**Notes:**

Michelle said SSPA didn’t provide any information about how the GHB was generated for the 9 layer model, so check the 6 layer model first, and then try to replicate layers 5-8 and layer 9.

SSPA provided very little input data that went into generating the GHB (no rasters, no contours as mentioned in the MPR text): “Water-level data from monitoring wells in the unconfined aquifer were interpolated monthly throughout the 100-Area for the period 2014-2020, using the interpolation methodology presented in the 100 Area P&T annual report (DOE-RL-2020-61), to develop monthly groundwater contours.”

**Check:**

1. Check that the extracted head values at the southern boundary (in *S:\PSC\CHPRC.C003.HANOFF\Rel.112\100-HR-3\_GWFTM\4\_GHB\GHBcellscreate.xlxs*) can be recreated accurate from a raster
   1. Used the last for (433) of the grids\_as\_centroids.shp and extracted the head elevation from the 2020 rasters (monthly average head as rasters, provided by Hai). Since SSPA didn’t provide rasters, we could only do a spot check with one had access to.
   2. Used the “Extract MultiValue at Point Tool” in ArcMap, and exported the values to a csv for comparison
      1. *S:\PSC\CHPRC.C003.HANOFF\Rel.112\100-HR-3\_GWFTM\4\_GHB\GHB\_Check\_INTERA\GHB.mxd*
   3. Did a Vlookup in excel using the row/column as key to determine if the head values are accurate in.
      1. *S:\PSC\CHPRC.C003.HANOFF\Rel.112\100-HR-3\_GWFTM\4\_GHB\GHB\_Check\_INTERA\4\_GHB\ GHBcellscreate\_SSW.xlxs*
      2. Results are in “GridCentroid\_Extract” tab.
   4. **No errors found, but:** the MPR states: “An ArcGIS script was used to sample the monthly mapped groundwater elevations **at a distance of 750 meters south from the cell centers of the GHB row**, for each month between January 2014 and December 2020.”
   5. It looks like they ***actually sampled the WL raster AT the grid centroids***, not the offset head locations in the shapefile they provided. The points 750 meters to the south seem to have no influence on the model, the WLs are not the ones used to create the GHB.
   6. When the WLs are sampled at the 750m offset locations instead of the grid nodes, they are not a match to what is in *S:\PSC\CHPRC.C003.HANOFF\Rel.126\Updated\_Model\_9L\0\_Layer\_River\_Create \LayerCreation\_9Lay.xlsx*, formulas from *S:\PSC\CHPRC.C003.HANOFF\Rel.112\100-HR-3\_GWFTM\4\_GHB* \*GHBcellscreate.xlxs (see tab “Offesthead\_Extract” tab)*
   7. Diagram

      Description automatically generated
2. Recreate the individual layer files from GHBcellscreate.xlxs which are found here: *S:\PSC\CHPRC.C003.HANOFF\Rel.112\100-HR-3\_GWFTM\4\_GHB\CSVFiles*
   1. Verified that the excel equations in GHBcellscreate.xlxs are accurate view a spot check
   2. Verified that the CSVs match what is in the GHBcellscreate.xlxs layer tabs
   3. Used the file compare script to check CSV between the 6 layer model and 9 layer model for layers 1 to 4 (same for both models) and they are the same as the “ReadMe” indicates.
      1. *S:\PSC\CHPRC.C003.HANOFF\Rel.112\100-HR-3\_GWFTM\4\_GHB\CSVFiles*
      2. *S:\PSC\CHPRC.C003.HANOFF\Rel.126\Updated\_Model\_9L\0\_Layer\_River\_Create\GHBCSV*
      3. *file\_compare\_GHB-CSV.py, file\_compare\_GHB-CSV.txt*
   4. Recreated CSVs for layers 5-8 and layer 9
      1. ModelLayer9 tab from *S:\PSC\CHPRC.C003.HANOFF\Rel.126\Updated\_Model\_9L\0\_Layer\_River\_Create \LayerCreation\_9Lay.xlsx*, formulas from *S:\PSC\CHPRC.C003.HANOFF\Rel.112\100-HR-3\_GWFTM\4\_GHB* \*GHBcellscreate.xlxs*
      2. Used file compare script as well, match.
      3. *file\_compare\_GHB-CSV.py, file\_compare\_GHB-CSV.txt*
   5. **No errors found**

**Text from MPR:**

* “GHB cells were placed along the southern boundary, **at row 433**, starting in column 1 and extending to the first river cell in layer 1 in the east, at column 747”.
  + 9 layer is 433 and 875
* “Water-level data from monitoring wells in the unconfined aquifer **were interpolated monthly** throughout the 100-Area for the period 2014-2020, using the interpolation methodology presented in the 100 Area P&T annual report (DOE-RL-2020-61), to develop monthly groundwater contours”.
  + **Where is the monitoring well data? No provided raw**
  + **Where are these contours? Not provided, not in EMMA**
  + **Need water table rasters, only have 2020 from Hai**
* “An ArcGIS script was used to sample the monthly mapped groundwater elevations at *a distance of 750 meters south from the cell centers of the GHB row*, for each month between January 2014 and December 2020”.
  + I’m not sure why they used a distance of 750 meters….

# From the 6 layer README:

# GHB

GHBcellcreate.xlsx – Template file used to generate general head boundary csv files to be imported into GWV to create GHB package. Excel file contains head info for 2006-2020; 2014 model begins with stress period 97.

## CSVFiles

Folder containing all the CSV files exported from GHBcellcreate.xlsx imported into GWV to create GHB package. Conductance values are not calibrated values but were used to create PEST template files.

## Shapefiles

GHB\_Lay6.shp – All the GHB cells in layer 6 along with reach number  
GHB\_with\_offset\_Heads.shp – Monthly observed heads (2006-2020) at an offset from GHB cells

# From the 9 layer README:

# 0\_Layer\_River\_Create Creation

LayerCreation\_9Lay.xlsx – Calculates the top and bottom of all layers, determines which cells are river cells, and assigns their associated bottom elevation for nine layer model.

rivercells9laynew2020.xlsx – Template file used to generate river csv files to be imported into GWV to create RIV package for nine layer model. Excel file contains stage info for 2006-2020; 2014 model begins at stress period 97. Was updated using the new convolution for 2020.

River\_New2020\_GHBRIV.gwv – The groundwater vistas file used to generate the DIS, BAS, RIV and GHB packages

## BottomCSV

Folder containing all the CSV files exported from LayerCreation\_9Lay.xls imported into GWV to create DIS package

## GHBCSV

Folder containing all the CSV files exported from GHBcellcreate.xlsx (Previously provided, did not change) imported into GWV to create GHB package. Conductance values are not calibrated values but were used to create PEST template files.