E+03 UN=0.1314E+04
 17 Y=0.4719E+01 P=0.6077E+03 N=0.8402E+15 V=0.3218E+01 VG=0.000468 R=-.2326E+12 UP=0.4546E+03 UN=0.1314E+04
 18 Y=0.4750E+01 P=0.5930E+03 N=0.8403E+15 V=0.3219E+01 VG=0.000468 R=-.2326E+12 UP=0.4546E+03 UN=0.1314E+04
 19 Y=0.5000E+01 P=0.4747E+03 N=0.8415E+15 V=0.3228E+01 VG=0.000468 R=-.2324E+12 UP=0.4546E+03 UN=0.1314E+04
 20 Y=0.5500E+01 P=0.2434E+03 N=0.8714E+15 V=0.3251E+01 VG=0.000468 R=-.2247E+12 UP=0.4546E+03 UN=0.1314E+04
 21 Y=0.5533E+01 P=0.2234E+03 N=0.8910E+15 V=0.3254E+01 VG=0.000468 R=-.2197E+12 UP=0.4546E+03 UN=0.1314E+04
 22 Y=0.5567E+01 P=0.2038E+03 N=0.9161E+15 V=0.3256E+01 VG=0.000468 R=-.2137E+12 UP=0.4546E+03 UN=0.1314E+04
 23 Y=0.5600E+01 P=0.1843E+03 N=0.9493E+15 V=0.3259E+01 VG=0.000468 R=-.2063E+12 UP=0.4546E+03 UN=0.1314E+04
 24 Y=0.5700E+01 P=0.1278E+03 N=0.1133E+16 V=0.3269E+01 VG=0.000468 R=-.1729E+12 UP=0.4546E+03 UN=0.1314E+04
 25 Y=0.5733E+01 P=0.1078E+03 N=0.1266E+16 V=0.3274E+01 VG=0.000468 R=-.1547E+12 UP=0.4546E+03 UN=0.1314E+04
 26 Y=0.5767E+01 P=0.8803E+02 N=0.1471E+16 V=0.3279E+01 VG=0.000468 R=-.1332E+12 UP=0.4546E+03 UN=0.1314E+04
 27 Y=0.5800E+01 P=0.6862E+02 N=0.1805E+16 V=0.3286E+01 VG=0.000468 R=-.1085E+12 UP=0.4546E+03 UN=0.1314E+04
 28 Y=0.5827E+01 P=0.5334E+02 N=0.2258E+16 V=0.3293E+01 VG=0.000468 R=-.8676E+11 UP=0.4546E+03 UN=0.1314E+04
 29 Y=0.5842E+01 P=0.4498E+02 N=0.2647E+16 V=0.3297E+01 VG=0.000468 R=-.7402E+11 UP=0.4546E+03 UN=0.1314E+04
 30 Y=0.5857E+01 P=0.3697E+02 N=0.3194E+16 V=0.3303E+01 VG=0.000468 R=-.6133E+11 UP=0.4546E+03 UN=0.1314E+04
 31 Y=0.5875E+01 P=0.2836E+02 N=0.4146E+16 V=0.3310E+01 VG=0.000468 R=-.4724E+11 UP=0.4546E+03 UN=0.1314E+04
 32 Y=0.5887E+01 P=0.2263E+02 N=0.5203E+16 V=0.3316E+01 VG=0.000468 R=-.3765E+11 UP=0.4546E+03 UN=0.1314E+04
 33 Y=0.5900E+01 P=0.1736E+02 N=0.6819E+16 V=0.3323E+01 VG=0.000468 R=-.2873E+11 UP=0.4546E+03 UN=0.1314E+04
 34 Y=0.5910E+01 P=0.1352E+02 N=0.8831E+16 V=0.3330E+01 VG=0.000468 R=-.2218E+11 UP=0.4546E+03 UN=0.1314E+04
 35 Y=0.5920E+01 P=0.1007E+02 N=0.1202E+17 V=0.3338E+01 VG=0.000468 R=-.1630E+11 UP=0.4546E+03 UN=0.1314E+04
 36 Y=0.5930E+01 P=0.7057E+01 N=0.1751E+17 V=0.3348E+01 VG=0.000468 R=-.1119E+11 UP=0.4546E+03 UN=0.1314E+04
 37 Y=0.5940E+01 P=0.4529E+01 N=0.2823E+17 V=0.3360E+01 VG=0.000468 R=-.6940E+10 UP=0.4546E+03 UN=0.1314E+04
 38 Y=0.5951E+01 P=0.2370E+01 N=0.5771E+17 V=0.3379E+01 VG=0.000468 R=-.3395E+10 UP=0.4546E+03 UN=0.1314E+04
 39 Y=0.5955E+01 P=0.1768E+01 N=0.8024E+17 V=0.3387E+01 VG=0.000468 R=-.2442E+10 UP=0.4546E+03 UN=0.1314E+04
 40 Y=0.5958E+01 P=0.1318E+01 N=0.1244E+18 V=0.3398E+01 VG=0.002847 R=-.1309E+11 UP=0.3722E+03 UN=0.9356E+03
 41 Y=0.5962E+01 P=0.1225E+01 N=0.2615E+18 V=0.3409E+01 VG=0.018017 R=-.4586E+11 UP=0.2548E+03 UN=0.5392E+03
 42 Y=0.5967E+01 P=0.1104E+01 N=0.7868E+18 V=0.3428E+01 VG=0.038431 R=-.1090E+12 UP=0.1574E+03 UN=0.2936E+03
 43 Y=0.5973E+01 P=0.1117E+01 N=0.2248E+19 V=0.3446E+01 VG=0.057093 R=-.2238E+12 UP=0.1024E+03 UN=0.1781E+03
 44 Y=0.5978E+01 P=0.1279E+01 N=0.5578E+19 V=0.3461E+01 VG=0.073115 R=-.4100E+12 UP=0.7758E+02 UN=0.1305E+03
 45 Y=0.5984E+01 P=0.1515E+01 N=0.1207E+20 V=0.3474E+01 VG=0.086812 R=-.6911E+12 UP=0.6646E+02 UN=0.1099E+03
 46 Y=0.5989E+01 P=0.1720E+01 N=0.2343E+20 V=0.3486E+01 VG=0.098758 R=-.1101E+13 UP=0.6110E+02 UN=0.1002E+03
 47 Y=0.5995E+01 P=0.1947E+01 N=0.2931E+20 V=0.3489E+01 VG=0.102672 R=-.1275E+13 UP=0.5991E+02 UN=0.9806E+02
 48 Y=0.6000E+01 P=0.2009E+01 N=0.3272E+20 V=0.3491E+01 VG=0.104662 R=-.1379E+13 UP=0.5938E+02 UN=0.9711E+02
1 2 V=   0.000000E+00 X=   0.427333E+02 I=  44
  1 Y=0.0000E+00 P=0.4057E+09 N=0.8403E+15 V=0.7920E+00 VG=0.000468 R=0.4535E+15 UP=0.4546E+03 UN=0.1314E+04
  2 Y=0.1000E+01 P=0.4152E+09 N=0.8403E+15 V=0.7915E+00 VG=0.000468 R=0.4641E+15 UP=0.4546E+03 UN=0.1314E+04
  3 Y=0.2000E+01 P=0.4450E+09 N=0.8403E+15 V=0.7900E+00 VG=0.000468 R=0.4973E+15 UP=0.4546E+03 UN=0.1314E+04
  4 Y=0.3000E+01 P=0.4993E+09 N=0.8403E+15 V=0.7876E+00 VG=0.000468 R=0.5581E+15 UP=0.4546E+03 UN=0.1314E+04
  5 Y=0.4000E+01 P=0.5869E+09 N=0.8401E+15 V=0.7843E+00 VG=0.000468 R=0.6561E+15 UP=0.4546E+03 UN=0.1314E+04
  6 Y=0.4094E+01 P=0.5979E+09 N=0.8394E+15 V=0.7839E+00 VG=0.000468 R=0.6684E+15 UP=0.4546E+03 UN=0.1314E+04
  7 Y=0.4187E+01 P=0.6097E+09 N=0.8383E+15 V=0.7835E+00 VG=0.000468 R=0.6815E+15 UP=0.4546E+03 UN=0.1314E+04
  8 Y=0.4281E+01 P=0.6226E+09 N=0.8363E+15 V=0.7831E+00 VG=0.000468 R=0.6960E+15 UP=0.4546E+03 UN=0.1314E+04
  9 Y=0.4375E+01 P=0.6374E+09 N=0.8325E+15 V=0.7826E+00 VG=0.000468 R=0.7125E+15 UP=0.4546E+03 UN=0.1314E+04
 10 Y=0.4437E+01 P=0.6491E+09 N=0.8281E+15 V=0.7822E+00 VG=0.000468 R=0.7256E+15 UP=0.4546E+03 UN=0.1314E+04
 11 Y=0.4500E+01 P=0.6630E+09 N=0.8215E+15 V=0.7818E+00 VG=0.000468 R=0.7411E+15 UP=0.4546E+03 UN=0.1314E+04
 12 Y=0.4542E+01 P=0.6741E+09 N=0.8151E+15 V=0.7814E+00 VG=0.000468 R=0.7536E+15 UP=0.4546E+03 UN=0.1314E+04
 13 Y=0.4583E+01 P=0.6872E+09 N=0.8067E+15 V=0.7810E+00 VG=0.000468 R=0.7683E+15 UP=0.4546E+03 UN=0.1314E+04
 14 Y=0.4625E+01 P=0.7031E+09 N=0.7957E+15 V=0.7804E+00 VG=0.000468 R=0.7860E+15 UP=0.4546E+03 UN=0.1314E+04
 15 Y=0.4656E+01 P=0.7174E+09 N=0.7851E+15 V=0.7800E+00 VG=0.000468 R=0.8020E+15 UP=0.4546E+03 UN=0.1314E+04
 16 Y=0.4687E+01 P=0.7343E+09 N=0.7723E+15 V=0.7794E+00 VG=0.000468 R=0.8209E+15 UP=0.4546E+03 UN=0.1314E+04
 17 Y=0.4719E+01 P=0.7546E+09 N=0.7568E+15 V=0.7787E+00 VG=0.000468 R=0.8436E+15 UP=0.4546E+03 UN=0.1314E+04
 18 Y=0.4750E+01 P=0.7793E+09 N=0.7380E+15 V=0.7779E+00 VG=0.000468 R=0.8712E+15 UP=0.4546E+03 UN=0.1314E+04
 19 Y=0.5000E+01 P=0.1245E+10 N=0.4919E+15 V=0.7661E+00 VG=0.000468 R=0.1392E+16 UP=0.4546E+03 UN=0.1314E+04
 20 Y=0.5500E+01 P=0.1478E+12 N=0.1013E+14 V=0.6423E+00 VG=0.000468 R=0.1625E+18 UP=0.4546E+03 UN=0.1314E+04
 21 Y=0.5533E+01 P=0.3140E+12 N=0.5067E+13 V=0.6227E+00 VG=0.000468 R=0.3290E+18 UP=0.4546E+03 UN=0.1314E+04
 22 Y=0.5567E+01 P=0.7046E+12 N=0.2453E+13 V=0.6017E+00 VG=0.000468 R=0.6070E+18 UP=0.4546E+03 UN=0.1314E+04
 23 Y=0.5600E+01 P=0.1671E+13 N=0.1157E+13 V=0.5793E+00 VG=0.000468 R=0.7573E+18 UP=0.4546E+03 UN=0.1314E+04
 24 Y=0.5700E+01 P=0.3098E+14 N=0.1049E+12 V=0.5036E+00 VG=0.000468 R=0.1168E+18 UP=0.4546E+03 UN=0.1314E+04
 25 Y=0.5733E+01 P=0.9194E+14 N=0.4338E+11 V=0.4753E+00 VG=0.000468 R=0.4848E+17 UP=0.4546E+03 UN=0.1314E+04
 26 Y=0.5767E+01 P=0.2900E+15 N=0.1700E+11 V=0.4455E+00 VG=0.000468 R=0.1901E+17 UP=0.4546E+03 UN=0.1314E+04
 27 Y=0.5800E+01 P=0.9854E+15 N=0.6137E+10 V=0.4138E+00 VG=0.000468 R=0.6863E+16 UP=0.4546E+03 UN=0.1314E+04
 28 Y=0.5827E+01 P=0.2897E+16 N=0.2430E+10 V=0.3858E+00 VG=0.000468 R=0.2717E+16 UP=0.4546E+03 UN=0.1314E+04
 29 Y=0.5842E+01 P=0.5721E+16 N=0.1337E+10 V=0.3681E+00 VG=0.000468 R=0.1496E+16 UP=0.4546E+03 UN=0.1314E+04
 30 Y=0.5857E+01 P=0.1236E+17 N=0.6743E+09 V=0.3481E+00 VG=0.000468 R=0.7541E+15 UP=0.4546E+03 UN=0.1314E+04
 31 Y=0.5875E+01 P=0.3799E+17 N=0.2581E+09 V=0.3194E+00 VG=0.001239 R=0.8922E+15 UP=0.4235E+03 UN=0.1158E+04
 32 Y=0.5887E+01 P=0.1325E+18 N=0.1398E+09 V=0.2925E+00 VG=0.012237 R=0.3373E+16 UP=0.2891E+03 UN=0.6417E+03
 33 Y=0.5900E+01 P=0.3830E+18 N=0.1390E+09 V=0.2727E+00 VG=0.027868 R=0.8632E+16 UP=0.2038E+03 UN=0.4033E+03
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  41 Y=0.5962E+01 P=0.1035E+18 N=0.8817E+09 V=0.2941E+00 VG=0.002581 R=0.6877E+16 UP=0.3797E+03 UN=0.9659E+03
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  45 Y=0.5984E+01 P=0.4193E+17 N=0.2134E+10 V=0.3169E+00 VG=0.001346 R=0.8224E+16 UP=0.4187E+03 UN=0.1136E+04
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  47 Y=0.5995E+01 P=0.3537E+17 N=0.2514E+10 V=0.3212E+00 VG=0.001084 R=0.7228E+16 UP=0.4309E+03 UN=0.1194E+04
  48 Y=0.6000E+01 P=0.3454E+17 N=0.2565E+10 V=0.3217E+00 VG=0.000988 R=0.6482E+16 UP=0.4356E+03 UN=0.1217E+04
1 3 V=   0.000000E+00 X=   0.620000E+02 I=  69

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   7 Y=0.4187E+01 P=0.6132E+16 N=0.6972E+16 V=0.3615E+00 VG=0.000468 R=0.3649E+22 UP=0.4449E+03 UN=0.1236E+04
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  11 Y=0.4500E+01 P=0.6258E+16 N=0.7098E+16 V=0.3610E+00 VG=0.000468 R=0.3719E+22 UP=0.4448E+03 UN=0.1235E+04
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  14 Y=0.4625E+01 P=0.6310E+16 N=0.7150E+16 V=0.3607E+00 VG=0.000468 R=0.3749E+22 UP=0.4447E+03 UN=0.1234E+04
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  17 Y=0.4719E+01 P=0.6350E+16 N=0.7191E+16 V=0.3606E+00 VG=0.000468 R=0.3771E+22 UP=0.4446E+03 UN=0.1234E+04
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  31 Y=0.5875E+01 P=0.4684E+17 N=0.1197E+16 V=0.3091E+00 VG=0.001239 R=0.4035E+22 UP=0.4139E+03 UN=0.1090E+04
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  46 Y=0.5989E+01 P=0.1707E+15 N=0.2342E+20 V=0.5034E+00 VG=0.098746 R=0.5719E+24 UP=0.5975E+02 UN=0.9660E+02
  47 Y=0.5995E+01 P=0.1585E+15 N=0.2930E+20 V=0.5073E+00 VG=0.102664 R=0.6620E+24 UP=0.5852E+02 UN=0.9437E+02
  48 Y=0.6000E+01 P=0.1529E+15 N=0.3279E+20 V=0.5092E+00 VG=0.104656 R=0.7143E+24 UP=0.5797E+02 UN=0.9337E+02
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  15 X=0.9092E+01 P=0.1432E+04 N=0.8400E+15 V=0.3158E+01 VG=0.000468 R=-.2317E+12 UP=0.4546E+03 UN=0.1314E+04
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  27 X=0.1662E+02 P=0.1785E+04 N=0.8400E+15 V=0.2741E+01 VG=0.000468 R=-.2314E+12 UP=0.4546E+03 UN=0.1314E+04
  28 X=0.1665E+02 P=0.1787E+04 N=0.8400E+15 V=0.2739E+01 VG=0.000468 R=-.2314E+12 UP=0.4546E+03 UN=0.1314E+04
```

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 30 X=0.1673E+02 P=0.1790E+04 N=0.8400E+15 V=0.2734E+01 VG=0.000468 R=-.2313E+12 UP=0.4546E+03 UN=0.1314E+04
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  6 X=0.4100E+01 P=0.8812E+01 N=0.3272E+20 V=0.3509E+01 VG=0.104662 R=-.1347E+13 UP=0.5938E+02 UN=0.9711E+02
  7 X=0.6550E+01 P=0.3876E+01 N=0.3272E+20 V=0.3500E+01 VG=0.104662 R=-.1370E+13 UP=0.5938E+02 UN=0.9711E+02
  8 X=0.9000E+01 P=0.2009E+01 N=0.3272E+20 V=0.3491E+01 VG=0.104662 R=-.1379E+13 UP=0.5938E+02 UN=0.9711E+02
  9 X=0.9024E+01 P=0.6562E+00 N=0.3748E+19 V=0.3454E+01 VG=0.066585 R=-.3296E+12 UP=0.8577E+02 UN=0.1459E+03
 10 X=0.9035E+01 P=0.7186E+00 N=0.3998E+18 V=0.3414E+01 VG=0.029681 R=-.9309E+11 UP=0.1949E+03 UN=0.3812E+03
 11 X=0.9046E+01 P=0.1657E+01 N=0.4663E+17 V=0.3373E+01 VG=0.000468 R=-.4202E+10 UP=0.4546E+03 UN=0.1314E+04
 12 X=0.9048E+01 P=0.2016E+01 N=0.3786E+17 V=0.3368E+01 VG=0.000468 R=-.5175E+10 UP=0.4546E+03 UN=0.1314E+04
 13 X=0.9050E+01 P=0.2422E+01 N=0.3118E+17 V=0.3363E+01 VG=0.000468 R=-.6283E+10 UP=0.4546E+03 UN=0.1314E+04
 14 X=0.9070E+01 P=0.8604E+01 N=0.8385E+16 V=0.3328E+01 VG=0.000468 R=-.2337E+11 UP=0.4546E+03 UN=0.1314E+04
 15 X=0.9092E+01 P=0.2234E+02 N=0.3329E+16 V=0.3302E+01 VG=0.000468 R=-.5885E+11 UP=0.4546E+03 UN=0.1314E+04
 16 X=0.9208E+01 P=0.1759E+03 N=0.8764E+15 V=0.3245E+01 VG=0.000468 R=-.2235E+12 UP=0.4546E+03 UN=0.1314E+04
 17 X=0.1260E+02 P=0.7237E+03 N=0.8400E+15 V=0.3000E+01 VG=0.000468 R=-.2325E+12 UP=0.4546E+03 UN=0.1314E+04
 18 X=0.1600E+02 P=0.1010E+04 N=0.8400E+15 V=0.2811E+01 VG=0.000468 R=-.2322E+12 UP=0.4546E+03 UN=0.1314E+04
 19 X=0.1617E+02 P=0.1017E+04 N=0.8400E+15 V=0.2803E+01 VG=0.000468 R=-.2322E+12 UP=0.4546E+03 UN=0.1314E+04
 20 X=0.1625E+02 P=0.1018E+04 N=0.8400E+15 V=0.2799E+01 VG=0.000468 R=-.2322E+12 UP=0.4546E+03 UN=0.1314E+04
 21 X=0.1632E+02 P=0.1017E+04 N=0.8400E+15 V=0.2796E+01 VG=0.000468 R=-.2322E+12 UP=0.4546E+03 UN=0.1314E+04
 22 X=0.1640E+02 P=0.1015E+04 N=0.8399E+15 V=0.2793E+01 VG=0.000468 R=-.2322E+12 UP=0.4546E+03 UN=0.1314E+04
 23 X=0.1647E+02 P=0.1009E+04 N=0.8399E+15 V=0.2789E+01 VG=0.000468 R=-.2322E+12 UP=0.4546E+03 UN=0.1314E+04
 24 X=0.1650E+02 P=0.1006E+04 N=0.8399E+15 V=0.2788E+01 VG=0.000468 R=-.2323E+12 UP=0.4546E+03 UN=0.1314E+04
 25 X=0.1654E+02 P=0.1002E+04 N=0.8399E+15 V=0.2786E+01 VG=0.000468 R=-.2323E+12 UP=0.4546E+03 UN=0.1314E+04
 26 X=0.1658E+02 P=0.9972E+03 N=0.8398E+15 V=0.2784E+01 VG=0.000468 R=-.2323E+12 UP=0.4546E+03 UN=0.1314E+04
 27 X=0.1662E+02 P=0.9911E+03 N=0.8398E+15 V=0.2783E+01 VG=0.000468 R=-.2323E+12 UP=0.4546E+03 UN=0.1314E+04
 28 X=0.1665E+02 P=0.9850E+03 N=0.8397E+15 V=0.2781E+01 VG=0.000468 R=-.2323E+12 UP=0.4546E+03 UN=0.1314E+04
 29 X=0.1669E+02 P=0.9782E+03 N=0.8396E+15 V=0.2780E+01 VG=0.000468 R=-.2324E+12 UP=0.4546E+03 UN=0.1314E+04
 30 X=0.1673E+02 P=0.9703E+03 N=0.8395E+15 V=0.2778E+01 VG=0.000468 R=-.2324E+12 UP=0.4546E+03 UN=0.1314E+04
 31 X=0.1676E+02 P=0.9614E+03 N=0.8394E+15 V=0.2777E+01 VG=0.000468 R=-.2324E+12 UP=0.4546E+03 UN=0.1314E+04
 32 X=0.1706E+02 P=0.8491E+03 N=0.8375E+15 V=0.2765E+01 VG=0.000468 R=-.2331E+12 UP=0.4546E+03 UN=0.1314E+04
 33 X=0.1735E+02 P=0.6466E+03 N=0.8271E+15 V=0.2753E+01 VG=0.000468 R=-.2363E+12 UP=0.4546E+03 UN=0.1314E+04
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 35 X=0.1780E+02 P=0.1351E+03 N=0.6612E+15 V=0.2732E+01 VG=0.000468 R=-.2963E+12 UP=0.4546E+03 UN=0.1314E+04
 36 X=0.2170E+02 P=0.3447E+17 N=0.1066E+01 V=0.3237E+00 VG=0.000988 R=-.1311E+11 UP=0.4357E+03 UN=0.1217E+04
 37 X=0.2580E+02 P=0.3454E+17 N=0.2218E+01 V=0.3236E+00 VG=0.000988 R=-.1308E+11 UP=0.4357E+03 UN=0.1217E+04
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 40 X=0.3270E+02 P=0.9160E+16 N=0.1938E+05 V=0.3581E+00 VG=0.000988 R=-.3716E+09 UP=0.4357E+03 UN=0.1217E+04
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 42 X=0.3790E+02 P=0.9158E+16 N=0.5082E+05 V=0.3581E+00 VG=0.000988 R=0.7907E+11 UP=0.4357E+03 UN=0.1217E+04
 43 X=0.3810E+02 P=0.3452E+17 N=0.7104E+07 V=0.3235E+00 VG=0.000988 R=0.1794E+14 UP=0.4357E+03 UN=0.1217E+04
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 45 X=0.4737E+02 P=0.3454E+17 N=0.1444E+13 V=0.3200E+00 VG=0.000988 R=0.3650E+19 UP=0.4353E+03 UN=0.1214E+04
 46 X=0.5200E+02 P=0.3463E+17 N=0.1487E+15 V=0.3182E+00 VG=0.000988 R=0.3743E+21 UP=0.4322E+03 UN=0.1191E+04
 47 X=0.5291E+02 P=0.3474E+17 N=0.1304E+16 V=0.3179E+00 VG=0.000988 R=0.3176E+22 UP=0.4265E+03 UN=0.1148E+04
 48 X=0.5291E+02 P=0.3045E+17 N=0.1577E+16 V=0.3213E+00 VG=0.000988 R=0.3788E+22 UP=0.4263E+03 UN=0.1147E+04
 49 X=0.5292E+02 P=0.2634E+17 N=0.1915E+16 V=0.3251E+00 VG=0.000988 R=0.4510E+22 UP=0.4261E+03 UN=0.1145E+04
 50 X=0.5293E+02 P=0.2110E+17 N=0.2517E+16 V=0.3308E+00 VG=0.000988 R=0.5681E+22 UP=0.4258E+03 UN=0.1143E+04
 51 X=0.5293E+02 P=0.1807E+17 N=0.3009E+16 V=0.3349E+00 VG=0.000988 R=0.6518E+22 UP=0.4257E+03 UN=0.1143E+04
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 57 X=0.5296E+02 P=0.1206E+16 N=0.5100E+17 V=0.4056E+00 VG=0.002112 R=0.7610E+22 UP=0.3810E+03 UN=0.9519E+03
 58 X=0.5296E+02 P=0.8017E+15 N=0.1363E+18 V=0.4237E+00 VG=0.016966 R=0.2603E+23 UP=0.2557E+03 UN=0.5342E+03
 59 X=0.5297E+02 P=0.5224E+15 N=0.3712E+18 V=0.4422E+00 VG=0.031826 R=0.4064E+23 UP=0.1818E+03 UN=0.3456E+03
 60 X=0.5297E+02 P=0.4052E+15 N=0.6383E+18 V=0.4525E+00 VG=0.039295 R=0.4820E+23 UP=0.1516E+03 UN=0.2776E+03
 61 X=0.5297E+02 P=0.3215E+15 N=0.1067E+19 V=0.4622E+00 VG=0.046629 R=0.5787E+23 UP=0.1271E+03 UN=0.2260E+03
 62 X=0.5299E+02 P=0.1067E+15 N=0.2489E+20 V=0.5173E+00 VG=0.099786 R=0.3790E+24 UP=0.5964E+02 UN=0.9661E+02
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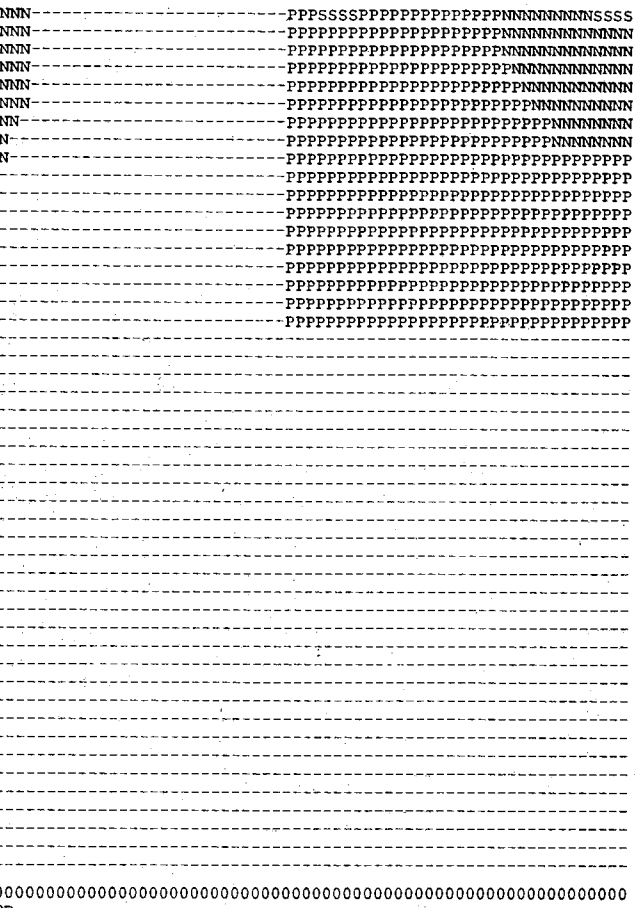
 67 X=0.5940E+02 P=0.1533E+15 N=0.3279E+20 V=0.5092E+00 VG=0.104656 R=0.7164E+24 UP=0.5796E+02 UN=0.9337E+02
 68 X=0.6070E+02 P=0.1530E+15 N=0.3279E+20 V=0.5092E+00 VG=0.104656 R=0.7148E+24 UP=0.5797E+02 UN=0.9337E+02
 69 X=0.6200E+02 P=0.1529E+15 N=0.3279E+20 V=0.5092E+00 VG=0.104656 R=0.7143E+24 UP=0.5797E+02 UN=0.9337E+02
***** ENTER DUMP2D

DUMP2D(4,2) CALLED  21 TIMES

***** ENTER DUMP2D
```

```
1********** DAP2D - VERSION 4 **********
 RUN: 2223     09/22/87   04.23.15
 DEVICE DIMENSIONS:
      X DIRECTION 0.6200E+02 MICRONS, 69 MESH LINES
      Y DIRECTION 0.6000E+01 MICRONS, 48 MESH LINES
```



```
 ***** ENTER DUMP2D
#eor
1 CY205 PERMANENT FILE SPACE USAGE REPORT FOR  252430 (UTX)
0   SYSTEM PACKS     -    1500 BLOCKS ALLOCATED,    1512 BLOCKS USED.
0                                                    LAST ACCESSED
     FILE NAME   POOL NAME  ORG OWNER  FILE SIZE   MO/DD/YY  HH:MM:SS

      SUMM2D                  252430         32    9/22/87   6:27:25
      RUNNO                   252430         40    9/22/87   4:23:15
      DAP77                   252430        544    9/22/87   4:23:11
      EQDAP77                  252430        256    9/22/87   4:21:45
      JLGLIB                  252430        288    9/21/87  17:47:29
      PLTLIB                  252430         64    6/03/87   9:35:40
    * PLTNEW                  252430        288    6/03/87   9:33:26
```