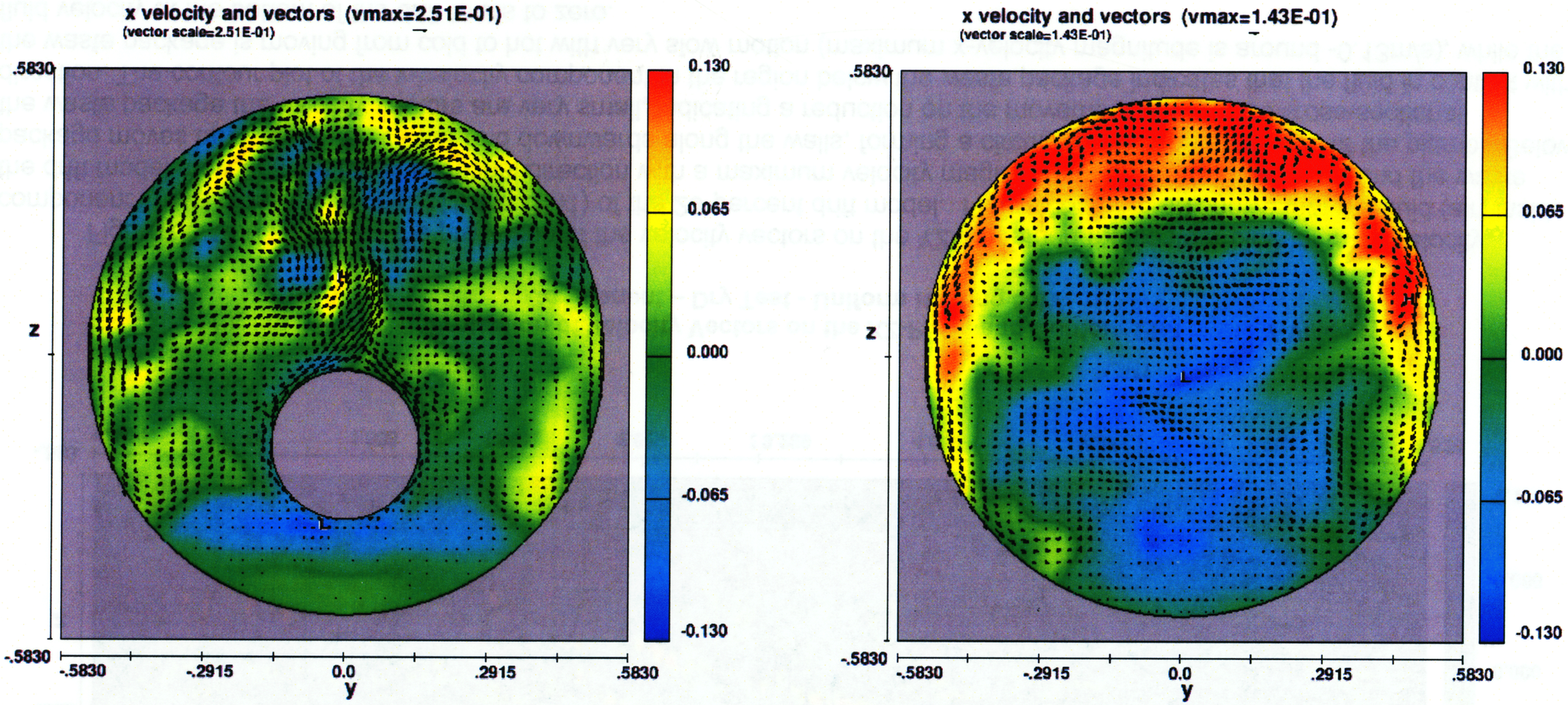
that the fluid moves in the axial direction from hot to cold at the top of the drift and from cold to hot at the center. In the green zone the fluid is moving only in the cross sectional direction as the interface between the two axial cross-currents is located in that zone.



(a) (b)

Figure 06/16/06-4. Projection of Velocity Vectors on the YZ-Plane and Contour Plot of the X-Velocity Component – Dry Test - Uniform Heating 50W.

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06/29/06 – F.V.

CFD Results – Dry Case 75w

The FLOW-3D input and results files are respectively: prepinr.Dry75a-rmesh2 and flsgrfr.Dry75w. The CFD results for this case obtained from the results file, at a time of 1690 seconds.

Figure 06/29/06-1 shows the contour plot of the temperature on the XZ-plane along the centerline of the drift model. The lowest air temperatures are found by the cold end wall towards the bottom of the drift and below the waste packages. The highest air temperatures are encounter above the waste packages. This plot shows high temperatures extend further above the waste packages, reaching the top of the drift model while for the case with a total heat rate of 200 watts, the high temperatures were observed right on top of the waste packages (see Figure 06/16/06-1).

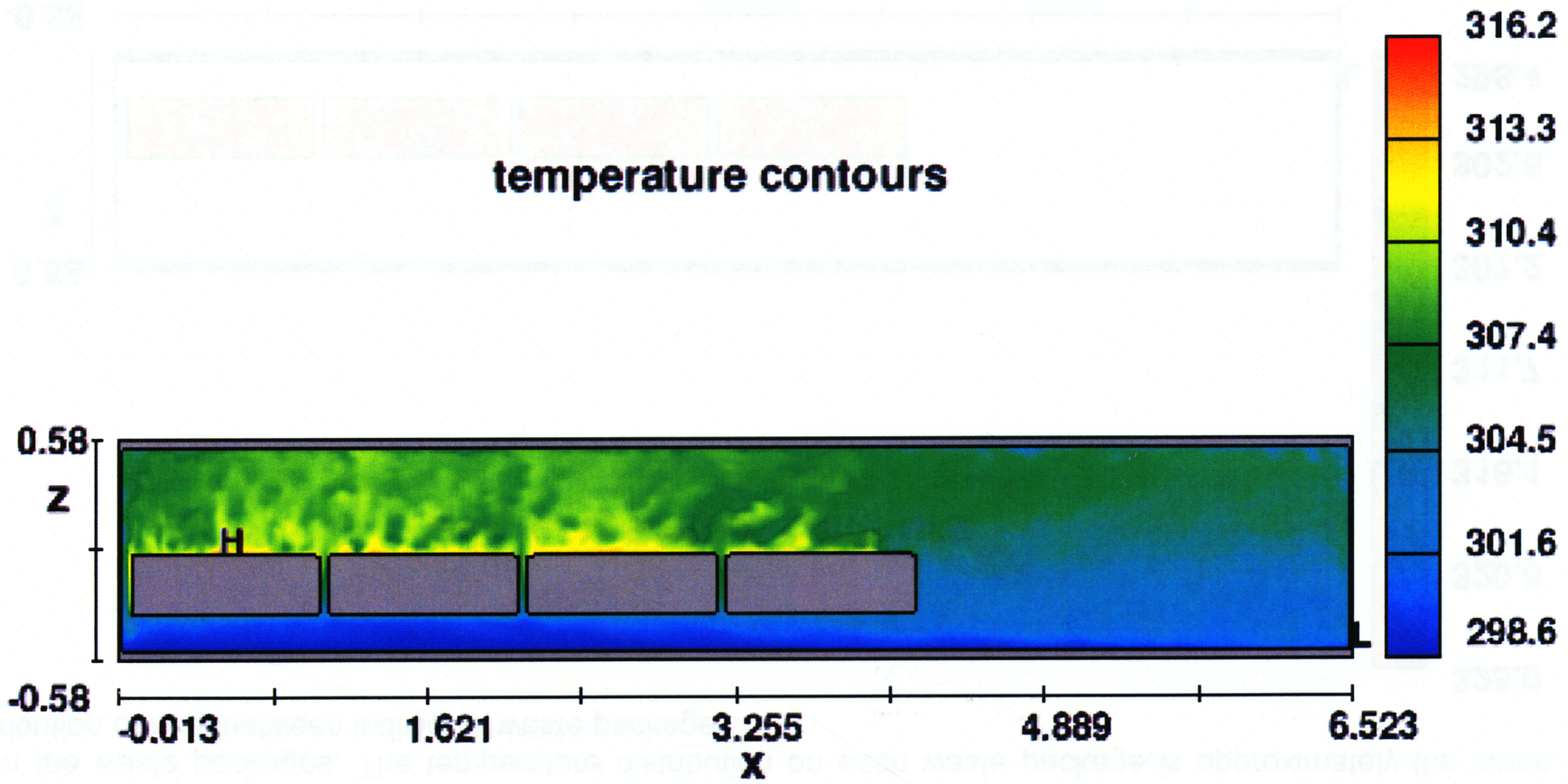

Figure 06/29/06-1. Contour Plot of the Air Temperature (K) – Dry Test – Uniform Heating 75W.

Figure 06/29/06-2, shows the contours of the temperature on the solid components of the model (waste packages and drift walls including the end caps). As expected, the lowest temperatures are observed on the drift walls while the highest temperatures are found on the waste packages. The temperature distribution on each waste package is approximately the same due to the uniform distribution of heat between individual waste packages.

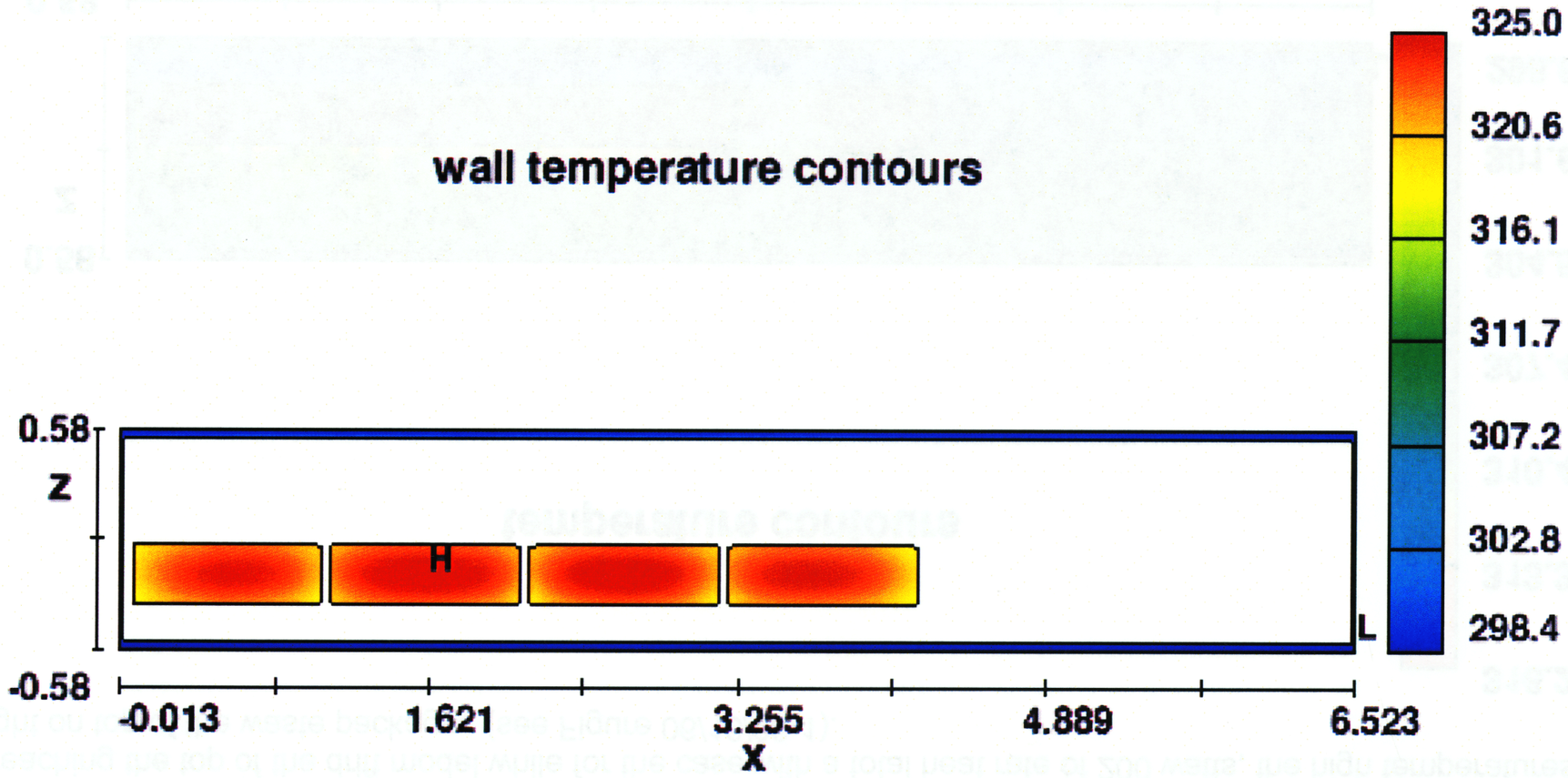

Figure 06/29/06-2. Contour Plot of the Wall Temperature (K) – Dry Test – Uniform Heating 75W.

Figure 06/29/06-3 shows the projection on the XZ plane of the velocity vectors together with the contour plot of the y-velocity component. The flow field is very similar to that observed for the 50W case; however, the velocity magnitudes are higher for this case with a higher total heat transfer rate.

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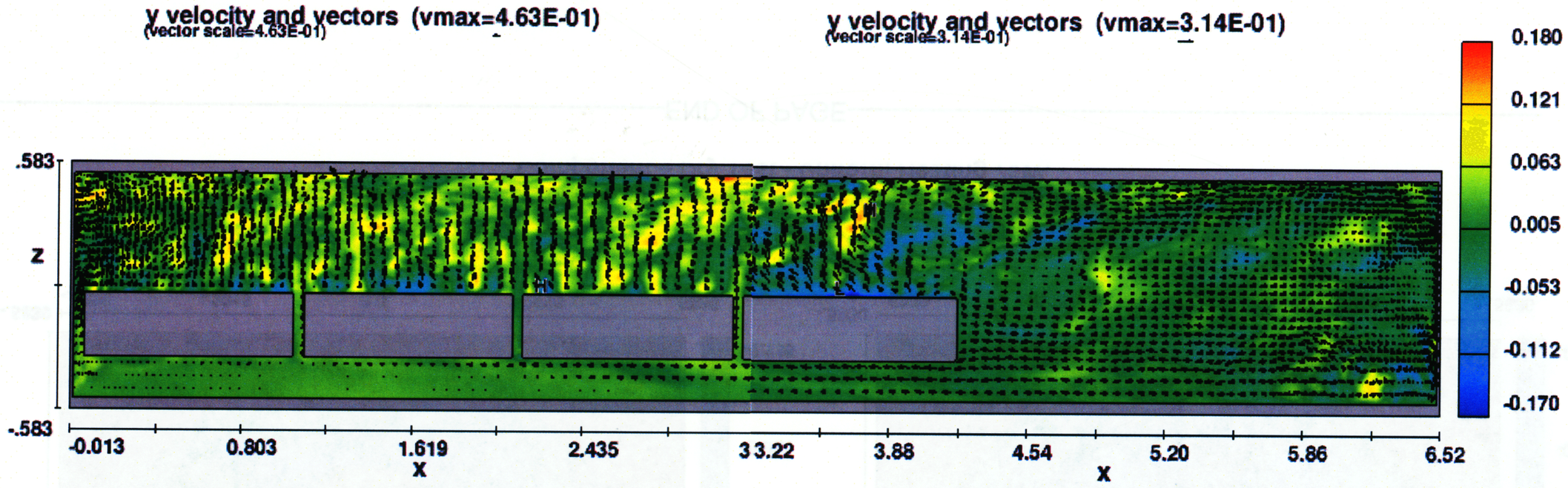

Figure 06/29/06-3. Projection of Velocity Vectors on the XZ-Plane and Contour Plot of the Y-Velocity Component – Dry Test - Uniform Heating 75W.

Figure 06/29/06-4 shows the velocity field and x-velocity component at two cross sections of the drift. Again the flow field is very similar to that observed for the case 50W.

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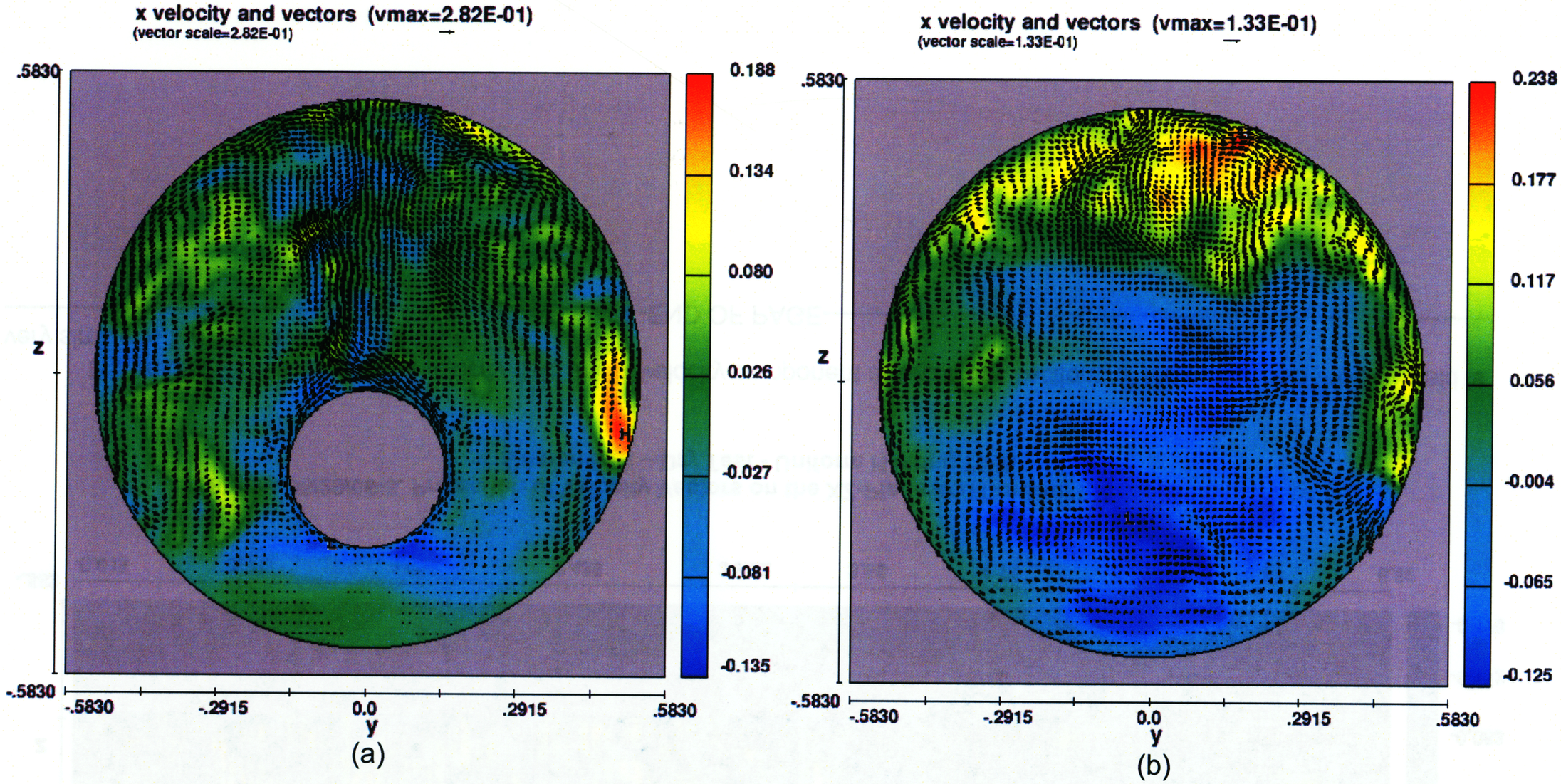

Figure 06/29/06-4. Projection of Velocity Vectors on the YZ-Plane and Contour Plot of the X-Velocity Component – Dry Test - Uniform Heating 75W.

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07/14/06 – F.V.

CFD Results – Dry Case 75-25-25-75w

The FLOW-3D input and results files are respectively: prepinr.Dry75-25-25-75 and flsgrfr.Dry75-25-25-75. The CFD results for this case obtained from the results file, at a time of 1200 seconds.

Figure 06/29/06-1 shows the contour plot of the temperature on the XZ-plane along the centerline of the drift model. The lowest air temperatures are observed near the cold end wall towards the bottom of the drift and below the waste packages. The highest air temperatures are encounter above waste packages A and D as they have the highest heat rate (75 watts).

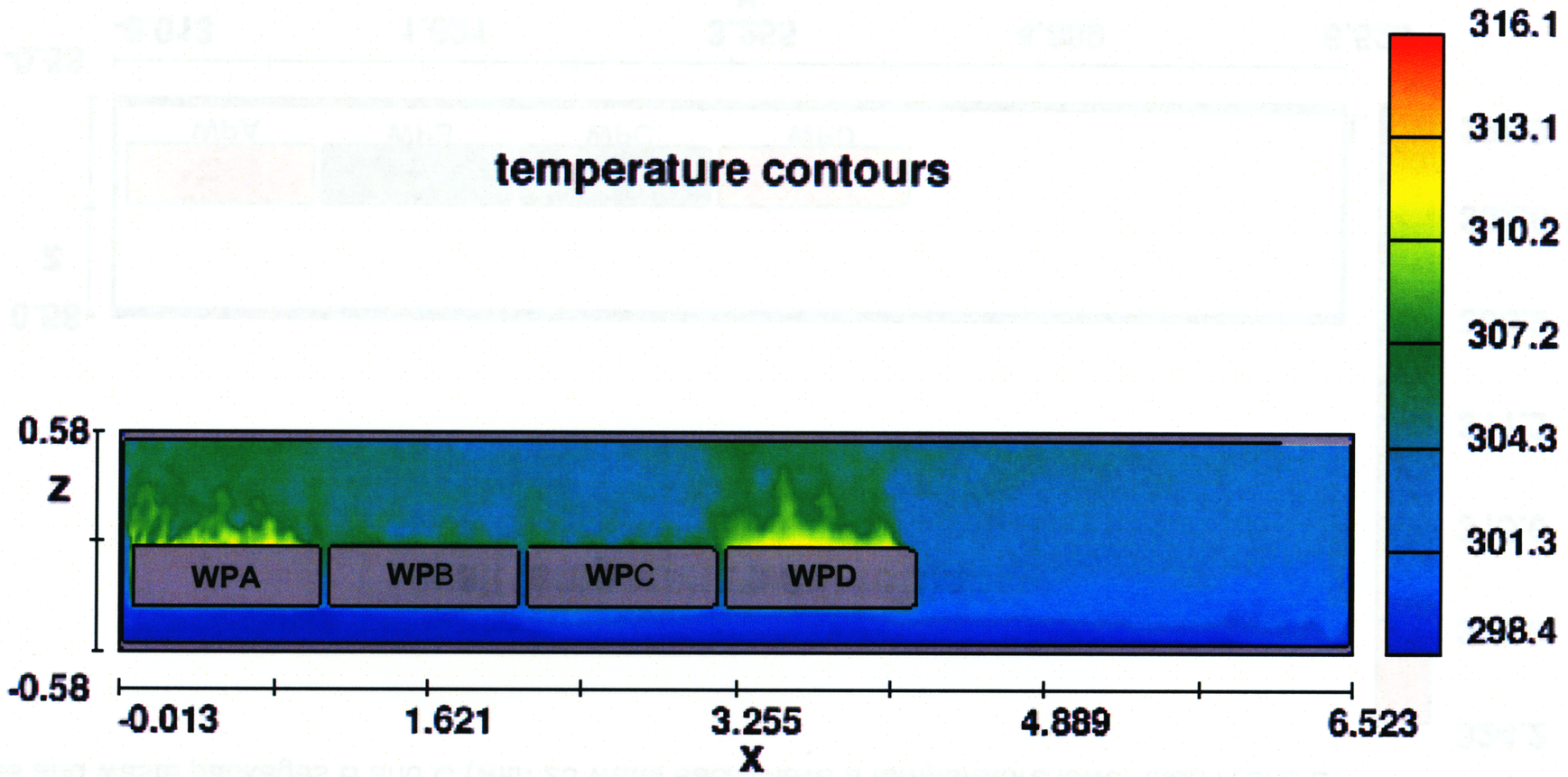

Figure 07/14/06-1. Contour Plot of the Air Temperature (K) – Dry Test – Non-Uniform Heating 75-25-25-75W.

Figure 07/14/06-2 shows the wall temperature contour plot. The temperature on the waste packages is consistent with the rate of heat applied to each individual waste package. Waste packages A and D (with 75 watts each) have similar and the highest temperatures and waste packages B and C (with 25 watts each) have a temperature lower than A and D.

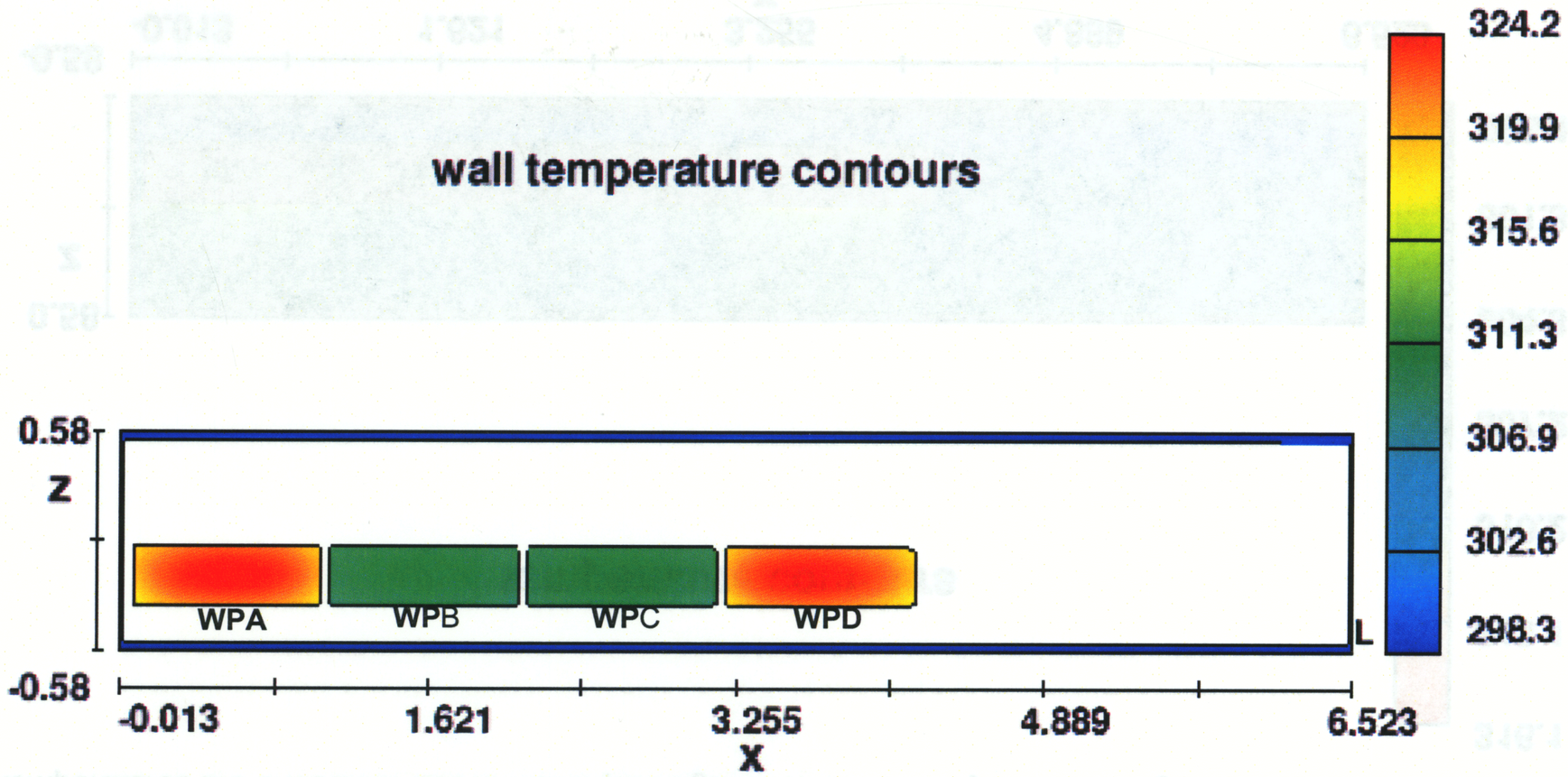

Figure 07/14/06-2. Contour Plot of the Wall **Temperature (K) – Dry Test – Non-Uniform Heating 75-25-25-75W.**

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The velocity field at the XZ plane along the centerline of the drift together with the y-velocity contour is shown in Figure 07/14/06-3. The velocity vectors indicate a similar pattern as that observed for the previous cases.

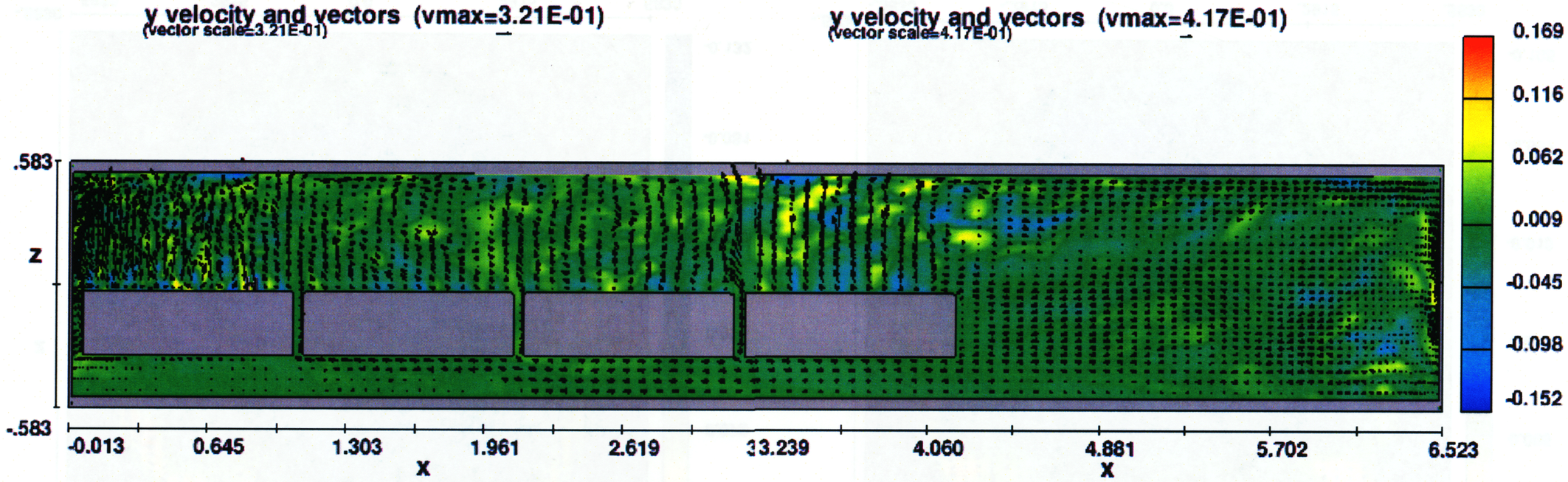

Figure 07/14/06-3. Projection of Velocity Vectors on the XZ-Plane and Contour Plot of the Y-Velocity Component – Dry Test – Non-Uniform Heating 75-25-25-75W.

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Figure 07/14/06-4 shows the velocity vectors in the YZ plane and the x-velocity component at the two cross sections BM1 and CM1. The velocity vectors show a pattern similar to that observed for the previous cases. However, unlike previous cases, there is a pattern in the x-velocity component shown in Figure 07/14/06-4a. There is a region around the waste package where the x-velocity component is mainly negative which means that the flow is moving from cold to hot end. That region is surrounded by a green region followed by a yellow-orange region indicating that the flow is moving in the direction from hot to cold.

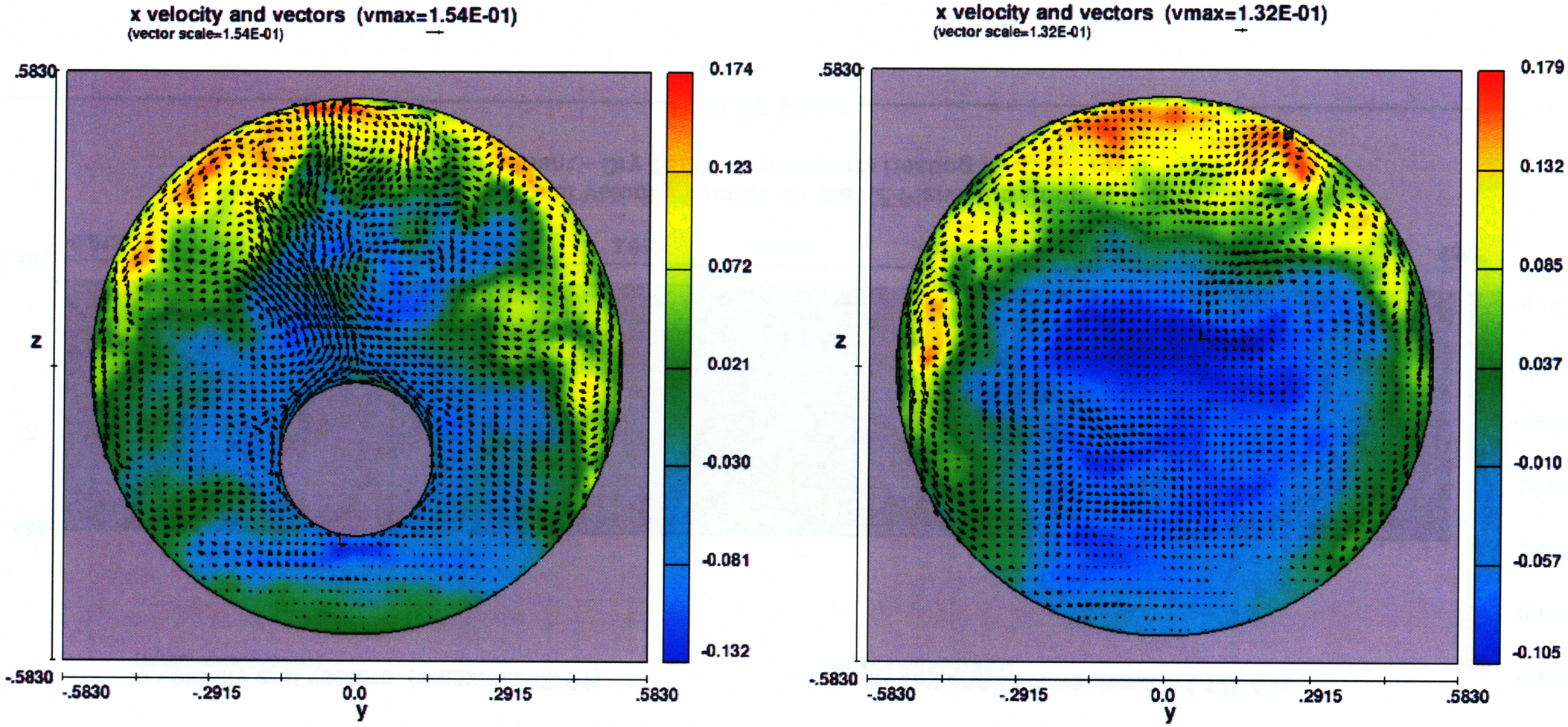

Figure 07/14/06-4. Projection of Velocity Vectors on the YZ-Plane and Contour Plot of the X-Velocity Component – Dry Test – Non-Uniform Heating 75-25-25-75W.

07/18/06 – F.V.

CFD Results – Dry Case 80-60-40-20w

The FLOW-3D input and results files are respectively: prepinr.Dry80-60-40-20 and flsgrfr.Dry80-60-40-20. The CFD results for this case obtained from the results file, at a time of 1100 seconds.

Figure 07/18/06-1 shows a contour plot of the temperature on the XZ plane along the centerline of the drift. The air temperature reaches it highest value on top of waste package A and decreases in we move to each one of the waste packages with decreasing heat rate.

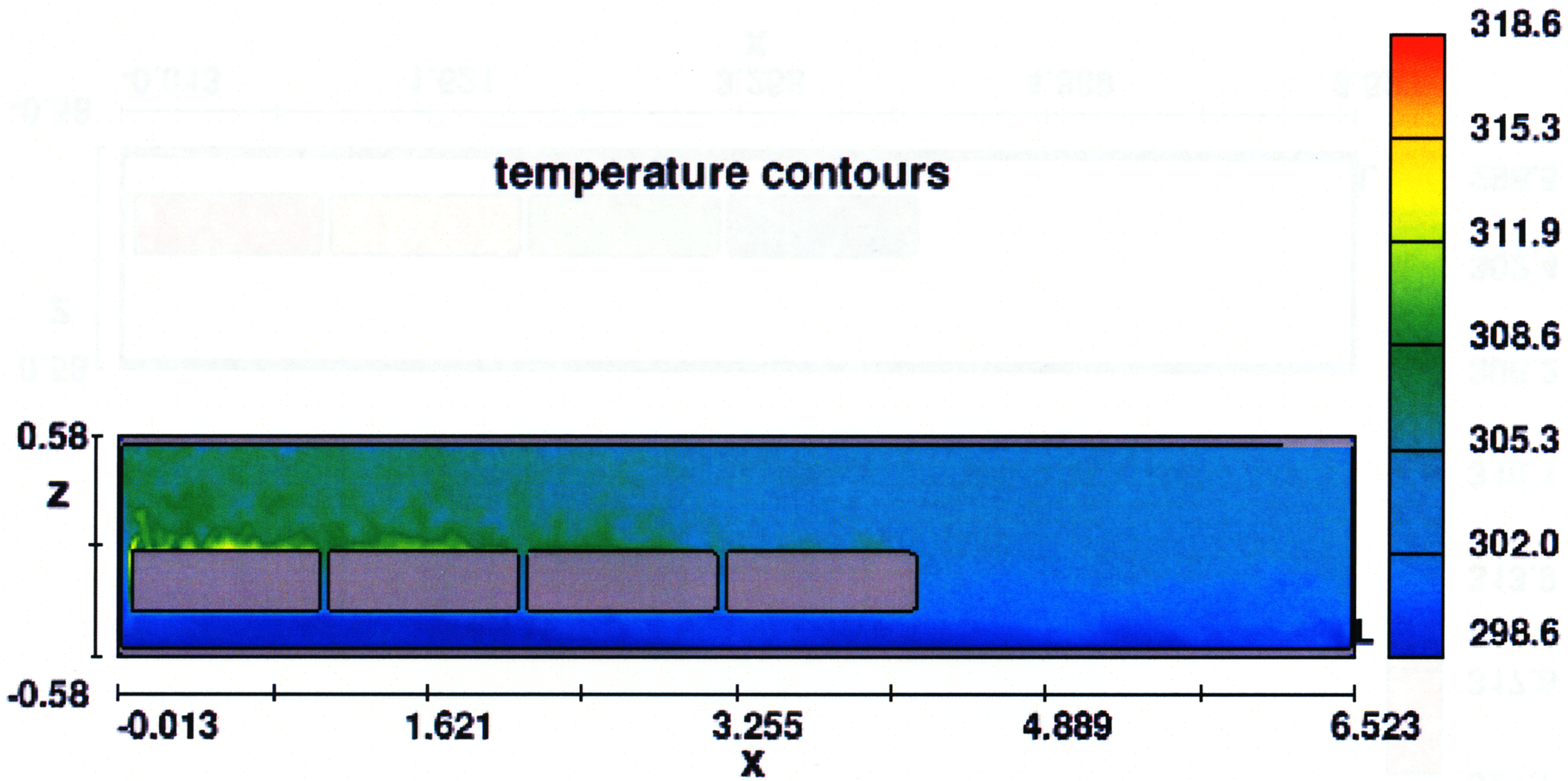

Figure 07/18/06-1. Contour Plot of the Air Temperature (K) – Dry Test – Non-Uniform Heating 80-60-40-20W.

Figure 07/18/06-2 shows the wall temperature on the drift walls and the waste packages. The decrease in temperature on the waste packages is consistent with the decreasing heat rate applied to each one.

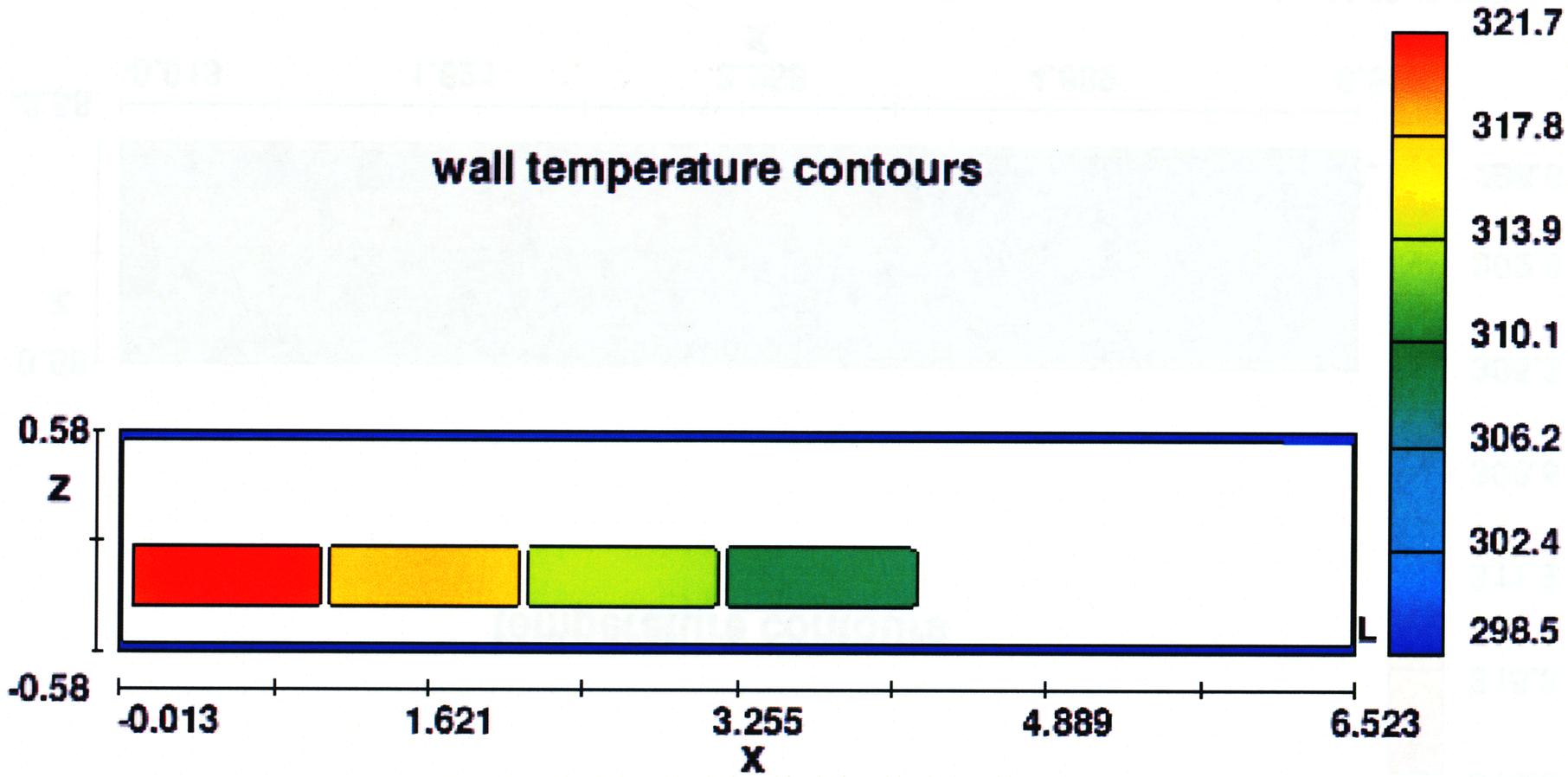

Figure 07/18/06-2. Contour Plot of the Wall **Temperature (K) – Dry Test – Non-Uniform Heating 80-60-40-20W.**

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