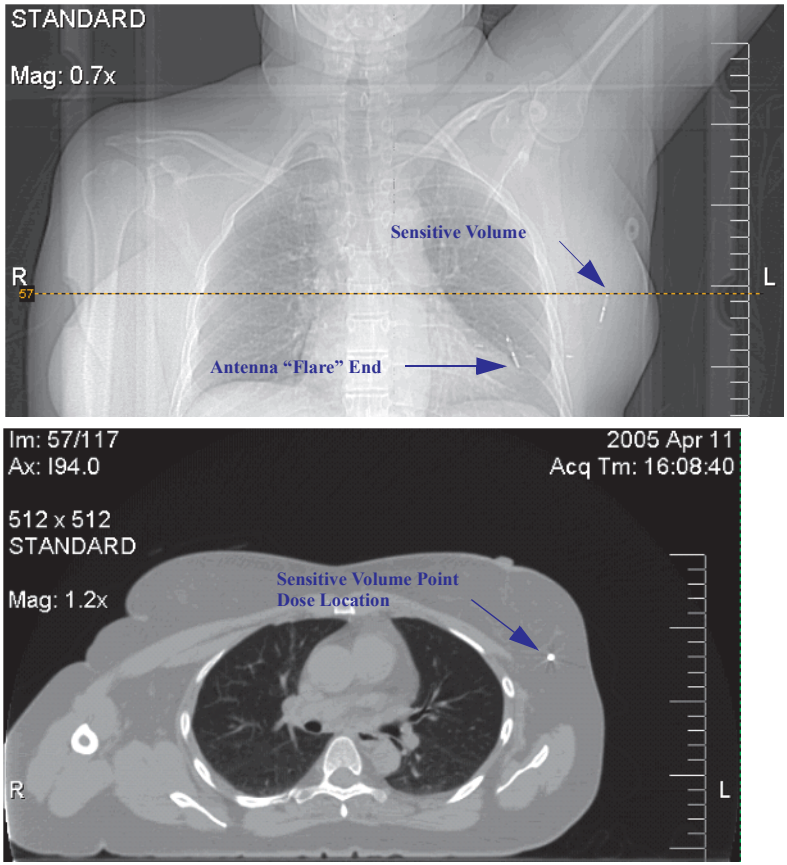


Figure 28 — CT Scout and Transverse Images

1. Login to the Plan and Review Software.
2. Click **Patient Information**.
3. Click **Add**.
4. In the **Patient Data Entry** dialog box, enter the patient information:
   a. Enter the patient number.
   b. Enter the patient's name.
   c. Enter the physician's name (this is generally the attending radiation oncologist).
5. Click **Add Dosimeter** to assign the implanted dosimeters to the patient.
   a. Scan the dosimeter's bar code. The bar code contains the dosimeter's serial number and calibration information.

b. Enter the implant location for each dosimeter from the transfer labels.

6. Click **Add Plan** and add the patient's plan information:
   a. Enter the name of each plan, and the number of fractions for each plan.
   b. Enter the predicted dose at each dosimeter (point dose) from the planning CTs. Note that this must be in cGy (not MU). The dose fractions usually range from 150-250 cGy. Values outside this range result in the following error message:

      This predicted dose is outside the typical range of 150 to 250 cGy. Are you sure you want to use this value?

Note: After implantation, additional plans may be added, such as a boost plan.

4.4 Step 4 – Measure Radiation Pre-dose and Post-dose Values Using The DVS Reader

1. Login to the Reader.
2. Press **Scan patient**.
3. Select the patient from the list and press **Next**.
4. Select the current plan and fraction for the patient and press **Next**.
5. Read the dosimeters' pre-dose values.
   a. Hold the Reader Wand up to the patient.
   b. Press then release the button on the Reader Wand.
   c. Hold the Reader Wand near the patient's treatment area until the Reader scans and reads all the dosimeters.
6. Proceed with radiation therapy.
7. Press **Next** on the reader to display the **POST-Dose Reading** screen.
8. Read the dosimeters' post-dose values within 10 minutes of treatment:
   a. Hold the Reader Wand up to the patient.
   b. Press then release the button on the Reader Wand.
   c. Hold the Reader Wand near the patient's treatment area until the Reader scans and reads all the dosimeters again.

9. Press **Next** and enter any notes related to the therapy on the **Treatment Notes** screen.
10. Press **Save** to save the readings to the Dosimetry Database.

5 Using the Plan and Review Software

The Plan and Review Software is used to:

- Enter patient, dosimeter, and plan information
- Review results from the patient's dosimeters
- Maintain the authorized user list
- Setup system options

5.1 Logging into the DVS Plan and Review Software

To log into the Plan and Review Software:

1. Click the **DVS Plan and Review** icon on the Desktop or select **Start>Programs>DVS>DVS Plan and Review**. The **DVS Login** dialog box appears (Figure 29).

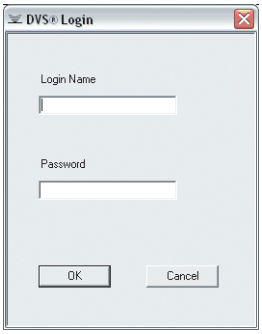


Figure 29 — DVS Login

2. Enter the **Login Name** and **Password** that were assigned to you by the DVS Administrator.
3. Click **OK**.

5.2 DVS Main Menu Overview

The **DVS Main Menu** contains five buttons as shown in Figure 30:

- **Patient Information** – Enter or edit patient, dosimeter, and plan information (see section 5.3 *Working With Patient Information* on page 39)

- **Patient Results** – View charts and reports for the patient's dosimeter results (section 4 *Quick Start Instructions* on page 33)
- **Administration** – Maintain the list of authorized users, and set DVS options (see section 5.5 *DVS System Administration* on page 53)
- **Exit DVS** – Exit the Plan and Review Software
- **About…** – Show software version and copyright information

Note: Depending on the user's authorization level, some of these buttons may be disabled. For more information, see *Adding and Editing DVS Users* on page 53.

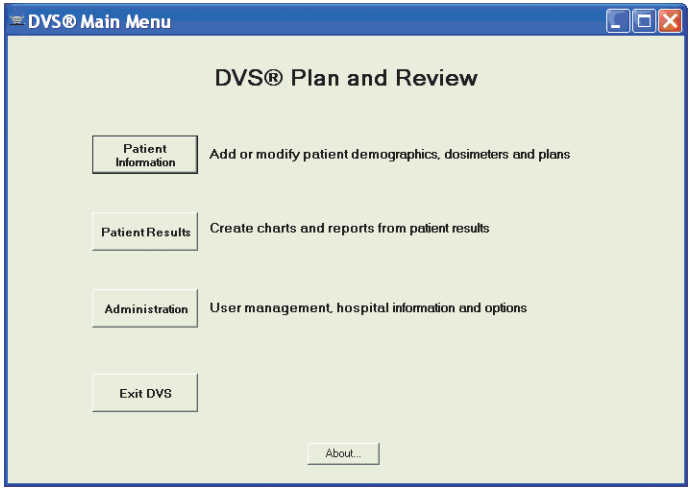


Figure 30 — DVS Main Menu

5.3 Working With Patient Information

From the **DVS Main Menu**, click **Patient Information** to perform the following tasks:

- Adding, Editing and Viewing Patients
- Entering Patient, Dosimeter, and Plan Information
- Entering Patient and Physician Information
- Entering Plans
- Entering Dosimeters
- Changing or Deleting Dosimeters
- Working with Measurement Fractions and Skipped Fractions
- Changing Information for a Fraction

Adding, Editing, and Viewing Patients

To add, edit or view patients, click **Patient Information** on the **DVS Main Menu**. The **Patient Selection for Editing** window appears (Figure 31).

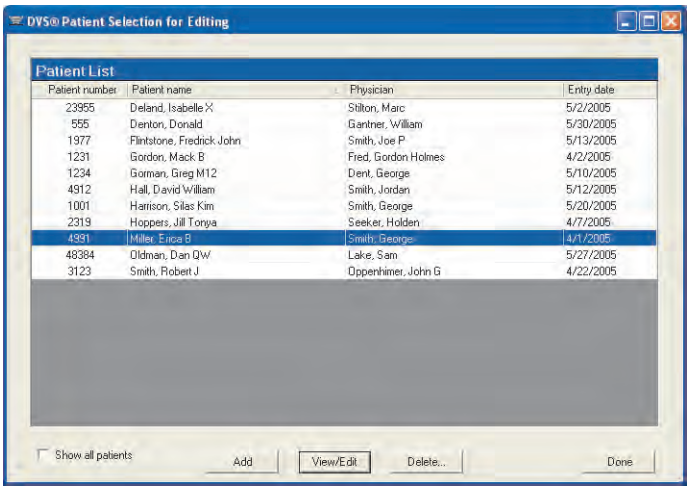


Figure 31 — Patient Selection for Editing

By default, the patient list displays only the patients that are marked to be shown in the DVS Reader. This makes it easier to manage a large list of patients. To list all the patients in the Dosimetry Database, select the **Show all patients** check box. From this window, you can perform the following tasks:

- **To add a new patient**, click **Add**. The **Patient Data Entry** window appears. You can enter the new patient's information using this window.
- **To delete a patient from the list**, select the patient in the list and click **Delete**. Patients who have dosimeters with measurements cannot be deleted. To remove a patient from the list, clear the **Patient shown on Reader** check box in the **Patient Data Entry** window.
- **To edit a patient's information**, select the patient in the list and click **View/Edit**. The **Patient Data Entry** window appears. You can enter the new patient's information using this window.
- **To return to the Main Menu**, click **Done**.

For more information about the **Patient Data Entry** window, see *Entering Patient, Dosimeter, and Plan Information* on page 41.

Entering Patient, Dosimeter, and Plan Information

To edit patient, dosimeter, and plan information, click **Add** or **View/Edit** on the **Patient Selection for Editing** window to display the **Patient Data Entry** window (Figure 32).

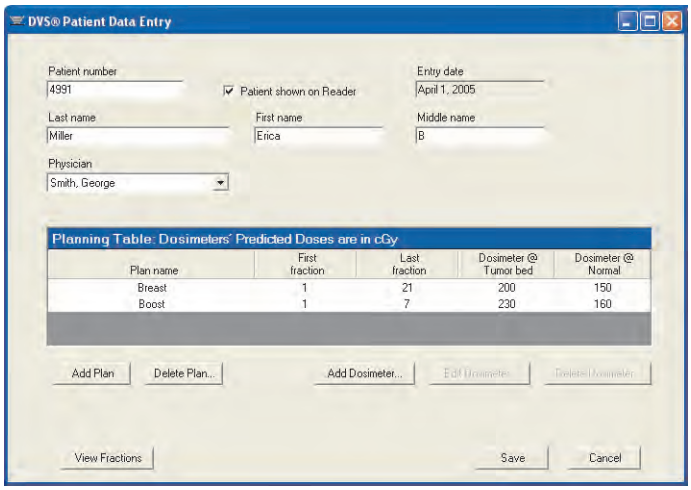


Figure 32 — Patient Data Entry

From the **Patient Selection for Editing** window, you can perform the following tasks:

- Entering Patient and Physician Information
- Entering Plans
- Entering Dosimeters
- Changing or Deleting Dosimeters
- Working with Measurement Fractions and Skipped Fractions
- Changing Information for a Fraction

Entering Patient and Physician Information

The top of the **Patient Data Entry** window has the following fields for entering patient demographic information:

- **Patient number** – (required) This must contain a unique patient number or identifier
- **Patient shown on Reader** – Select this check box to display the patient on the **Select Patient** screen on the DVS Reader. For patients that are no longer active, clear this check box.

- **Entry date** – (read-only) Displays the date the patient was entered.
- **Last name** – (required) Enter the patient's last name
- **First name** – Enter the patient's first name.
- **Middle name** – Enter the patient's middle name
- **Physician** – Select a physician from the list. If you want to add a new physician, select **Add Physician** from the top of the list. The **Physician Data Entry** dialog box appears (Figure 33). Enter the physician's name and unique physician number. Each field must be filled out. If there is not a unique number that identifies the physician, enter their name or other identifier.

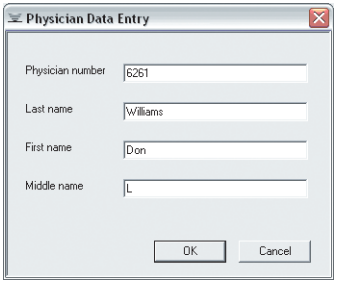


Figure 33 — Physician Data Entry

When finished making changes, click **Save** to save the data entered in this window and its dialog boxes. Click **Cancel** to discard all changes made for the current patient.

Entering Plans

Use the planning table on the **Patient Data Entry** window to enter the patient's plan information. Each row in the planning table contains a plan for the patient. Each plan is made of a series of treatment fractions each at the same dose level.

To add a new plan:

1. Click **Add Plan** and edit the new row that appears.
2. Set the following items for each plan:
   - **Plan name** – The name to use for the plan
   - **First fraction** – The number of the first fraction. This is typically 1, but can is any number greater than zero, and less than or equal to the **Last fraction**.
   - **Last fraction** – The number of the last fraction. This must be greater than or equal to the **First fraction**.

If dosimeters have been assigned to the patient, additional columns appear in the table, one for each dosimeter. For more information about assigning dosimeters to a patient, see *Entering Dosimeters* on page 43.

To delete a plan:

1. Select the row to delete.
2. Click **Delete Plan**.

Entering Dosimeters

Dosimeters assigned to the patient are shown in the planning table on the **Patient Data Entry** window.

To add a new dosimeter:

1. Click **Add Dosimeter**. A dialog box for entering the dosimeter's bar coded calibration values appears (Figure 34).

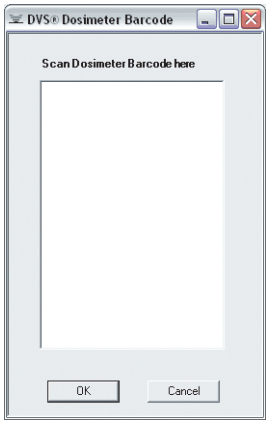


Figure 34 — Dosimeter Barcode

2. Use the bar code scanner to read the 2D bar code from the transfer label for the dosimeter. The button on the bar code scanner must remain pressed while the barcode is scanning. An audible beep will indicate when the barcode has been read. The data from the bar code label is entered into this dialog box.
3. When completed, click **OK**. The **Dosimeter Data Entry** dialog box appears (Figure 35).

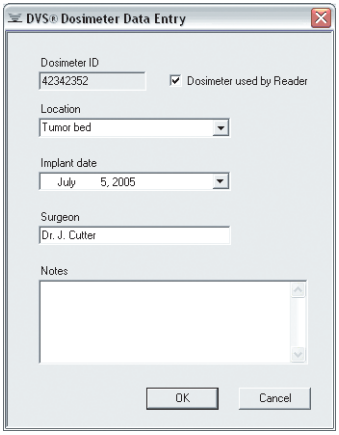


Figure 35 — Dosimeter Data Entry

4. Enter the following information about the dosimeter:
   - **Dosimeter ID** – (Read-only) Displays the serial number of the dosimeter.
   - **Location** – Select a location name for the dosimeter from the pull-down menu. If you want to create a new location, just type it into this field.
   - **Implant date** – (Optional) Select the implant date of the dosimeter. The default is today's date.
   - **Surgeon** – (Optional) Enter the surgeon's name.
   - **Notes** – (Optional) Enter notes about the dosimeter
   - **Dosimeter used by Reader** – To have the DVS Reader scan for this dosimeter, select this check box. To prevent the Reader from scanning for this dosimeter, clear this check box.
5. Click **OK** to save the dosimeter information. The planning table is updated with a new column for the dosimeter. The **Location** that was entered in the **Dosimeter Data Entry** dialog box appears in the new column's heading.

Changing or Deleting Dosimeters

Dosimeters assigned to the patient are shown in the planning table on the **Patient Data Entry** dialog box.

To edit dosimeter information

1. Put the cursor in the **Dosimeters** column.

2. Click **Edit Dosimeter**. The **Dosimeter Data Entry** dialog box appears (Figure 35).
3. Change the information in this dialog box.
4. Click **OK** to save the information.

To delete a dosimeter:

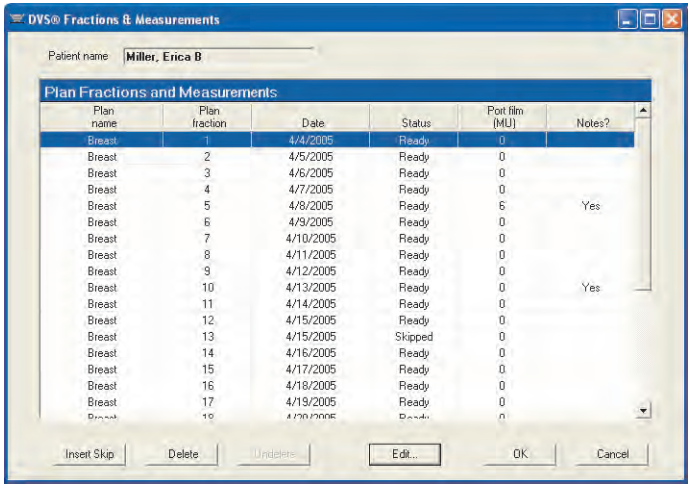
1. Put the cursor in the **Dosimeters** column.
2. Click **Delete Dosimeter**.

Note: Dosimeters with measurements cannot be deleted. Click **Edit Dosimeter** to display the **Dosimeter Data Entry** dialog box. Clear the **Dosimeter used by Reader** check box.

Working with Measurement Fractions and Skipped Fractions

As measurements are collected from a patient's dosimeters, you can make changes to the information collected on the DVS Reader's **Treatment Notes** screen, and you can add, edit, or delete skipped fractions.

On the **Patient Data Entry** window, click **View Fractions** to display the **Fractions & Measurements** windows. This window lists the planned fractions and the measurements made for each fraction (Figure 36).



Plan name	Plan fraction	Date	Status	Port film (MU)	Notes?
Breast	1	4/4/2005	Ready	0	
Breast	2	4/5/2005	Ready	0	
Breast	3	4/6/2005	Ready	0	
Breast	4	4/7/2005	Ready	0	
Breast	5	4/8/2005	Ready	6	Yes
Breast	6	4/9/2005	Ready	0	
Breast	7	4/10/2005	Ready	0	
Breast	8	4/11/2005	Ready	0	
Breast	9	4/12/2005	Ready	0	
Breast	10	4/13/2005	Ready	0	Yes
Breast	11	4/14/2005	Ready	0	
Breast	12	4/15/2005	Ready	0	
Breast	13	4/15/2005	Skipped	0	
Breast	14	4/16/2005	Ready	0	
Breast	15	4/17/2005	Ready	0	
Breast	16	4/18/2005	Ready	0	
Breast	17	4/19/2005	Ready	0	

Figure 36 — Fractions & Measurements

The columns in the **Fractions & Measurements** window are defined as follows:

- **Plan name** – The plan's name from the planning table.

- **Plan fraction** – The plan's fraction number.
- **Date** – The measurement date.
- **Status** – The measurement status for the plan and fraction:
  - **Ready** – A normal measurement was taken.
  - **Skipped** – No measurement was taken, but treatment was given.
  - **Deleted** – The measurement is marked as deleted; it is not associated with a plan and fraction.
  - [Blank] – No measurement or treatment has been performed yet.
- **Port film (MU)** – The number of monitor units from port films taken during the measurement.
- **Notes?** – Whether any notes check boxes were selected for the measurement. **Yes** means there are notes. Blank means there are no notes.

Deleting a Fraction

To mark a measurement fraction as deleted so it is not associated with a plan and fraction, perform the following steps:

1. Select the measurement.
2. Click **Delete**. The measurement is not actually deleted, but will not be used to calculate total dose administered.

To restore a deleted measurement:

1. Select the fraction.
2. Click **Undelete**.

Inserting Skipped Fractions

Skipped fractions are used to record when treatment was given, but measurements from the DVS Dosimeters were not made or completed.

To insert a skipped fraction:

1. Select the row with the plan and fraction that was missed.
2. Click **Insert Skip**. This associates a skipped fraction with the selected plan and fraction.

To remove a skipped fraction:

1. Select the row with the skipped fraction.
2. Click **Delete**.

Changing Information for a Fraction

From the **Fractions & Measurements** window, you can change the notes or the port film monitor units for a fraction:

1. Select the fraction to edit.
2. Click **Edit** to display the **Measurement Data Entry** dialog box (Figure 37).

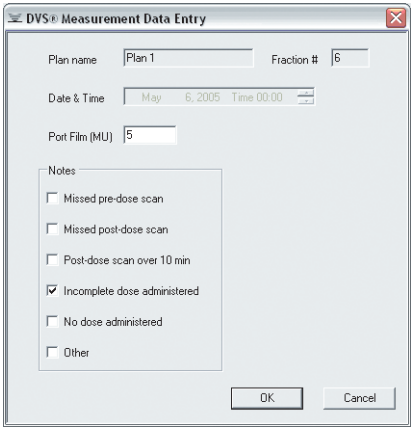


Figure 37 — Measurement Data Entry

3. Edit the following information in the **Measurement Data Entry** dialog box:
   - **Plan name** – (read-only) The plan name of the selected fraction
   - **Fraction #** – (read-only) The plan's fraction number
   - **Date & Time** – (read-only, except for *Skipped* fractions) The date and time of the measurement. For *Skipped* fractions, this can be changed; however, the date and time must stay between the fraction before and after the current fraction. This is needed to keep the measurement fractions in the proper order.
   - **Port Film (MU)** – The number of monitor units from Port films taken during this measurement
   - **Notes** – This group-box contains check boxes that record the notes entered by the user
4. Click **OK** to save the changes made in this dialog box. To discard the changes, click **Cancel**.

5.4 Viewing Patient Results

From the **Main Menu**, click **Patient Results** to perform the following tasks:

- Displaying a List of Patient Results
- Viewing Results Charts
- Viewing Results Reports

Displaying a List of Patient Results

To view patient results, click **Patient Results** on the **DVS Main Menu**. The **Patient Selection for Results** window appears (Figure 38).

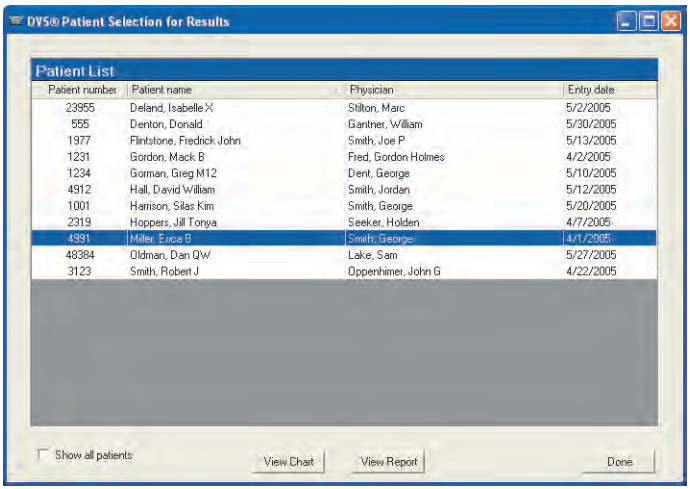


Figure 38 — Patient Selection for Results

By default, the patient list displays only the patients that are marked to be shown in the DVS Reader. This makes it easier to manage a large list of patients. To list all the patients in the Dosimetry Database, select the **Show all patients** check box. From this window, you can perform the following tasks:

- **To view a chart showing the dose measurements from a patient's dosimeters**, select the patient and click **View Chart** to display the **Results Chart** screen. For more information, see *Viewing Results Charts* on page 49.
- **To view a report showing the dose measurements from a patient's dosimeters**, select the patient and click **View Report**

to display the **Results Report** screen. For more information, see *Viewing Results Reports* on page 51.

- **To return to the Main Menu**, click **Done**.

Viewing Results Charts

The **Results Chart** window summarizes a patient's dosimeter measurements. There are two charts and a statistics table shown for each dosimeter (Figure 39 and Figure 40).

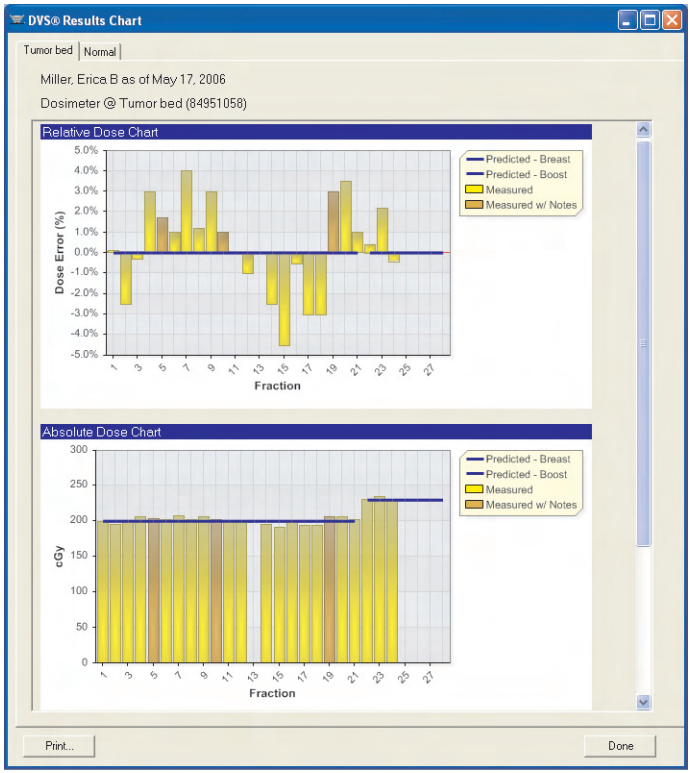


Figure 39 — Results Charts

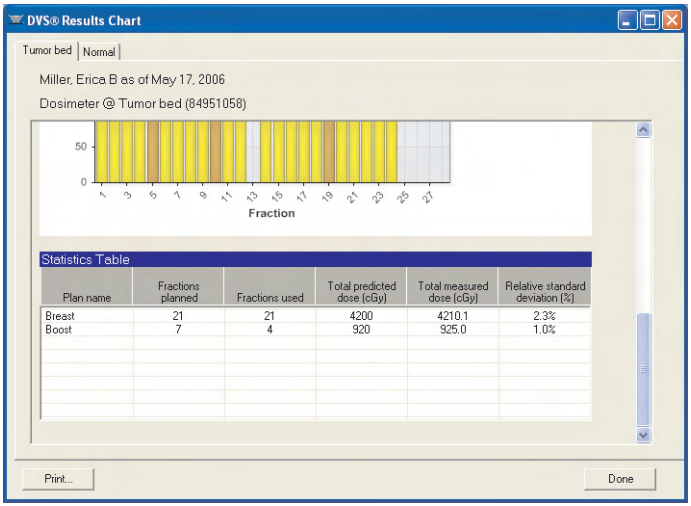


Figure 40 — Statistics Table

Dosimeter results are displayed in a tab labeled with the dosimeter location.

The first chart is the **Relative Dose Chart**. This shows the difference between each measured dose and its predicted dose as a percentage. The value shown for each bar is the measured dose relative to the predicted dose.

The second chart is the **Absolute Dose Chart**. This shows the measured doses (in cGy) as gold bars, and the predicted doses as blue lines. Each plan is shown as a separate blue line.

In the charts, the brown bars identify measurements where either a port film was taken or notes were entered by the user.

For each of the charts, the mouse can be positioned over a bar to show more information about the measurement:

- The value of the measurement
- The date of the measurement
- Who made the measurement
- The monitor units from port films that were taken
- Any notes selected during the measurement process

No bars are shown for skipped fractions or fractions where a dosimeter value could not be read. Positioning the mouse over these empty spaces will show if it was a skipped fraction or a measurement error.

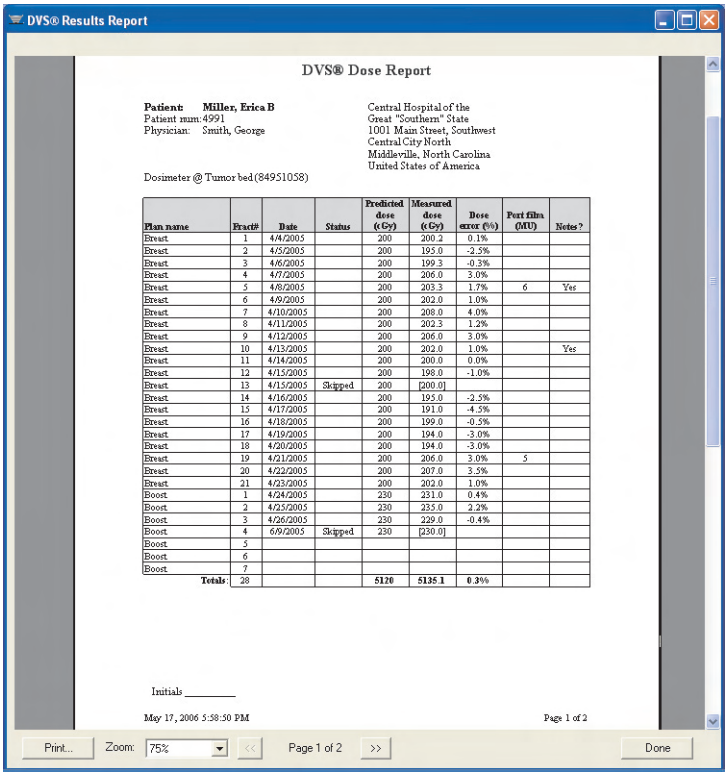
The **Statistics Table** shows summary statistics for each of the patient's plans. The columns are as follows:

- **Plan name** – The name of the plan
- **Fractions planned** – The number of fractions in the plan
- **Fractions used** – The number of dose fractions administered so far
- **Total predicted dose (cGy)** – The expected dose administered for the number of fractions displayed in the Fractions used column
- **Total measured dose (cGy)** – The measured dose for the number of fractions displayed in the Fractions used column. For skipped fractions or fractions with measurement errors, the predicted dose is used instead.
- **Relative standard deviation (%)** – The standard deviation of the measurements divided by the average of the measurements. For skipped fractions or fractions with measurement errors, the predicted dose is used instead.

To print the charts for a patient, click **Print**. One page is printed for each dosimeter.

Viewing Results Reports

The **Results Report** window summarizes a patient's dosimeter measurements in a report format (Figure 41).



DVS® Results Report

DVS® Dose Report

Patient: **Miller, Erica B**
Patient mrn: 4991
Physician: Smith, George

Central Hospital of the
Great "Southern" State
1001 Main Street, Southwest
Central City North
Middleville, North Carolina
United States of America

Dosimeter @ Tumor bed (84951058)

Plan name	Fract#	Date	Status	Predicted dose (cGy)	Measured dose (cGy)	Dose error (%)	Port film (MU)	Notes ?
Breast	1	4/4/2005		200	200.2	0.1%		
Breast	2	4/5/2005		200	195.0	-2.5%		
Breast	3	4/6/2005		200	199.3	-0.3%		
Breast	4	4/7/2005		200	206.0	3.0%		
Breast	5	4/8/2005		200	203.3	1.7%	6	Yes
Breast	6	4/9/2005		200	202.0	1.0%		
Breast	7	4/10/2005		200	208.0	4.0%		
Breast	8	4/11/2005		200	202.3	1.2%		
Breast	9	4/12/2005		200	206.0	3.0%		
Breast	10	4/13/2005		200	202.0	1.0%		Yes
Breast	11	4/14/2005		200	200.0	0.0%		
Breast	12	4/15/2005		200	198.0	-1.0%		
Breast	13	4/15/2005	Skipped	200	[200.0]			
Breast	14	4/16/2005		200	195.0	-2.5%		
Breast	15	4/17/2005		200	191.0	-4.5%		
Breast	16	4/18/2005		200	199.0	-0.5%		
Breast	17	4/19/2005		200	194.0	-3.0%		
Breast	18	4/20/2005		200	194.0	-3.0%		
Breast	19	4/21/2005		200	206.0	3.0%	5	
Breast	20	4/22/2005		200	207.0	3.5%		
Breast	21	4/23/2005		200	202.0	1.0%		
Boost	1	4/24/2005		230	231.0	0.4%		
Boost	2	4/25/2005		230	235.0	2.2%		
Boost	3	4/26/2005		230	229.0	-0.4%		
Boost	4	6/9/2005	Skipped	230	[230.0]			
Boost	5							
Boost	6							
Boost	7							
Totals:	28			**5120**	**5135.1**	**0.3%**		

Initials _____

May 17, 2006 5:58:50 PM

Page 1 of 2

Print... Zoom: 75% << Page 1 of 2 >> Done

Figure 41 — Results Report

The report is similar to the **Fractions & Measurements** screen (see *Working with Measurement Fractions and Skipped Fractions* on page 45). However, the report also shows the dose values from each dosimeter. The measurement for each dosimeter is shown in a separate table. The columns in the tables are as follows:

- **Plan name** – The plan's name from the planning table.
- **Fract #** – The plan's fraction number.
- **Date** – The measurement date.
- **Status** – The measurement status for the plan and fraction. It is one of:
  - [Blank] – A normal measurement was taken.
  - **Skipped** – No measurement was taken, but treatment was given.

  - **Deleted** – The measurement is marked as deleted; it is not associated with a plan and fraction.
  - **Error** – An error occurred when taking the measurement from this dosimeter.
- **Predicted dose (cGy)** – The dose from the planning table.
- **Measured dose (cGy)** – The measured dose.
- **Dose error (%)** – The difference between the Measured dose and the Predicted dose, divided by the Predicted dose.
- **Port film (MU)** – The number of monitor units from port films taken during the measurement.
- **Notes?** – Whether any notes check boxes were selected for the measurement. **Yes** means there are notes. Blank means there are no notes.

The size of the displayed report can be changed with the **Zoom** selection. This does not affect the printed report.

To display the next page of the report, click >>. To display the previous page, click <<.

To print the report, click **Print**.

5.5 DVS System Administration

From the Main Menu, click **System Administration** to display the **Administration** screen. This screen contains three tabs:

- **Users** – This tab contains the list of authorized users.
- **Options** – This tab contains options for the DVS system.
- **Database** – This tab contains the database connection information.

From these tabs, you can perform the following tasks:

- Adding and Editing DVS Users
- Changing Institutional Information and System Options
- Changing the Database Connections
- Backing up and Restoring the DVS Database

Adding and Editing DVS Users

The Users tab displays the list of authorized users (Figure 42).

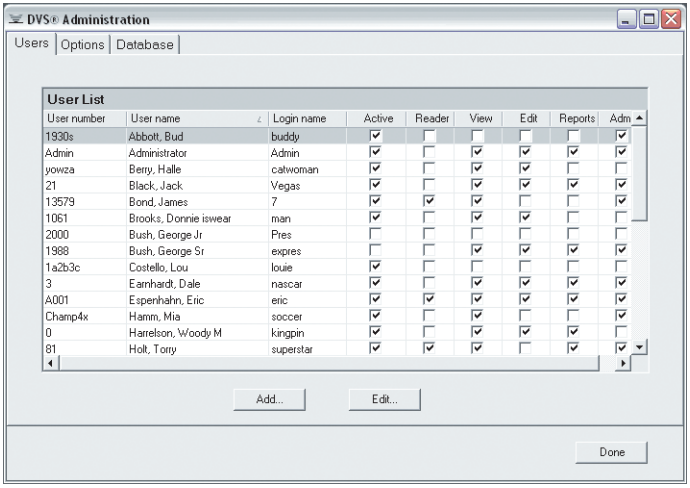


Figure 42 — Users

Each person who uses the DVS Plan and Review Software and the DVS Reader, must have a login name and password. To add a new user, click **Add**. This displays the **User Data Entry** window (Figure 43). The fields in this window are as follows:

- **Active user** – Select this check box to let the user log in. Clear this check box to disable this user.
- **User number** – (Required) Enter a unique user number or identifier.
- **Last name** – (Required) Enter the user's last name.
- **First name** – Enter the user's first name.
- **Middle name** – Enter the user's middle name.
- **Login name** – (Required) Enter the user's login name for the Plan and Review Software.
- **Password** – (Required) Enter the user's password.
- **Verify password** – (Required) Enter the user's password for verification.
- **Entry date** – (Read-only) Enter the date when the user was added.
- **Can use Reader** – Select this check box to allow the user to log in and use the DVS Reader. Clear this check box to prevent this user from appearing in the user list on the Reader.
- **View Patient data** – Select this check box to allow the user to select the **Patient Information** button and view the screens

that it contains. Clear this check box to disable the **Patient Information** button for this user.

- **Edit Patient data** – Select this check box to allow the user to edit patient information. If this check box is selected, then the **View Patient Data** check box is selected also. Clear this check box to prevent the user from changing any patient information.
- **Create reports** – Select this check box to allow the user to select the **Patient Results** button and view the charts and reports. Clear this check box to disable the **Patient Results** button.
- **Administrator** – Select this check box to allow the user to select the **Administration** button and perform administrative functions. Clear this check box to disable the **Administration** button.

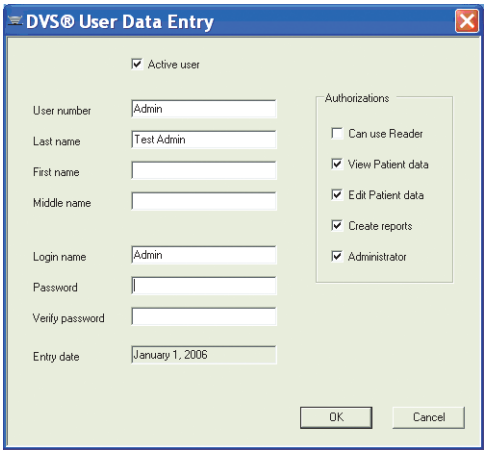


Figure 43 — User Data Entry

To edit an existing user, select the user in the list and click Edit. This displays the **User Data Entry** window with the user's information.

To return to the **Main Menu**, click **Done**.

Changing Institutional Information and System Options

The **Options** tab contains information that is typically setup once when the DVS system is installed (Figure 44).

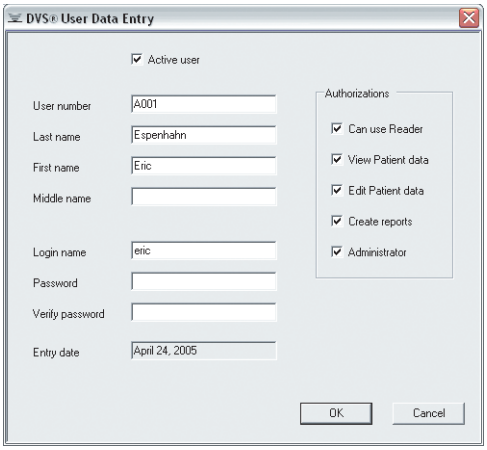


Figure 44 — Options

The **Options** tab contains the following fields:

- **Institution's name** – The name of the institution to print on the charts and reports
- **Address** – The address printed on the charts and report
- **On Reader, time for automatic logout** – This is the number of minutes of idle time to allow before automatically logging out of the DVS Reader
- **How to show the measured dose on the Reader's Notes Screen** –The user can choose from three options to the dose on the Reader:
  - **None** – Do not show the measured dose on the Reader
  - **Percent error** – Show the measure dose as a percentage relative to the predicted dose
  - **Absolute dose** – Show the measured dose in cGy

Changing the Database Connections

The **Database** tab contains the connection information to the Dosimetry Database. Contact your DVS administrator to get the settings for this tab (Figure 45).

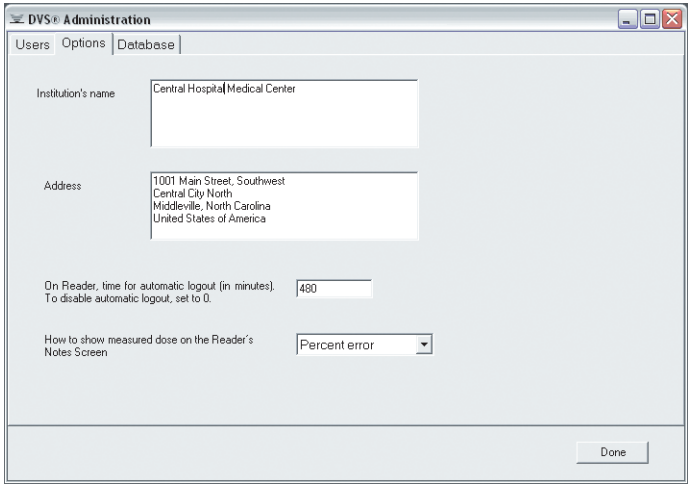


Figure 45 — Database

Backing up and Restoring the DVS Database

To back up or restore the DVS Database, perform the following steps:

1. Click the **DVS Plan and Review** icon on the Desktop or select **Start>Programs>DVS>DVS Plan and Review**. The DVS Main Menu and DVS Login dialog box appears.
2. In the **DVS Login** dialog box, enter the Admin login name and password.
3. Click **OK**. The Main Menu of the DVS Plan and Review Software appears.
4. Click **Administration**.
5. Click the **Database** tab.
6. To back up the database:
   a. Click **Backup Database**.
   b. In the **Backup DVS Database** dialog box, select a location to save the backup file.
   c. Click **Save**. The database backup file is saved using the current date and time in the file name. For example: DVS DB Backup 20Apr2006 15.20.32.bak
   d. When the database is successfully backed up, a message box appears. Click **OK**.

7. To restore a database:
   a. Click **Restore Database**.
   b. In the **Restore DVS Database** dialog box, select the backup file you want to restore. DVS Database files are saved using the current date and time in the file name. For example: DVS DB Backup 20Apr2006 15.20.32.bak
   c. Click **Open**.
8. Click **Done**.

6 Using the DVS Reader

Use the DVS Reader to perform the following tasks:

- Powering on the DVS Reader
- Login to the DVS Reader
- Test a Dosimeter
- Select a Patient
- Select a Plan/Fraction
- Take a Pre-Dose Reading
- Take a Post-Dose Reading
- Enter Treatment Notes

In order to use the DVS Reader, the patient, dosimeter, and plan information must have been entered using the Plan and Review Software.

6.1 Power On the DVS Reader

1. Power on the Reader. The **Power On** screen appears briefly.

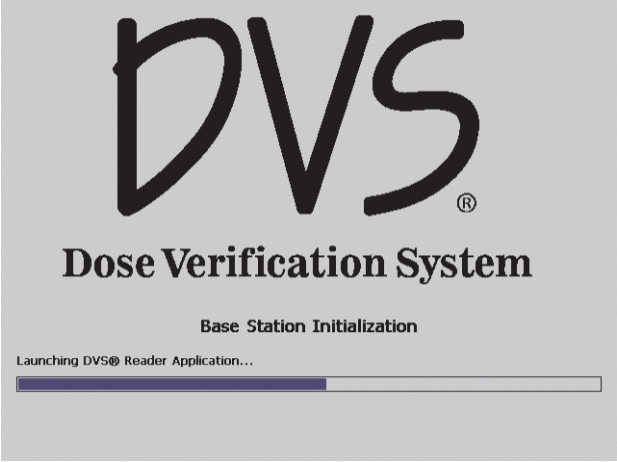


Figure 46 — Power On

The **Initializing DVS Reader** screen appears indicating that the Reader is starting up (Figure 47).

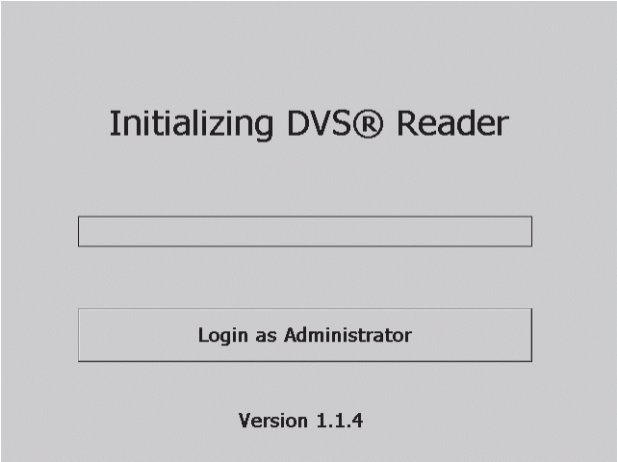


Figure 47 — Initializing DVS Reader

The Reader performs tests to verify the connection to the Dosimetry Database, software compatibility, and that the Reader Wand is functioning.

If you need to set up the DVS Dosimetry Database, you can login using the **Administrator Login** screen by clicking **Login as Administrator**. You need to get the Administrator password-of-the-day from Technical Support. All other users should wait until initialization is complete and the **DVS Reader Login** appears.

Note: If there are any errors, see section 8 *Troubleshooting* on page 70 for a resolution.

6.2 Login to the DVS Reader

To login to the DVS Reader, perform the following steps:

1. Select a username from the list (Figure 48).

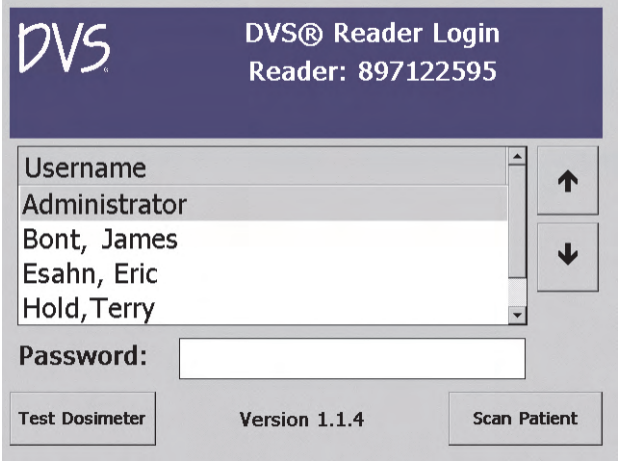


Figure 48 — Reader Login

Tap the **Password** field and a numeric keypad appears.

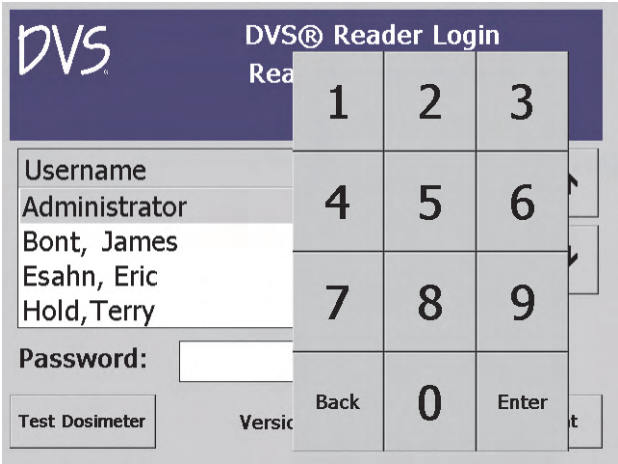


Figure 49 — Keypad

2. Enter the password using the touch-screen keypad and then press **Enter** on the keypad.

3. Choose whether you want to test a dosimeter or scan a patient:
   - Press **Test Dosimeter** to test a dosimeter's functionality before implantation.
   - Press **Scan Patient** to begin the process of reading a patient's dose.

6.3 Test a Dosimeter

Dosimeters may be tested prior to implant to assure functionality or to verify dosimeters that have already been implanted. The dosimeter may be tested by either entering the dosimeter's serial number or scanning using the Reader Wand, or by simply scanning using the Reader Wand without entering a serial number.

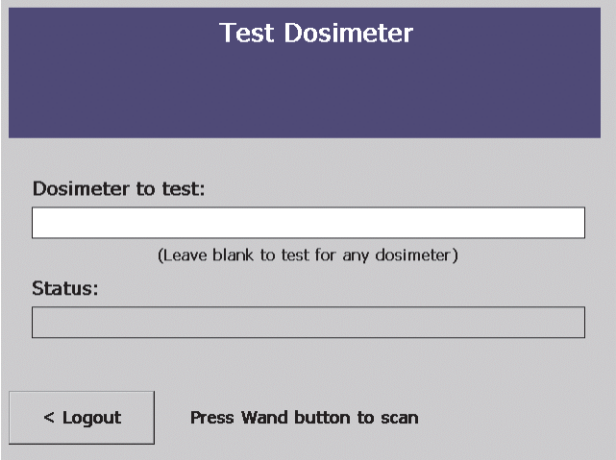


Figure 50 — Test Dosimeter

If there are two or more dosimeters in the read range, then you need to enter each dosimeter's serial number one at a time. If you do not enter a dosimeter's serial number, then only one dosimeter is allowed in the read range volume. If there is only one dosimeter in the read range, make sure the **Dosimeter to test** field is blank so the Reader searches for any dosimeter.

- **To read a dosimeter without knowing its serial number**, leave the **Dosimeter to test** field blank (Figure 50), then hold the dosimeter near the Reader Wand and press the button on the Reader Wand. The Reader searches for any available dosimeters within the read range.

- **To scan for a specific dosimeter**, tap the **Dosimeter to test** field and a numeric keypad appears. Enter the dosimeter number in the field and press **Enter**. Next, hold the dosimeter near the Reader Wand and press the button on the Reader Wand.

If the dosimeter is functional, a message appears indicating that the dosimeter was found. For example:

Dosimeter 456789 was found.

If the dosimeter could not be read, an error message appears:

No Dosimeter found.

When finished testing, press **Logout** and the Reader returns to the **Login Screen**.

6.4 Scan a Patient

To scan a patient, log in to the DVS Reader and press **Scan Patient**. The scan patient screens are set up like a wizard. You can move forward and backward through the series of screens by pressing **Next** or **Back**.

The workflow for scanning a patient is as follows:

- Select a Patient
- Select a Plan/Fraction
- Take a PRE-Dose Reading
- Dose the Patient
- Take a POST-Dose Reading
- Enter Treatment Notes

Select a Patient

To select a patient:

1. Press **Scan Patient** on the **Login Screen**. The **Select Patient** screen appears (Figure 51). Patient names appear in alphabetical order. To find a patient, tap the up and down arrows on the right side of the screen to move between pages of patients.

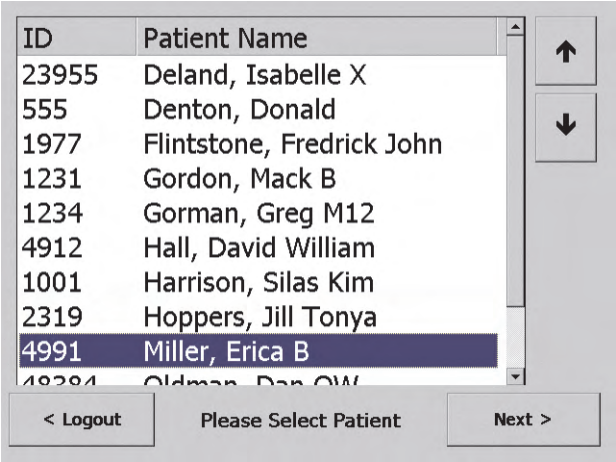


Figure 51 — Select Patient

2. Select the patient to be scanned by pressing the patient's name on the touch screen, then press **Next**.

Press **Logout** and the system returns to the **Login Screen**.

Select a Plan/Fraction

After a patient is selected and the patient data is retrieved from the database, the **Select Plan** screen appears for the selected patient (Figure 52).

Important: Always verify that the correct patient is being treated by verifying the name at the top of the screen.

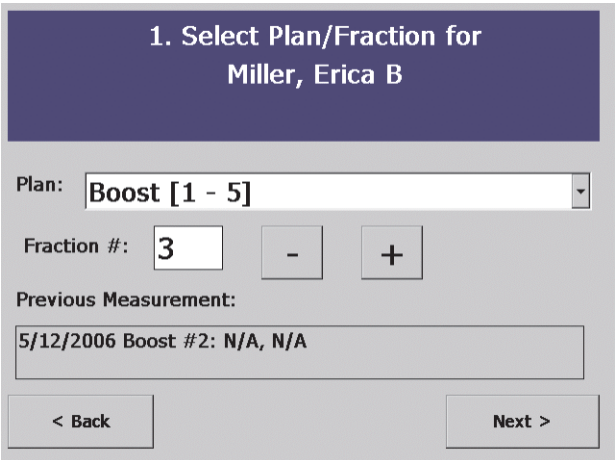


Figure 52 — Select Plan

The **Select Plan/Fraction** screen displays the current plan, treatment fraction, and previous dose measurements. If more than one plan was set up for the patient, you can select a new plan by tapping the **Plan** pull-down menu and selecting the new plan. If the fraction needs to be changed, press the – button or the + button to decrease or increase the fraction number. You can also tap the **Fraction** field and enter the fraction number using the keypad.

Note: You cannot use a fraction that is not part of the patient's plan, use a fraction that has been skipped, or re-use a fraction that already has measurements.

If the selected plan and fraction number is advanced beyond the initial value, then the following message appears:

Are you sure you wish to add Skip Fraction(s)?

This is a reminder that one or more skipped fractions will be added to the Dosimetry Database. These skipped fractions serve as markers that measurements were not made for some of the planned fractions. Press the **OK** button to accept the skipped fractions. Press the **Cancel** button to return to the **Select Plan** screen and choose another plan or fraction.

Later, the skipped fractions can be edited using the Plan and Review Software. For information about skipped fractions in the Plan and Review Software, see *Working with Measurement Fractions and Skipped Fractions* on page 45.

When the correct plan and fraction are selected, press **Next** to go to the **PRE-Dose** screen.

To cancel the treatment at this point, press **Back** and to return to the **Select Patient** screen where you can press **Logout**.

Take a PRE-Dose Reading

The **PRE-Dose** screen is used to scan the patient's dosimeters before being treated (Figure 53). If the plan and fraction are correct, position the Reader Wand next to the patient where the dosimeters are implanted. Press the button on the Reader Wand to activate the Reader Wand.

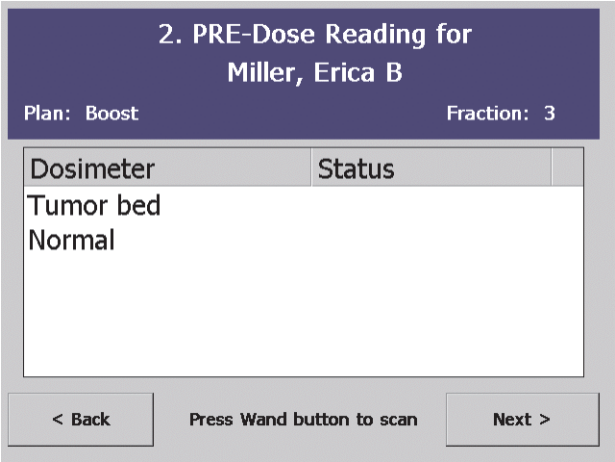


Figure 53 — PRE-Dose

As the Reader Wand begins scanning for the dosimeters, the blue lights on the Reader Wand will blink indicating that it is searching for the dosimeters. On the **PRE-Dose** screen, the following message appears next to each dosimeter as it is read:

Scanning…XX%

where *XX%* is the percentage of the data from the dosimeter that has been read.

When each dosimeter has been completely read, the **Status** for the dosimeter changes to *Complete*. When all of the dosimeters have been found, the light on the Reader Wand stops blinking. Press **Next** to go on to **POST-Dose** screen.

All Dosimeters Not Read

If all dosimeters were not read during the pre-dose operation, the following message appears:

Not all dosimeters have been read. Do you want to continue?

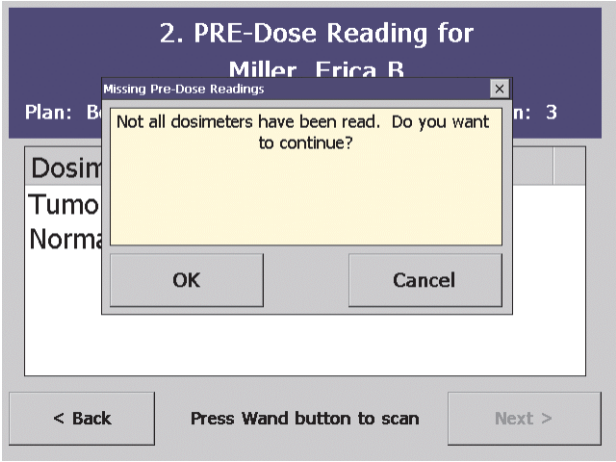


Figure 54 — Dosimeters Not Read

Press **OK** to skip the dosimeters that were not read and go on to **POST-Dose** screen. However, if *no* dosimeters have been read (none are *Complete*), the **Treatment Notes** screen appears instead of the **POST-Dose** screen. Press **Cancel** to cancel the operation and stay on the **PRE-Dose** screen.

Discard Readings

If you want to discard the readings just made, press **Back** and the following message appears:

Do you want to discard these Pre-dose readings?

Press **OK** to discard the pre-dose readings and return to the **Select Plan** screen. Press **Cancel** to cancel the operation and stay on the **PRE-Dose** screen.

Dose the Patient

When the pre-dose operation is complete, the patient is ready for radiotherapy. Treat the patient as usual. Within ten (10) minutes of completing radiation therapy, scan the patient again to obtain a post-dose reading (Optimal post-dose reading is 2.5 minutes following irradiation).

Take a POST-Dose Reading

The **POST-Dose** screen is used to scan the patient's dosimeters after being treated (Figure 55).

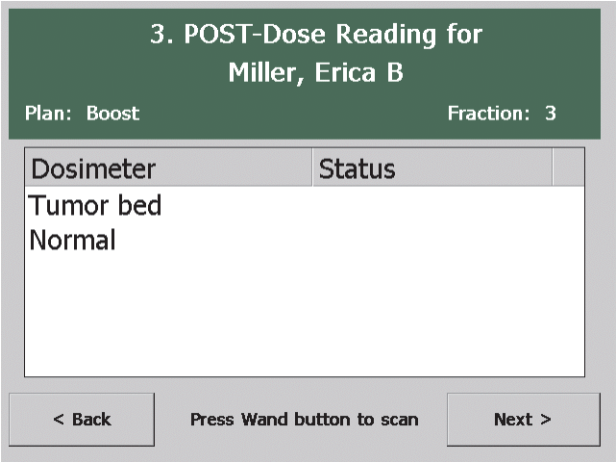


Figure 55 — POST-Dose

Position the Reader Wand next to the patient where the dosimeters are implanted. Press the button on the Reader Wand to activate the Reader Wand. As the Reader Wand begins scanning for the dosimeters, the lights on the Reader Wand blink indicating that it is looking for the dosimeters. On the **POST-Dose** screen, the following message appears:

Scanning…XX%

When each dosimeter has been completely read, the **Status** for the dosimeter changes to *Complete*. When all of the dosimeters have been found, the light on the Reader Wand stops blinking. Press **Next** to display the **Treatment Notes** screen.

All Dosimeters Not Read

If all dosimeters were not read during the post-dose operation, the following message appears:

Not all dosimeters have been read. Do you want to continue?

Press **OK** to skip the dosimeters that were not read and go on to the **Treatment Notes** screen. Press **Cancel** to cancel the operation and stay on the **POST-Dose** screen.

Discard Readings

If you want to discard the readings just made, press the **Back** button and the following message appears:

Do you want to discard these Post-dose readings?

Press **OK** to discard the post-dose readings and return to the **PRE-Dose** screen. Press **Cancel** to cancel the operation and stay on the **POST-Dose** screen.

Enter Treatment Notes

Use the **Treatment Notes** screen to record information about the treatment session (Figure 56).

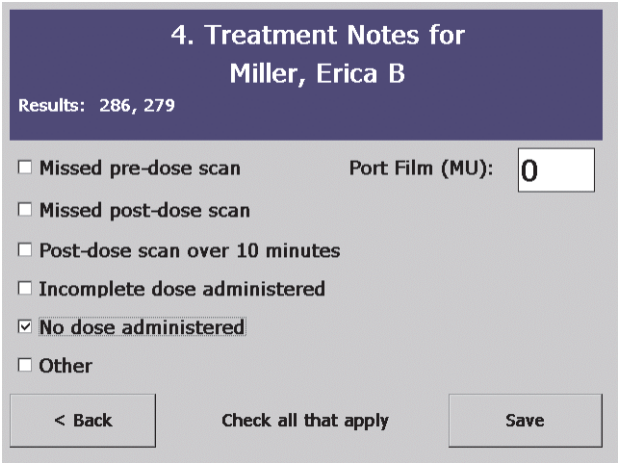


Figure 56 — Treatment Notes

Select any of the check boxes in this screen, or enter the number of monitor units (MU) from a port film that the patient received. To enter the number of monitor units, tap the **Port Film** field to display the keypad. The port film's monitor units will not be incorporated into the calculated daily or cumulative dose.

When you have completed this screen, press **Save**. A dialog box asks if you want to save the results. Press **OK** to save the results, or **Cancel** to stay on the **Treatment Notes** screen.

After the data is saved, the **Select Patient** screen appears again, so you can start scanning the next patient.

7 Imaging and Therapeutic Compatibility

The following table provides guidance on the interactions of an implanted dosimeter with various imaging and therapeutic modalities:

Imaging/ Therapeutic Modality	Compatible	Potential Issues	Resolution
X-Ray Photography (10-100kV)	Yes The dosimeter is radio-opaque and will appear on X-Ray images.	1. Dosimeter obstructs region of interest. 2. For fluoroscopic procedures, Dosimeter will accumulate dose – reducing total dose range.	1. Use alternate X-Ray views. 2. Complete anticipated fluoroscopic procedures prior to implantation if possible.
Computed Tomography (CT)	Yes The dosimeter is radio-opaque and will appear on CT images.	The dosimeter contains metal components and can cause streak artifacts in transverse CT images.	Use metal artifact reduction (MAR) software to remove/ reduce artifacts if necessary.
Mammography	Yes The dosimeter is radio-opaque and will appear on mammograms.	The dosimeter may obstruct region of interest.	Use additional views during screening, use digitized scans and computer aided detection for increased sensitivity, and/or use ultrasound.
Nuclear Imaging (PET and Bone Scan)	Yes	The dosimeter could cause some attenuation of “hot-spots” in the nuclear image.	Use artifact reduction algorithms or tomography if a region of interest is obstructed by the dosimeter.
Magnetic Resonance Imaging (MRI)	MR Conditional	The dosimeter will cause a “flare” or image artifact in the MRI image in all directions around the dosimeter.	Perform any necessary MR imaging prior to implantation. Subsequent imaging may require removal of the DVS dosimeters.
Ultrasound	Yes	The dosimeter obstructs region of interest.	Use additional views during screening.
Shortwave or Microwave Diathermy	No	Heating of metal may cause tissue damage and loss of functionality.	Contraindicated
Therapeutic Ultrasound	No	Heating of metal or mechanical stress may cause tissue damage and loss of functionality.	Contraindicated

8 Troubleshooting

This section provides a list of common issues and error messages and the steps you can take to resolve them.

- Troubleshooting the DVS Server System Software Setup
- DVS Reader not operational
- Unable to obtain a pre-dose or post-dose reading
- DVS Reader error messages
- Plan and Review Software error messages

8.1 Troubleshooting the DVS Server System Software Setup

If the window below appears more than two or three times while installing the DVS Dosimetry Database Server, close it and click Stop on the **DVS Server System Software Setup** window. Click **Setup Server Components** to restart the setup program. If this problem continues, remove ALL components from system, reboot the computer, and restart the setup program.

8.2 DVS Reader Not Operational

Check that the power cord is fully seated in the electrical outlet and in the back of the Reader Base Station.

8.3 Unable to Obtain a Pre-Dose or Post-Dose Reading

1. Check that the Reader Wand is connected to the Base Station.
2. Make sure metal objects are clear of the patient and Reader Wand.
3. Re-position the Reader Wand to another area near the implanted Dosimeters.
4. Hold the reader steady over the area with the implanted Dosimeters.

8.4 DVS Reader Error Messages

The error messages displayed by the Reader are listed in this section in alphabetical order.

Cannot access the Dosimetry Database. Please check connections, or contact your IT Department, then press OK to try again.

If you encounter this error, perform the following troubleshooting steps:

- Make sure the LAN (local area network) cable is firmly connected to the Reader.
- Make sure that the Windows XP Firewall is turned OFF on the database server computer or create an exception to allow access to the computer over Port 80 (HTTP).
- Make sure the computer with the Dosimetry Database is running and is connected to the LAN.
- Contact the IT Department to make sure they did not change the setup of the Dosimetry Database.

To have the Reader try the operation again, press the **OK** button.

If the problem remains, turn off the Reader then wait 15 seconds and turn it on again. Try the operation again. If the problem remains, contact the manufacturer.

Cannot communicate with the Wand. Please refer to the trouble-shooting guide, and then press OK to try again.

If you encounter this error, make sure that the Reader Wand's green power-on light is lit. If it is not, then make sure the Wand cable is firmly connected to the back of the Base Station.

To have the Reader try the operation again, press the **OK** button.

If the problem remains, turn off the Reader then wait 15 seconds and turn it on again. Try the operation again. If the problem remains, contact the manufacturer.

The data for this Patient is invalid. Please select another patient.

This message means that the patient's data was likely changed without using the DVS Software. Contact your DVS Administrator to resolve this problem.

The Dosimetry Database has changed. Contact Technical Support.

This message means that the Dosimetry Database was likely changed without using the DVS Software. Contact your DVS Administrator to resolve this problem.

The dosimetry database is not compatible with this Reader. Please correct and press OK to try again.

Verify that all software upgrades needed for the Reader, the Dosimetry Database, and the Plan and Review Software have been implemented. Then press the **OK** button to try this operation again.

This patient has no more Fractions. Please verify that the Plans are correct.

This message means that all the planned fractions for this patient have been used. That is, each planned fraction has dosimeter measurement data.

To collect more dosimeter measurements, more fractions must be added to the patient's **Planning Table** (see *Entering Plans* on page 42).

This Plan & Fraction # cannot be found. Please select another.

This message means that the selected plan and fraction number are not in the patient's **Planning Table**.

You can either select another plan and fraction # that is in the **Planning Table**, or add more fractions to the patient's **Planning Table** (see *Entering Plans* on page 42).

This Plan & Fraction # has already been used. Please select another.

This message means that the selected plan and fraction number have dosimeter measurement data already.

You can either select another plan and fraction number that is in the **Planning Table**, or add more fractions to the patient's **Planning Table** (see *Entering Plans* on page 42).

Wand field current <current> A is outside the acceptable range. Place the Wand in its Base, then press OK to try again.

If you encounter this error, perform the following troubleshooting steps:

- Check the connection of the Reader Wand cable to the back of the Base Station.
- Make sure the Reader Wand is not near any metal objects. It is recommended that the Wand is placed in the Base Station during initialization.

To have the Reader try the operation again, press the **OK** button.

If the problem remains, turn off the Reader then wait 15 seconds and turn it on again. Try the operation again. If the problem remains, contact the manufacturer.

Wand not operating properly. Place the Wand in its Base, then press OK to try again.

If you encounter this error, perform the following troubleshooting steps:

- Check the connection of the Reader Wand cable to the back of the Base Station.
- Make sure the Reader Wand is not near any metal objects. It is recommended that the Reader Wand is placed in the Base Station during initialization.

To have the Reader try the operation again, press the **OK** button.

If the problem remains, turn off the Reader then wait 15 seconds and turn it on again. Try the operation again. If the problem remains, contact the manufacturer.

Wand resonant frequency <freq> kHz is outside the acceptable range. Place the Wand in its Base, then press OK to try again.

If you encounter this error, perform the following troubleshooting steps:

- Check the connection of the Reader Wand cable to the back of the Base Station.

- Make sure the Reader Wand is not near any metal objects. It is recommended that the Reader Wand is placed in the Base Station during initialization.

To have the Reader try the operation again, press the **OK** button.

If the problem remains, turn off the Reader then wait 15 seconds and turn it on again. Try the operation again. If the problem remains, contact the manufacturer.

8.5 Plan and Review Software Error Messages

The error messages displayed by the Plan and Review Software are listed in this section in alphabetical order.

A Patient cannot have more than 8 Dosimeters.

The limit on the number of dosimeters assigned to a patient is eight. Delete a dosimeter to add a new one.

A Patient cannot have more than 8 plans.

The limit on the number of plans for a patient is eight. Delete a plan to add a new one.

Barcode misread. Please scan the Dosimeter barcode again.

The verification check of the dosimeter checksum data failed. Try to read the dosimeter's bar code again.

Cannot access the database. Do you want to attempt to connect again?

This message may appear when the Plan and Review Software starts and a connection to the Dosimetry Database cannot be made. To try to connect again, press the **Yes** button. If the problem continues, perform the following steps:

- Make sure the LAN (local area network) cable is firmly connected to the Reader.
- Make sure the computer with the Dosimetry Database is running and is connected to the LAN.

- Contact the IT Department to make sure they did not change the setup of the Dosimetry Database.

To try the operation again, press the **OK** button. If the problem remains, contact your DVS Administrator or the IT Department.

Cannot access the database. Please check connections, or contact your I.T. Department, then press OK to try again.

If you encounter this error, perform the following steps:

- Make sure the LAN (local area network) cable is firmly connected to the Reader.
- Make sure the computer with the Dosimetry Database is running and is connected to the LAN.
- Contact the IT Department to make sure they did not change the setup of the Dosimetry Database.

To try the operation again, press the **OK** button. If the problem remains, contact your DVS Administrator or the IT Department.

Cannot delete a patient with Dosimeter measurements.

Patients who have dosimeters with measurements cannot be deleted. Instead, open the **Patient Data Entry** window for the patient and clear the **Patient shown on Reader** check box (see *Entering Patient, Dosimeter, and Plan Information* on page 41).

Cannot delete this Dosimeter because it has measurement data.

Dosimeters with measurements cannot be deleted. Instead, Instead, open the Dosimeter Data Entry dialog box for the dosimeter and clear the **Dosimeter used by Reader** check box (see *Entering Dosimeters* on page 43).

Cannot insert a Skipped measurement here.

A skipped fraction cannot be within two minutes of the most recent fraction. Try to add the skipped fraction between two other factions in the list.

Cannot save Database settings to the registry.

This message means that you do not have permission to write to the registry on the computer. Contact your system administrator to correct this problem.

Checksum error reading <table>. This data cannot be loaded.

This message means that the Dosimetry Database was changed without using the DVS Software. Contact your DVS Administrator to resolve this problem.

In plan '<plan>', the Last fraction # cannot be less than the First fraction #.

The last fraction number must be greater than or equal to the first fraction number. Make the last fraction number greater to correct this problem.

Login name <login name> is already assigned to User '<user name>'. Please correct before saving this User's data.

The **Login name** entered is already used by another person. Enter a different **Login name** for this user.

More than 100 Patients cannot be shown on the Reader. Please reduce the number of Patients shown on the Reader before adding more Patients.

At most, 100 patients at a time can be shown on the DVS Reader. The patients shown on the Reader are those with the **Patient shown on Reader** check box selected.

To correct this problem, clear the **Patient shown on Reader** check box for inactive patients.

Password fields do not match. Please enter Passwords again.

When setting up a new user, the fields **Password** and **Verify** password must be the same. Type the same password into these two fields again and press **OK**.

Password must be at least 4 digits long.

Make sure the user's password is at least four digits long.

Patient number <patient num> is already assigned to patient <patient>. Please correct before saving this patient's data.

The **Patient number** entered is already used by another patient. Enter a different **Patient number** for this patient.

Physician number <physician num> is already assigned to Physician '<physician>'. Please correct before saving this Physician's data.

The **Physician number** entered is already used by another physician. Enter a different **Physician number** for this physician.

Plan/Fraction '<plan name, fraction #>' is duplicated. Please correct before saving the plans.

In the **Planning Table**, the displayed plan and fraction # are listed more than once. Remove this duplication from the **Planning Table**.

The dosimetry database is not compatible with this software.

Verify that all software upgrades needed for the Reader, the Dosimetry Database, and the Plan and Review Software have been implemented. Then press the **OK** button to try this operation again.

There are <x> more measurements than planned fractions for this Patient. Please adjust the plans/fractions so that all the measurements will have a planned fraction.

This message means that there are not enough planned fractions for all the measurements made so far. Each dosimeter measurement needs to have a planned fraction that it is associated with. Adjust the number of fractions in the **Planning Table** to correct this problem.

There cannot be more than 99 total fractions. Please correct before saving the plans.

There are more than 99 planned fractions in the **Planning Table**. Reduce the number of fractions to correct this problem.

There is nothing to view because no measurements have been made from this Patient's Dosimeters.

The **Fractions & Measurement** window cannot be used until at least one dosimeter measurement has been taken for the patient.

This Dosimeter is already assigned to patient '<patient name>'. Please use another Dosimeter.

Each dosimeter can only be assigned to one patient. The dosimeter scanned is already assigned to another patient. Either delete the dosimeter from the other patient or select another dosimeter for this patient.

This record was updated by someone else during this editing session. Please reload this data and make the changes again.

This message means that someone else changed the same data (for example, patient or user) that you were editing. Press the **Cancel** button to discard your changes, and then make the changes again.

Since this patient has either no plans or no dosimeters, he/she will not be shown on the DVS Reader.

In order to scan a patient's dosimeters using the DVS Reader, there must be both plans and dosimeters assigned to the patient. If one or the other of these is not assigned yet, the patient cannot be used by the Reader. This message is a notice that the Plan and Review Software will clear the **Patient shown on Reader** check box, so the patient will not appear in the Reader's patient list.

User number <user num> is already assigned to User '<user name>'. Please correct before saving this User's data.

The user number entered is already being used by another person. Enter a different user number for this person.

9 Maintenance and Technical Support

9.1 Dosimeter Maintenance

Dosimeters are provided sterile. Following expiration dosimeters should be discarded. DO NOT SEND DOSIMETERS TO A RE-PROCESSING FACILITY FOR RE-STERILIZATION OR RE-STERILIZE THEM USING A HOSPITAL OR LABORATORY STERILIZER. This may result in damage to the dosimeter.

9.2 Disinfecting the Reader Wand

Disinfect or cover the surface of the Reader Wand if direct contact with skin is required to obtain a reading or following any occurrence of direct contact. Disinfect by wiping the contact surface of the Reader Wand with a standard isopropyl alcohol-based disinfectant.

9.3 Technical Support

For Technical Support, contact

Sicel Technologies, Inc.
Telephone: 1-888-DVS-6697 (1-888-387-6697)
E-mail: helpdesk@siceltech.com.

10 Specifications

Parameter	Rating
Calibration	Factory calibrated using Co^{60}; no additional calibration required; ADCL accuracy verification performed on each lot
Implant Depth	3-12 cm 12 cm maximum from any one skin surface
Implant Distance	At least 1 cm distance between each dosimeter
Energy Range	6 to 18 MV Photon
Dose Range	80 Gy maximum
Dose Fractions	150 to 250 cGy
Dose Accuracy	±5% (2σ) for 150-250 cGy fractions (Dosimeter axis is placed roughly parallel to the body axis)
Shelf Life (Dosimeter)	See Expiration Date printed on package
Time to Read Dosimeter	Up to 10 minutes following radiation therapy. Optimal read time is 2 to 3 minutes following irradiation.
Power	100V to 240V~, 50 to 60 Hz 1A @ 120V~
Inputs/Outputs	1-Ethernet port 1-Wand Cable Assembly Connection 1-USB Connection (For Field Service Use Only)
Operating Conditions	**Dosimeter** Dosimeter is optimized for use *in vivo* at temperatures ranging from 34°C to 40°C. Dosimeter performance at room temperature has not been characterized. **Reader** Temperature: 10°C-40°C (50 -104°F). Humidity at 10% to 95%, non-condensing
Storage Conditions	Temperature -18°C to 55°C Humidity at 10% to 95%, non-condensing
Fuse	250V 5 AMP Type T or 250V 5 Amp Type 3AG
Classification	Class I, Type B Applied Part
Mode of Operation	Continuous Operation