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FACULTY: Barcelona East School of Engineering

DEPARTMENT: Department of Chemical Engineering

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**Exploring the Feasibility of Using Fire Dynamics Simulator to Improve the Calculation of the Wildfire Available Safe Egress Time**

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Master thesis submitted in the Erasmus+ Study Programme

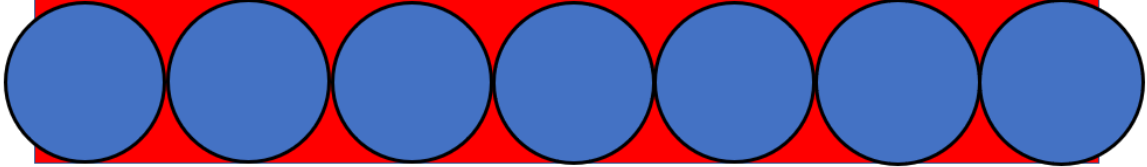
**International Master of Science in Fire Safety Engineering**



## Appendix

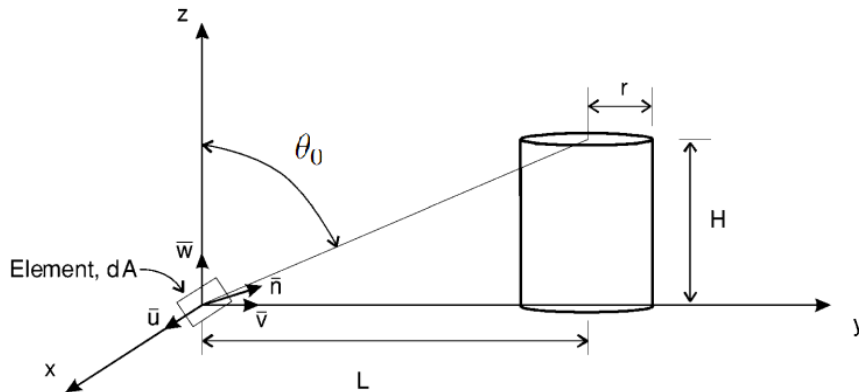
### A. Radiative heat flux empirical calculations

The calculation in this section is followed according to the SFPE handbook of fire protection [1] and its section on heat flux calculation from a flame. As the flame in the source is assumed to be a cylinder, and the burner in this thesis is a long cube, the cube has to be estimated as multiple adjacent cylinder fires as seen in Figure 1. It will be assumed that each fire has an equal HRR.



**Figure 1.** Fire shape estimation

As the burner is 520 meters wide and 80 meters long, cylinders would have a diameter of 80 meters. That would divide the rectangle to 6.5 fitting cylinders. In order to have full cylinders, 7 are used by leaving on the sides 0.25 of the spilling cylinders. The HRR is then divided by 7 and the analysis is conducted from one cylinder. Then, the calculation result is multiplied by 6.5 to represent the initial burner.



**Figure 2.** Calculation schematic from [1]

The incident heat flux at the element  $dA$  is calculated according to the equation [1]:

$$\ddot{q}'' = \sigma T_f^4 \varepsilon (F_1 + F_2 + F_3) \quad (1)$$

With  $\sigma$  being the Stephan-Boltzman constant equal to  $5.6704 \times 10^{-8} \text{ W/m}^2 \cdot \text{K}$ . Then  $T_f$  is the flame temperature assumed as the maximum flame temperature previously measured in [2] which is 1450 K. Where [1]:

$$\varepsilon = 1 - \exp(-0.7\mu) \quad (2)$$

and [1]

$$\mu = \frac{2r\kappa}{\sin \beta} \quad (3)$$

where [1]

$$\beta = \frac{\theta_0 + \pi/2}{2} \quad (4)$$

$r$  is the radius of the cylinder flame in meters (40 meters in this case).  $\kappa$  is the effective flame absorption coefficient in  $\text{m}^{-1}$ .  $\theta_0$  is the angle shown in Figure 2, the angle that the element makes with the top of the flame.

The view factors  $F_1$ ,  $F_2$  and  $F_3$  are calculated according to the equations [1]:

$$F_1 = \frac{u}{4\pi} \left(\frac{r}{L}\right)^2 (\pi - 2\theta_0 + \sin 2\theta_0) \quad (5)$$

$$F_2 = \frac{v}{2\pi} \left(\frac{r}{L}\right)^2 (\pi - 2\theta_0 + \sin 2\theta_0) \quad (6)$$

$$F_3 = \frac{w}{\pi} \left(\frac{r}{L}\right) \cos^2 \theta_0 \quad (7)$$

$u$ ,  $v$  and  $w$  are coefficients that affect the normal vector  $\vec{n}$ , in our case, as the cylinder is assumed to be directly in front of the village point of interest, it is only  $v$  that is not 0,  $v = 1$ . Thus,  $F_1 = F_3 = 0$ .  $L$  is the distance of the element  $dA$  from the cylinder's center as shown in Figure 2.

$\theta_0$  can be found using the equation [1]:

$$\theta_0 = \tan^{-1} \frac{L}{H} \quad (8)$$

As the distances examined in the thesis are from the border of the burner,  $L$  values are equal to these distances plus the radius.  $H$ , the height of the flame is unknown. As the model incorporates vegetation of the type: tall grass, chaparral vegetation and dormant brush, there are no trees in the model. Even if the flame height was 10 meters, which is an abnormally large height, the  $L/H$  ratio would still be at least 10 using  $L = 100$  meters. That would set a minimum  $\theta_0 = 84$  degrees. Thus, since the flame height is not known and there is no method to calculate it that applies to wildfires (to the knowledge of the author),  $H$  is taken as 10 meters. In [1], for wood (combustion material assumed in the simulations) and at  $T_f = 1350$  K,  $\kappa$  is taken equal to  $0.8 \text{ m}^{-1}$ . Since all the unknowns were assigned values, the calculations with  $L = 150$ ;  $L = 175$ ;  $L = 200$  and  $L = 300$  yield the following results (multiplied by 7 to represent all the burner).

**Table 1.** Incident radiant heat flux calculation results

Case study	$L$ (m)	$q_{\text{calculated}}$ ( $\text{kW}/\text{m}^2$ )	$q_{\text{max}}$ from results of FDS ( $\text{kW}/\text{m}^2$ )
100m	140	6.01	0.24
150m	190	2.42	0.18
175m	215	1.67	0.16
200m	240	1.20	0.15
300m	340	0.42	0.13

The results are shown in Table 1 and the steps followed are:

- Find  $\beta$  through equation 4
- Find  $\mu$  through equation 3
- Find  $\varepsilon$  through equation 2
- Find  $F_3$  through equation 7
- Find  $\ddot{q}''$  through equation 1 and multiply it by 6.5

## B. FDS code

The following codes are part of an example, corresponding to the southern fire case. The FDS obstacle lines &OBST have been omitted from the large scale cases because otherwise the code would have 130000 lines and would add too many pages to the current document. In the small scale cases code, the houses, road and roofs were omitted too. Also, the mesh was made unique instead of divided. In the small scale cases code, the devices used were included only on height 1 meter, contrary to the full file that includes them on heights 1, 2 and 3 meters. For the full input document, contact the author through the email on the cover page number ??.

### B.1. Large scale cases

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      H=1.7,  
      O=0.72,  
      N=1.0E-3,  
      CO_YIELD=4.0E-3,  
      SOOT_YIELD=0.015,  
      HEAT_OF_COMBUSTION=1.71E+4,  
      RADIATIVE_FRACTION=0.371 /
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Domain and its boundary conditions

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↪ =1062.96, 897.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A6', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1047.96, 919.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A7', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1046.96, 944.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A8', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1052.194368, 969.769196, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A9', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1052.383621, 991.438649, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A10', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1052.0282, 1014.556623, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A11', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1052.0282, 1027.67672, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A12', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1054.46, 1038.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A13', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1037.840188, 1046.060112, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A14', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1019.838194, 1053.993194, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A15', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1008.96, 1063.95, 430.0, ORIENTATION=0.0,0.0,1.0/

&DEVC ID='COmf-A16', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1000.96, 1073.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A17', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =991.96, 1082.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A18', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =983.96, 1091.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A19', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =976.46, 1101.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A20', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =964.96, 1106.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A21', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =952.96, 1111.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A22', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =945.96, 1114.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A23', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =935.96, 1119.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A24', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =927.96, 1127.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A25', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =921.96, 1133.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A26', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =915.96, 1139.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A1', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1106.46, 825.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A2', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1096.983191, 840.914324, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A3', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1086.46, 859.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A4', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1076.46, 876.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A5', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1062.96, 897.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A6', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1047.96, 919.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A7', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1046.96, 944.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A8', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1052.194368, 969.769196, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A9', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =1052.383621, 991.438649, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A10', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=1052.0282, 1014.556623, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A11', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=1052.0282, 1027.67672, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A12', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=1054.46, 1038.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A13', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=1037.840188, 1046.060112, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A14', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=1019.838194, 1053.993194, 430.0, ORIENTATION=0.0,0.0,1.0/

&DEVC ID='COvf-A15', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=1008.96, 1063.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A16', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=1000.96, 1073.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A17', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=991.96, 1082.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A18', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=983.96, 1091.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A19', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=976.46, 1101.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A20', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=964.96, 1106.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A21', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=952.96, 1111.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A22', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=945.96, 1114.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A23', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=935.96, 1119.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A24', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=927.96, 1127.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A25', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=921.96, 1133.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A26', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=915.96, 1139.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A1', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1106.46, 825.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A2', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1096.983191, 840.914324, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A3', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1086.46, 859.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A4', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1076.46, 876.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A5', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1062.96, 897.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A6', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1047.96, 919.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A7', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1046.96, 944.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A8', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1052.194368, 969.769196, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A9', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1052.383621, 991.438649, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A10', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1052.0282, 1014.556623, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A11', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1052.0282, 1027.67672, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A12', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1054.46, 1038.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A13', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1037.840188, 1046.060112, 430.0, ORIENTATION=0.0,0.0,1.0/

&DEVC ID='CO2mf-A14', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1019.838194, 1053.993194, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A15', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1008.96, 1063.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A16', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1000.96, 1073.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A17', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =991.96, 1082.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A18', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =983.96, 1091.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A19', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =976.46, 1101.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A20', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =964.96, 1106.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A21', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =952.96, 1111.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A22', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =945.96, 1114.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A23', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =935.96, 1119.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A24', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =927.96, 1127.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A25', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =921.96, 1133.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A26', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =915.96, 1139.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A1', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1106.46, 825.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A2', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1096.983191, 840.914324, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A3', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1086.46, 859.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A4', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1076.46, 876.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A5', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1062.96, 897.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A6', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1047.96, 919.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A7', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1046.96, 944.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A8', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1052.194368, 969.769196, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A9', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =1052.383621, 991.438649, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A10', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=1052.0282, 1014.556623, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A11', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=1052.0282, 1027.67672, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A12', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=1054.46, 1038.45, 430.0, ORIENTATION=0.0,0.0,1.0/

&DEVC ID='CO2vf-A13', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=1037.840188, 1046.060112, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A14', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=1019.838194, 1053.993194, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A15', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=1008.96, 1063.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A16', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=1000.96, 1073.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A17', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=991.96, 1082.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A18', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=983.96, 1091.95, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A19', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=976.46, 1101.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A20', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=964.96, 1106.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A21', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=952.96, 1111.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A22', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=945.96, 1114.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A23', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=935.96, 1119.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A24', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=927.96, 1127.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A25', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=921.96, 1133.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A26', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=915.96, 1139.45, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A1', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1106.46, 825.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A2', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1096.983191,  
↪ 840.914324, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A3', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1086.46, 859.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A4', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1076.46, 876.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A5', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1062.96, 897.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A6', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1047.96, 919.95,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A7', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1046.96, 944.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A8', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1052.194368,  
↪ 969.769196, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A9', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1052.383621,  
↪ 991.438649, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A10', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1052.0282,  
↪ 1014.556623, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A11', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1052.0282,  
↪ 1027.67672, 430.0, ORIENTATION=0.0,0.0,1.0/

&DEVC ID='RHF-A12', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1054.46, 1038.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A13', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1037.840188,  
↪ 1046.060112, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A14', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1019.838194,  
↪ 1053.993194, 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A15', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1008.96, 1063.95,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A16', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=1000.96, 1073.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A17', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=991.96, 1082.95,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A18', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=983.96, 1091.95,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A19', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=976.46, 1101.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A20', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=964.96, 1106.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A21', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=952.96, 1111.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A22', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=945.96, 1114.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A23', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=935.96, 1119.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A24', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=927.96, 1127.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A25', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=921.96, 1133.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A26', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=915.96, 1139.45,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A1', QUANTITY='VISIBILITY', XYZ=1106.46, 825.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A2', QUANTITY='VISIBILITY', XYZ=1096.983191, 840.914324, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A3', QUANTITY='VISIBILITY', XYZ=1086.46, 859.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A4', QUANTITY='VISIBILITY', XYZ=1076.46, 876.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A5', QUANTITY='VISIBILITY', XYZ=1062.96, 897.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A6', QUANTITY='VISIBILITY', XYZ=1047.96, 919.95, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A7', QUANTITY='VISIBILITY', XYZ=1046.96, 944.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A8', QUANTITY='VISIBILITY', XYZ=1052.194368, 969.769196, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A9', QUANTITY='VISIBILITY', XYZ=1052.383621, 991.438649, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A10', QUANTITY='VISIBILITY', XYZ=1052.0282, 1014.556623, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/

&DEVC ID='Vis-A11', QUANTITY='VISIBILITY', XYZ=1052.0282, 1027.67672, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A12', QUANTITY='VISIBILITY', XYZ=1054.46, 1038.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A13', QUANTITY='VISIBILITY', XYZ=1037.840188, 1046.060112,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A14', QUANTITY='VISIBILITY', XYZ=1019.838194, 1053.993194,  
↪ 430.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A15', QUANTITY='VISIBILITY', XYZ=1008.96, 1063.95, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A16', QUANTITY='VISIBILITY', XYZ=1000.96, 1073.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A17', QUANTITY='VISIBILITY', XYZ=991.96, 1082.95, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A18', QUANTITY='VISIBILITY', XYZ=983.96, 1091.95, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A19', QUANTITY='VISIBILITY', XYZ=976.46, 1101.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A20', QUANTITY='VISIBILITY', XYZ=964.96, 1106.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A21', QUANTITY='VISIBILITY', XYZ=952.96, 1111.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A22', QUANTITY='VISIBILITY', XYZ=945.96, 1114.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A23', QUANTITY='VISIBILITY', XYZ=935.96, 1119.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A24', QUANTITY='VISIBILITY', XYZ=927.96, 1127.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A25', QUANTITY='VISIBILITY', XYZ=921.96, 1133.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Vis-A26', QUANTITY='VISIBILITY', XYZ=915.96, 1139.45, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='FED-A1', QUANTITY='FED', XYZ=1106.46, 825.45, 430.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A2', QUANTITY='FED', XYZ=1096.983191, 840.914324, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='FED-A3', QUANTITY='FED', XYZ=1086.46, 859.45, 430.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A4', QUANTITY='FED', XYZ=1076.46, 876.45, 430.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A5', QUANTITY='FED', XYZ=1062.96, 897.45, 430.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A6', QUANTITY='FED', XYZ=1047.96, 919.95, 430.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A7', QUANTITY='FED', XYZ=1046.96, 944.45, 430.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A8', QUANTITY='FED', XYZ=1052.194368, 969.769196, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='FED-A9', QUANTITY='FED', XYZ=1052.383621, 991.438649, 430.0,  
↪ ORIENTATION=0.0,0.0,1.0/

```

&DEVC ID='FED-A10', QUANTITY='FED', XYZ=1052.0282, 1014.556623, 430.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='FED-A11', QUANTITY='FED', XYZ=1052.0282, 1027.67672, 430.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='FED-A12', QUANTITY='FED', XYZ=1054.46, 1038.45, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A13', QUANTITY='FED', XYZ=1037.840188, 1046.060112, 430.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='FED-A14', QUANTITY='FED', XYZ=1019.838194, 1053.993194, 430.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='FED-A15', QUANTITY='FED', XYZ=1008.96, 1063.95, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A16', QUANTITY='FED', XYZ=1000.96, 1073.45, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A17', QUANTITY='FED', XYZ=991.96, 1082.95, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A18', QUANTITY='FED', XYZ=983.96, 1091.95, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A19', QUANTITY='FED', XYZ=976.46, 1101.45, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A20', QUANTITY='FED', XYZ=964.96, 1106.45, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A21', QUANTITY='FED', XYZ=952.96, 1111.45, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A22', QUANTITY='FED', XYZ=945.96, 1114.45, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A23', QUANTITY='FED', XYZ=935.96, 1119.45, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A24', QUANTITY='FED', XYZ=927.96, 1127.45, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A25', QUANTITY='FED', XYZ=921.96, 1133.45, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A26', QUANTITY='FED', XYZ=915.96, 1139.45, 430.0, ORIENTATION
  ↪ =0.0,0.0,1.0/

```

Landuse boundary conditions

```

&SURF ID='NA' RGB=255,255,255 /
&SURF ID='A01' RGB=255,254,212 VEG_LSET_FUEL_INDEX=1 /
&SURF ID='A02' RGB=255,253,102 VEG_LSET_FUEL_INDEX=2 /
&SURF ID='A03' RGB=236,212,99 VEG_LSET_FUEL_INDEX=3 /
&SURF ID='A04' RGB=254,193,119 VEG_LSET_FUEL_INDEX=4 /
&SURF ID='A05' RGB=249,197,92 VEG_LSET_FUEL_INDEX=5 /
&SURF ID='A06' RGB=217,196,152 VEG_LSET_FUEL_INDEX=6 /
&SURF ID='A07' RGB=170,155,127 VEG_LSET_FUEL_INDEX=7 /
&SURF ID='A08' RGB=229,253,214 VEG_LSET_FUEL_INDEX=8 /
&SURF ID='A09' RGB=162,191,90 VEG_LSET_FUEL_INDEX=9 /
&SURF ID='A10' RGB=114,154,85 VEG_LSET_FUEL_INDEX=10 /
&SURF ID='A11' RGB=235,212,253 VEG_LSET_FUEL_INDEX=11 /
&SURF ID='A12' RGB=163,177,243 VEG_LSET_FUEL_INDEX=12 /

```



```
&SURF ID='A13' RGB=0,0,0 VEG_LSET_FUEL_INDEX=13 /
&SURF ID='Urban' RGB=186,119,80 /
&SURF ID='Snow-Ice' RGB=234,234,234 /
&SURF ID='Agriculture' RGB=253,242,242 /
&SURF ID='Water' RGB=137,183,221 /
&SURF ID='Barren' RGB=133,153,156 /
&SURF ID='Ignition' VEG_LSET_IGNITE_TIME=0. COLOR='RED' /
&SURF ID='Burned' RGB=20,20,20 /
```

Output quantities

```
&SLCF AGL_SLICE=5. QUANTITY='LEVEL SET VALUE' /
&SLCF AGL_SLICE=5. QUANTITY='TEMPERATURE' VECTOR=T /
&SLCF PBX=0.00 QUANTITY='TEMPERATURE' VECTOR=T /
&SLCF PBY=0.00 QUANTITY='TEMPERATURE' VECTOR=T /
```

Wind

```
&WIND SPEED= 10.0, DIRECTION= 180 /
```

(Obstacles here)

```
&TAIL /
```

## B.2. Small scale cases

```
&HEAD CHID='smallcase_south_300m', TITLE='smallcase_south_300m' /
```

```
&MISC TMPA=37.0 /
```

```
&TIME T_BEGIN=0, T_END=1000 /
```

```
&DUMP DT_RESTART=300.0 /
```

Wind

```
&WIND SPEED=10.0 DIRECTION=180 /
```

```
&REAC ID='SFPE WOOD_OAK',  
      FYI='SFPE Handbook, 5th Ed, Tables A.38 and A.39 "Red oak"',  
      FUEL='REAC_FUEL',  
      C=1.0,  
      H=1.7,  
      O=0.72,  
      N=1.0E-3,  
      CO_YIELD=4.0E-3,  
      SOOT_YIELD=0.015,  
      HEAT_OF_COMBUSTION=1.71E+4,  
      RADIATIVE_FRACTION=0.371 /
```

Meshes

```
&MESH ID='MESH', IJK=550, 766, 37, XB=200.0, 750.0, 2.0, 768.0, -2.0, 35.0,  
      ↪ MPI_PROCESS=0 /
```

Vents

```
&VENT ID='Mesh Vent: MESH [XMIN]', SURF_ID='OPEN', XB  
      ↪ =200.0,200.0,2.0,768.0,-2.0,35.0 /  
&VENT ID='Mesh Vent: MESH [XMAX]', SURF_ID='OPEN', XB  
      ↪ =750.0,750.0,2.0,768.0,-2.0,35.0 /  
&VENT ID='Mesh Vent: MESH [YMIN]', SURF_ID='OPEN', XB  
      ↪ =200.0,750.0,2.0,2.0,-2.0,35.0 /  
&VENT ID='Mesh Vent: MESH [YMAX]', SURF_ID='OPEN', XB  
      ↪ =200.0,750.0,768.0,768.0,-2.0,35.0 /  
&VENT ID='Mesh Vent: MESH [ZMAX]', SURF_ID='OPEN', XB  
      ↪ =200.0,750.0,2.0,768.0,35.0,35.0 /
```

Slices

```
&SLCF QUANTITY='TEMPERATURE', ID='SliceTemp01', PBZ=1.0/  
&SLCF QUANTITY='PRESSURE', ID='SlicePressure01', PBZ=1.0/  
&SLCF QUANTITY='DENSITY', SPEC_ID='SOOT', ID='SliceSootDensity01', PBZ=1.0/  
&SLCF QUANTITY='MASS FRACTION', SPEC_ID='SOOT', ID='SliceSootMF01', PBZ=1.0/  
&SLCF QUANTITY='VISIBILITY', ID='SliceVis01', PBZ=1.0/
```

```
&SURF ID='Burner',  
      COLOR='RED',  
      HRRPUA=120,  
      TAU_Q=-60.0,  
      TMP_FRONT=300.0/
```

#### Obstacles

```
&OBST ID='Burner', XB=215.0,735.0,9.0,89.0,0.0,2.75, SURF_ID='Burner'/  
&OBST ID='Terrain', XB=0.0,956.13,0.0,768.64,-10.0,0.0, RGB=160,239,151,  
  ↪ TRANSPARENCY=0.309804/
```

#### Devices

```
&DEVC ID='Origin_UV', QUANTITY='U-VELOCITY', XYZ=478.04,384.3,30.0/  
&DEVC ID='Origin_VV', QUANTITY='V-VELOCITY', XYZ=478.04,384.3,30.0/  
&DEVC ID='Origin_WV', QUANTITY='W-VELOCITY', XYZ=478.04,384.3,30.0/  
&DEVC ID='Temp-A1', QUANTITY='TEMPERATURE', XYZ=358.0, 727.5, 1.0, ORIENTATION  
  ↪ =0.0,0.0,1.0/  
&DEVC ID='Temp-A2', QUANTITY='TEMPERATURE', XYZ=364.0, 721.5, 1.0, ORIENTATION  
  ↪ =0.0,0.0,1.0/  
&DEVC ID='Temp-A3', QUANTITY='TEMPERATURE', XYZ=370.0, 715.5, 1.0, ORIENTATION  
  ↪ =0.0,0.0,1.0/  
&DEVC ID='Temp-A4', QUANTITY='TEMPERATURE', XYZ=378.0, 707.5, 1.0, ORIENTATION  
  ↪ =0.0,0.0,1.0/  
&DEVC ID='Temp-A5', QUANTITY='TEMPERATURE', XYZ=388.0, 702.5, 1.0, ORIENTATION  
  ↪ =0.0,0.0,1.0/  
&DEVC ID='Temp-A6', QUANTITY='TEMPERATURE', XYZ=395.0, 699.5, 1.0, ORIENTATION  
  ↪ =0.0,0.0,1.0/  
&DEVC ID='Temp-A7', QUANTITY='TEMPERATURE', XYZ=407.0, 694.5, 1.0, ORIENTATION  
  ↪ =0.0,0.0,1.0/  
&DEVC ID='Temp-A8', QUANTITY='TEMPERATURE', XYZ=418.5, 689.5, 1.0, ORIENTATION  
  ↪ =0.0,0.0,1.0/  
&DEVC ID='Temp-A9', QUANTITY='TEMPERATURE', XYZ=426.0, 680.0, 1.0, ORIENTATION  
  ↪ =0.0,0.0,1.0/  
&DEVC ID='Temp-A10', QUANTITY='TEMPERATURE', XYZ=434.0, 671.0, 1.0,  
  ↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Temp-A11', QUANTITY='TEMPERATURE', XYZ=443.0, 661.5, 1.0,  
  ↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Temp-A12', QUANTITY='TEMPERATURE', XYZ=451.0, 652.0, 1.0,  
  ↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Temp-A13', QUANTITY='TEMPERATURE', XYZ=461.878194, 642.043194, 1.0,  
  ↪ ORIENTATION=0.0,0.0,1.0/
```

&DEVC ID='Temp-A14', QUANTITY='TEMPERATURE', XYZ=479.880188, 634.110112, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A15', QUANTITY='TEMPERATURE', XYZ=496.5, 626.5, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A16', QUANTITY='TEMPERATURE', XYZ=494.0682, 615.72672, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A17', QUANTITY='TEMPERATURE', XYZ=494.0682, 602.606623, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A18', QUANTITY='TEMPERATURE', XYZ=494.423621, 579.488649, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A19', QUANTITY='TEMPERATURE', XYZ=494.234368, 557.819196, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A20', QUANTITY='TEMPERATURE', XYZ=489.0, 532.5, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A21', QUANTITY='TEMPERATURE', XYZ=490.0, 508.0, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A22', QUANTITY='TEMPERATURE', XYZ=505.0, 485.5, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A23', QUANTITY='TEMPERATURE', XYZ=518.5, 464.5, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A24', QUANTITY='TEMPERATURE', XYZ=528.5, 447.5, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A25', QUANTITY='TEMPERATURE', XYZ=539.023191, 428.964324, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Temp-A26', QUANTITY='TEMPERATURE', XYZ=548.5, 413.5, 1.0,  
 ↪ ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A1', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=358.0, 727.5,  
 ↪ 1.0, ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A2', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=364.0, 721.5,  
 ↪ 1.0, ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A3', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=370.0, 715.5,  
 ↪ 1.0, ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A4', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=378.0, 707.5,  
 ↪ 1.0, ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A5', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=388.0, 702.5,  
 ↪ 1.0, ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A6', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=395.0, 699.5,  
 ↪ 1.0, ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A7', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=407.0, 694.5,  
 ↪ 1.0, ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A8', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=418.5, 689.5,  
 ↪ 1.0, ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A9', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=426.0, 680.0,  
 ↪ 1.0, ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A10', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=434.0,  
 ↪ 671.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A11', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=443.0,  
 ↪ 661.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
 &DEVC ID='Smf-A12', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=451.0,  
 ↪ 652.0, 1.0, ORIENTATION=0.0,0.0,1.0/

&DEVC ID='Smf-A13', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=461.878194,  
↪ 642.043194, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A14', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=479.880188,  
↪ 634.110112, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A15', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=496.5,  
↪ 626.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A16', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=494.0682,  
↪ 615.72672, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A17', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=494.0682,  
↪ 602.606623, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A18', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=494.423621,  
↪ 579.488649, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A19', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=494.234368,  
↪ 557.819196, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A20', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=489.0,  
↪ 532.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A21', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=490.0,  
↪ 508.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A22', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=505.0,  
↪ 485.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A23', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=518.5,  
↪ 464.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A24', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=528.5,  
↪ 447.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A25', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=539.023191,  
↪ 428.964324, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Smf-A26', QUANTITY='MASS FRACTION', SPEC\_ID='SOOT', XYZ=548.5,  
↪ 413.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A1', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=358.0,  
↪ 727.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A2', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=364.0,  
↪ 721.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A3', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=370.0,  
↪ 715.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A4', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=378.0,  
↪ 707.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A5', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=388.0,  
↪ 702.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A6', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=395.0,  
↪ 699.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A7', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=407.0,  
↪ 694.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A8', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=418.5,  
↪ 689.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A9', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=426.0,  
↪ 680.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A10', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=434.0,  
↪ 671.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A11', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=443.0,  
↪ 661.5, 1.0, ORIENTATION=0.0,0.0,1.0/

&DEVC ID='Svf-A12', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=451.0,  
↪ 652.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A13', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ  
↪ =461.878194, 642.043194, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A14', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ  
↪ =479.880188, 634.110112, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A15', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=496.5,  
↪ 626.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A16', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=494.0682,  
↪ 615.72672, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A17', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=494.0682,  
↪ 602.606623, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A18', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ  
↪ =494.423621, 579.488649, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A19', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ  
↪ =494.234368, 557.819196, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A20', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=489.0,  
↪ 532.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A21', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=490.0,  
↪ 508.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A22', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=505.0,  
↪ 485.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A23', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=518.5,  
↪ 464.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A24', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=528.5,  
↪ 447.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A25', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ  
↪ =539.023191, 428.964324, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='Svf-A26', QUANTITY='VOLUME FRACTION', SPEC\_ID='SOOT', XYZ=548.5,  
↪ 413.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A1', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =358.0, 727.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A2', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =364.0, 721.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A3', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =370.0, 715.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A4', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =378.0, 707.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A5', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =388.0, 702.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A6', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =395.0, 699.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A7', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =407.0, 694.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A8', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =418.5, 689.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A9', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =426.0, 680.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A10', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =434.0, 671.0, 1.0, ORIENTATION=0.0,0.0,1.0/

&DEVC ID='COmf-A11', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =443.0, 661.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A12', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =451.0, 652.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A13', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =461.878194, 642.043194, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A14', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =479.880188, 634.110112, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A15', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =496.5, 626.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A16', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =494.0682, 615.72672, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A17', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =494.0682, 602.606623, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A18', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =494.423621, 579.488649, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A19', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =494.234368, 557.819196, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A20', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =489.0, 532.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A21', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =490.0, 508.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A22', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =505.0, 485.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A23', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =518.5, 464.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A24', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =528.5, 447.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A25', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =539.023191, 428.964324, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COmf-A26', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =548.5, 413.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A1', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =358.0, 727.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A2', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =364.0, 721.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A3', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =370.0, 715.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A4', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =378.0, 707.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A5', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =388.0, 702.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A6', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =395.0, 699.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A7', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =407.0, 694.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A8', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =418.5, 689.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A9', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE', XYZ  
↪ =426.0, 680.0, 1.0, ORIENTATION=0.0,0.0,1.0/

&DEVC ID='COvf-A10', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=434.0, 671.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A11', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=443.0, 661.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A12', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=451.0, 652.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A13', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=461.878194, 642.043194, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A14', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=479.880188, 634.110112, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A15', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=496.5, 626.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A16', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=494.0682, 615.72672, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A17', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=494.0682, 602.606623, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A18', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=494.423621, 579.488649, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A19', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=494.234368, 557.819196, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A20', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=489.0, 532.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A21', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=490.0, 508.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A22', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=505.0, 485.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A23', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=518.5, 464.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A24', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=528.5, 447.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A25', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=539.023191, 428.964324, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='COvf-A26', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON MONOXIDE',  
↪ XYZ=548.5, 413.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A1', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =358.0, 727.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A2', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =364.0, 721.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A3', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =370.0, 715.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A4', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =378.0, 707.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A5', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =388.0, 702.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A6', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =395.0, 699.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A7', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =407.0, 694.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A8', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =418.5, 689.5, 1.0, ORIENTATION=0.0,0.0,1.0/



&DEVC ID='CO2mf-A9', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =426.0, 680.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A10', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =434.0, 671.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A11', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =443.0, 661.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A12', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =451.0, 652.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A13', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =461.878194, 642.043194, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A14', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =479.880188, 634.110112, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A15', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =496.5, 626.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A16', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =494.0682, 615.72672, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A17', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =494.0682, 602.606623, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A18', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =494.423621, 579.488649, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A19', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =494.234368, 557.819196, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A20', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =489.0, 532.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A21', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =490.0, 508.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A22', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =505.0, 485.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A23', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =518.5, 464.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A24', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =528.5, 447.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A25', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =539.023191, 428.964324, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2mf-A26', QUANTITY='MASS FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =548.5, 413.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A1', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =358.0, 727.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A2', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =364.0, 721.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A3', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =370.0, 715.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A4', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =378.0, 707.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A5', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =388.0, 702.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A6', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =395.0, 699.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A7', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =407.0, 694.5, 1.0, ORIENTATION=0.0,0.0,1.0/

&DEVC ID='CO2vf-A8', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =418.5, 689.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A9', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE', XYZ  
↪ =426.0, 680.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A10', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=434.0, 671.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A11', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=443.0, 661.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A12', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=451.0, 652.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A13', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=461.878194, 642.043194, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A14', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=479.880188, 634.110112, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A15', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=496.5, 626.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A16', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=494.0682, 615.72672, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A17', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=494.0682, 602.606623, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A18', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=494.423621, 579.488649, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A19', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=494.234368, 557.819196, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A20', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=489.0, 532.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A21', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=490.0, 508.0, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A22', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=505.0, 485.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A23', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=518.5, 464.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A24', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=528.5, 447.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A25', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=539.023191, 428.964324, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='CO2vf-A26', QUANTITY='VOLUME FRACTION', SPEC\_ID='CARBON DIOXIDE',  
↪ XYZ=548.5, 413.5, 1.0, ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A1', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=358.0, 727.5, 1.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A2', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=364.0, 721.5, 1.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A3', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=370.0, 715.5, 1.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A4', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=378.0, 707.5, 1.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A5', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=388.0, 702.5, 1.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
&DEVC ID='RHF-A6', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=395.0, 699.5, 1.0,  
↪ ORIENTATION=0.0,0.0,1.0/

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&DEVC ID='RHF-A7', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=407.0, 694.5, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A8', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=418.5, 689.5, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A9', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=426.0, 680.0, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A10', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=434.0, 671.0, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A11', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=443.0, 661.5, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A12', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=451.0, 652.0, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A13', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=461.878194,
  ↪ 642.043194, 1.0, ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A14', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=479.880188,
  ↪ 634.110112, 1.0, ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A15', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=496.5, 626.5, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A16', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=494.0682,
  ↪ 615.72672, 1.0, ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A17', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=494.0682,
  ↪ 602.606623, 1.0, ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A18', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=494.423621,
  ↪ 579.488649, 1.0, ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A19', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=494.234368,
  ↪ 557.819196, 1.0, ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A20', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=489.0, 532.5, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A21', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=490.0, 508.0, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A22', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=505.0, 485.5, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A23', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=518.5, 464.5, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A24', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=528.5, 447.5, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A25', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=539.023191,
  ↪ 428.964324, 1.0, ORIENTATION=0.0,0.0,1.0/
&DEVC ID='RHF-A26', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=548.5, 413.5, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
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  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A2', QUANTITY='VISIBILITY', XYZ=364.0, 721.5, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A3', QUANTITY='VISIBILITY', XYZ=370.0, 715.5, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A4', QUANTITY='VISIBILITY', XYZ=378.0, 707.5, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A5', QUANTITY='VISIBILITY', XYZ=388.0, 702.5, 1.0, ORIENTATION
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&DEVC ID='Vis-A6', QUANTITY='VISIBILITY', XYZ=395.0, 699.5, 1.0, ORIENTATION
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&DEVC ID='Vis-A7', QUANTITY='VISIBILITY', XYZ=407.0, 694.5, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
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  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A10', QUANTITY='VISIBILITY', XYZ=434.0, 671.0, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A11', QUANTITY='VISIBILITY', XYZ=443.0, 661.5, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A12', QUANTITY='VISIBILITY', XYZ=451.0, 652.0, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A13', QUANTITY='VISIBILITY', XYZ=461.878194, 642.043194, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='Vis-A14', QUANTITY='VISIBILITY', XYZ=479.880188, 634.110112, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='Vis-A15', QUANTITY='VISIBILITY', XYZ=496.5, 626.5, 1.0, ORIENTATION
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&DEVC ID='Vis-A16', QUANTITY='VISIBILITY', XYZ=494.0682, 615.72672, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='Vis-A17', QUANTITY='VISIBILITY', XYZ=494.0682, 602.606623, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='Vis-A18', QUANTITY='VISIBILITY', XYZ=494.423621, 579.488649, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='Vis-A19', QUANTITY='VISIBILITY', XYZ=494.234368, 557.819196, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
&DEVC ID='Vis-A20', QUANTITY='VISIBILITY', XYZ=489.0, 532.5, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A21', QUANTITY='VISIBILITY', XYZ=490.0, 508.0, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A22', QUANTITY='VISIBILITY', XYZ=505.0, 485.5, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A23', QUANTITY='VISIBILITY', XYZ=518.5, 464.5, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A24', QUANTITY='VISIBILITY', XYZ=528.5, 447.5, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='Vis-A25', QUANTITY='VISIBILITY', XYZ=539.023191, 428.964324, 1.0,
  ↪ ORIENTATION=0.0,0.0,1.0/
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  ↪ =0.0,0.0,1.0/
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  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A3', QUANTITY='FED', XYZ=370.0, 715.5, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/
&DEVC ID='FED-A4', QUANTITY='FED', XYZ=378.0, 707.5, 1.0, ORIENTATION
  ↪ =0.0,0.0,1.0/

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&DEVC ID='FED-A5', QUANTITY='FED', XYZ=388.0, 702.5, 1.0, ORIENTATION  
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&DEVC ID='FED-A6', QUANTITY='FED', XYZ=395.0, 699.5, 1.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A7', QUANTITY='FED', XYZ=407.0, 694.5, 1.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A8', QUANTITY='FED', XYZ=418.5, 689.5, 1.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A9', QUANTITY='FED', XYZ=426.0, 680.0, 1.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A10', QUANTITY='FED', XYZ=434.0, 671.0, 1.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A11', QUANTITY='FED', XYZ=443.0, 661.5, 1.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A12', QUANTITY='FED', XYZ=451.0, 652.0, 1.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
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↪ ORIENTATION=0.0,0.0,1.0/  
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&DEVC ID='FED-A17', QUANTITY='FED', XYZ=494.0682, 602.606623, 1.0, ORIENTATION  
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↪ ORIENTATION=0.0,0.0,1.0/  
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&DEVC ID='FED-A23', QUANTITY='FED', XYZ=518.5, 464.5, 1.0, ORIENTATION  
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&DEVC ID='FED-A24', QUANTITY='FED', XYZ=528.5, 447.5, 1.0, ORIENTATION  
↪ =0.0,0.0,1.0/  
&DEVC ID='FED-A25', QUANTITY='FED', XYZ=539.023191, 428.964324, 1.0,  
↪ ORIENTATION=0.0,0.0,1.0/  
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↪ =0.0,0.0,1.0/

&TAIL /