RESULTS

**BACKGROUND**

Breast cancer is the most frequently diagnosed cancer in women, with an estimated 178,480 new cases expected in the U.S. during 2007. Breast cancer is the second leading cause of cancer deaths among women, with an estimated 40,460 deaths expected in 2007. [Ref: www.cancer.org]

The Axxent System, developed by Xoft, Inc., is an electronic high dose rate brachytherapy device designed to be less labor intensive, to shorten treatment time compared to external beam radiation and ultimately lessen patient discomfort. The Axxent System does not require a heavily shielded environment, potentially bringing treatment centers closer to the patient’s home. This technology also eliminates the handling and disposal of isotope sources.

**METHODS**

This study was designed to evaluate the x-ray output stability of the Xoft Axxent® Electronic Brachytherapy System while delivering treatment plans to a phantom.

**RESULTS**

Overall Results

All 5 treatment plans were delivered successfully within an overall standard deviation of 0.91%. The standard deviations for all fractions varied from 0.45% to 2.93% (Table 1).

Table 1. Standard deviations for all fractions.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Fraction</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>1.62%</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>1.59%</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>1.91%</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>1.78%</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>1.63%</td>
</tr>
</tbody>
</table>

The repeated coincidence of exposure rate change with dwell position change indicates that these changes were clearly a result of the planned movement rather than a result of source radiation output shifts.

**EXPOSURE RATE**

To evaluate source stability, an average value of exposure rate was calculated for each of the nine dwell positions and then each reading was divided by the average for that dwell position. The fluctuations were less than ±0.02 about the average.

The standard deviation calculation did not include selected points at the transition between dwell positions if the reading clearly coincided with the transition time.

**Source Stability**

To evaluate source stability, an average value of exposure rate was calculated for each of the nine dwell positions and then each reading was divided by the average for that dwell position.

The fluctuations were less than ±0.02 about the average.

The data was downloaded at 1 second intervals to an MS Excel spreadsheet for analysis of dose rate fluctuations and drift.

**CONCLUSIONS**

This study demonstrated stable exposure rates from the Xoft Axxent® X-ray Source while delivering treatment plans to a phantom.

**REFERENCES**

1. Poster # SU-FF-T-383 presented at the 49th Annual Meeting of the American Association of Physicists in Medicine, July 2007, Minneapolis, MN.

2. This work was supported in part by grants from Xoft, Inc., Fremont, CA.