One of the issues in configuring the dispersion calculations is what resolution of concentration grid would be ideal. In the CAPTEX configuration the samplers covered a domain from near the source to many hundreds of kilometers downwind. Ideally a finer resolution concentration grid should be applied near the source, while a coarser grid would be sufficient further down wind. In HYSPLIT there is an option to define multiple concentration grids.

The way to start this is, let's go back and do a reset and then load the CAPTEX configuration that we had previously saved, for the CONTROL file and the name list file. Now to make this calculation run a little faster, let's go ahead and reduce the particle number from 50,000 to 10,000, and now when we go into the configuration, we are not going to go all the way to 68 hours, we'll just go 25 hours, which is essentially 24 hours after the start of sampling. So we will do the run over 8 three-hour sampling periods.

Now the only thing you need to do to configure multiple concentration grids, is just open up the grid menus and change the number from 1 to 2. And now you can select grid number two. It is first populated with the values from grid number one. Now we're interested in the region near the source, so let's center this finer concentration grid that we're going to define a little bit further west, at 82.5, and we'll make the resolution 5 km instead of 25, and we can cover a more limited domain of only 5° latitude and longitude. We should give it a unique output name, we'll

append FG here to the base name. And we only need to run this for 12 hours, because the finer resolution sampling terminates after, the three hour resolution sampling terminates after 12 hours. This would be the 26th sixth at 06. And we can do a save and save.

Now just run model with set up file. Once complete, we're going to display the results. And you can see now that we have two concentration grid files available for display. We will select the fine grid file and we will also append the output name here, also with FG, and we're going to make sure that the map is centered, over the source point, and we're going to force the contours, force the rings to be drawn, for easier determination of downwind distances. And we will draw these rings at 50 km intervals, four rings at 50 km intervals. We need to ensure that the units are picograms, so we're going to have a concentration multiplier of E+12. And the label will be picograms and increase the zoom to 100% to make a more interesting looking map. And now let's execute and we can see here the four time periods, let's just stop here, the second time period. The second three hour time period. So it's kind of in the middle. Let's display now the course grid result for that same time and I'm not going to change the output name, and I don't think we need that much zoom either, and let's execute the display.

And comparing the two, I should take it one more time period, 2100-0000, and you can see why it might be desirable to have higher resolution concentration grids near the source. Now this is not necessarily going to be a

penalty computationally because we're only sampling to this grid for 12 hours. If we're doing the full 68 hours simulation, after 12 hours, this fine grid will be turned off, and only the course grid computation would be maintained.

Now the other thing is we can also do multiple meteorology and multiple concentration grids at the same time. And for instance, we can add a fine grid meteorology file, as we did previously, and let's select for instance, the 9 km WRF. The reason I'm selecting this is because it does cover the entire computational domain for the three day period. So you can actually use this for the whole experiment. And we don't need to even run for 25 hours, let's make this go faster and only run for 13 hours, because adding meteorology does slow down the calculation, because each time step, the code, for each particle, needs determine the optimal meteorology grid to use.

Now I will run the model, exit and let’s display. We will select the fine grid again and I will leave the name as concplot so we can compare it to the other fine grid calculation, and I believe everything else would be the same, back 100 percent for fine grid, execute, here's the first time, second time, third, and fourth. Let's go back to the second time period and let's open up the previous calculation that used the NARR data only, and that would've been concplotFG.ps, and we’re looking at the same time period. And you can see that the use of the WRF data, this is on the left panel, gave us somewhat

more dispersion then using the NARR only data. And there are probably a couple of reasons for this. One, the wind fields maybe slightly different, in terms of the wind change, wind direction and speed with height, but also the mixing that is generated by the WRF model is going to be somewhat different than by the NARR.

So we will explore that actually a little bit more detail in the next section, in the next few sections, as to what different turbulence parameterizations and their effect on the computations. In some ways this becomes a range of uncertainty in the calculation, I mean these are all valid solutions, just with somewhat different assumptions.

And this concludes our discussion of the use of multiple grids.