This Section describes the Hydrologic Command Language (HCL) Techniques used by the Operational Forecast Program Function MAP.

A detailed description of each Technique is in Section VI.5.3D [Hyperlink].

The Techniques used by Function MAP can be categorized as those:
- often used
- not often used
- not used for forecasting

Technique	Notes	Description
Techniques Often Used		
Techniques to specify the type of run (specify only one):		
CGROUP	1/ 2/	Specifies that the run is a Carryover Group run and sets the name of the Carryover Group
FGROUP	1/ 2/	Specifies that the run is a Forecast Group run and sets the name of the Forecast Group
AREA	2/	Specifies that the run is an area run and sets the names of the areas to be run
Techniques to specify the run period:		
STARTRUN	1/ 2/	Sets the time for start of run
LSTCMPDY	1/ 2/	Sets the time for end of computational (observed data) period
LSTALLOW	1/ 2/	Sets the future time limit for the Technique LSTCMPDY
Techniques to specify MAP options:		
MDRONLY	2/	Specifies for which areas MAP values will be completely based on MDR data
MDRDIST	2/	Specifies for which areas the 6 hour distribution of daily MAP values will be completely based on MDR data
ESTTULSA	2/	Specifies if the 'Tulsa' method is used when estimating missing daily amounts from surrounding stations
CONVEC	2/	Specifies if the convective option is to be used and sets the convective radius
MDREST24	2/	Specifies if and how MDR data are to be used to

Technique	Notes	Description
		estimate missing 24 hour precipitation at stations in the defined network
MDREST6	2/	Specifies if MDR data are to be used to distribute daily amounts at stations which have missing less than 24 hour data
WTEST24	2/	Specifies if estimated daily precipitation values for all stations will be written to the PPDB
PP24MAX	2/	Specifies the maximum precipitation amount that is to be considered valid
PP24TIME	2/	Specifies if only reports that are consistent with the run period are used or if partial day reports should be used as daily totals

Techniques Not Often Used

MAP display control Techniques:

PRTPP24	2/	Specifies what values are to be printed for stations that only measure daily precipitation
PRTPP6	2/	Specifies if values are to be printed for stations that routinely measure precipitation at 1, 3 or 6 hour intervals
PRTMDR	2/	Specifies if a printer map of 6 hour MDR values and MDR derived precipitation is to be displayed
PRTMDR6	2/	Specifies if a comparison is to be made between observed 6 hour precipitation summations and MDR derived precipitation estimates for stations that have both
PLOTPP24	2/	Specifies if an AFOS graphics product is to be generated to plot daily precipitation values
PLOTDAYS	2/	Specifies the number of days for which an AFOS graphics product is to be generated
PRLASTDY	1/ 2/	Specifies if only the last day is to be displayed
PRTMAP	2/	Specifies whether to print computed MAP values

General display control Techniques:

METRIC	1/ 2/	Sets the English/Metric option for output
NOUTZ	1/ 2/	Sets the time zone number for output

Technique	Notes	Description
NOUTDS	1/ 2/	Specifies if output should be in daylight or standard time

Computational control Techniques:

NOEST6HR	2/	Specifies if missing 6 hour summations should ever be estimated from surrounding stations

Techniques Not Used For Forecasting

Debug control techniques:

PPDEBUG	1/ 2/	Sets the debug codes for Preprocessor Component routines
PPTRACE	1/ 2/	Sets the trace level for Preprocessor Component routines

Notes:

1/ The Technique is used by other Functions and will apply to all Functions unless changed between COMPUTE commands.

2/ Techniques are either Universal or Nonuniversal depending on whether or not their values can be changed during the COMPUTE of a Function. Universal Techniques are assigned a single value for the COMPUTE of a Function. Nonuniversal Techniques can be changed within the COMPUTE of a Function.

The Nonuniversal Techniques are:

MDRONLY
MDRDIST

All other Techniques are Universal.

Description and Guidelines for Specific MAP Techniques

This following is a description and guidelines for some of the Techniques that are used to specify options for Function MAP.

1. CONVEC

Description: This Technique determines if a convective radius will be used to limit the stations used to estimate daily amounts at a station with missing data. All estimators in each quadrant beyond the specified radius are ignored. CONVEC can be used with the original NWSRFS procedure or the Tulsa method. CONVEC will not be used for stations which use significance weights.

Guidelines: This Technique can improve the estimate of missing station amounts during convective events. It should not be used during general rainfall periods. The selection of the proper

convective radius can be tricky. The convective radius should be both a function of the size of the rainfall areas and the network density. If the radius is smaller than the average distance between stations, most of the missing amounts will be set to zero. This will result in an underestimation of the rainfall rather than the typical overestimation that occurs during convective events in areas with a lot of criteria stations.

2. ESTTULSA

Description: This Technique determines if the original NWSRFS procedure for estimating missing daily amounts (ESTTULSA off) or the 'Tulsa' procedure is used. This Technique has no effect on stations which use significance weights.

Each station has up to 5 stations per quadrant to use for estimating missing amounts (5 stations per quadrant are always available except near the edge of the RFC area). If all stations in a given quadrant are missing, the original NWSRFS procedure ignores the quadrant while the Tulsa method assumes that no precipitation occurred in that direction and thus uses zero as the estimator for the quadrant.

Guidelines: During general rainfall the original NWSRFS procedure is probably best, while during convective rain periods the Tulsa procedure is undoubtedly an improvement. When there are sufficient data so that there is always an estimator with data in each quadrant, both methods give the same result. The Tulsa method has been shown to produce about ½ the bias of the original NWSRFS procedure in an area with frequent convective events and a significant number of criteria stations.

3. PP24MAX

Description: This Technique specifies the maximum precipitation total allowed for any day in the run. It applies to a full or partial day total or the sum of 1, 3 or 6 hour values. If the Technique is on, any totals or sums that exceed the specified value are set to missing and a message is printed.

Guidelines: This Technique provides a crude quality control check and probably should be used to remove bad reports as long as the proper upper limit is supplied and the resulting messages are carefully monitored. If the runs are not monitored carefully, valid excessive precipitation amounts could be discarded.

4. PP24TIME

Description: This Technique determines if precipitation totals that do not correspond exactly to the period being run are used. Normally, only totals that represent the exact time period being run are used (e.g., only full day reports are used for a full day run and only 12-hour sums are used for a 12-hour partial day run). If this Technique is off, there is no check as to the period represented by the precipitation report (e.g., a 12-hour report would be treated as a daily total for a fully day run).

Guidelines: This Technique should be on (global default) if additional rain could have occurred after a partial day report was made. In this case, partial reports are not used and the values for these stations are estimated. Note that the estimate could be less than the partial report. The Technique should be off if, in most of cases, little or no precipitation occurs after a partial total is reported (i.e., if full-day totals are only reported when additional rain occurs and thus partial reports represent full-day totals if they are not updated).

5. MDRONLY

Description: For all the MAP areas for which MDRONLY is turned on, the 6 hour MAP values are computed, if possible, completely from MDR derived precipitation values. No station data are used for these areas. The MAP estimates are a simple average of the MDR derived precipitation for all MDR boxes that affect the area. MDRONLY cannot be used to get MAP estimates for areas which are specified as not being able to use MDR data or when any of the needed MDR box values are missing.

Guidelines: This Technique should be used carefully. The user needs to be careful so as not to use MDRONLY on areas for which satisfactory estimates of MAP have been determined using station data. The most recently computed MAP estimate for a given period overwrites the previous estimate on the Processed Data Base. MDRONLY should probably only be used when little or no station data are available.

6. MDRDIST

Description: For all MAP areas for which MDRDIST is turned on, the distribution of daily MAP values into 6 hour values are completely based, if possible, on MDR derived precipitation values (i.e., the daily amount is based on observed and estimated station data while the time distribution is based on MDR). As with MDRONLY, a simple average of all MDR boxes affecting the area is used and the Technique is turned off for areas that cannot use MDR or days with missing MDR data.

Guidelines: Some experimentation is needed, but this Technique should be quite useful especially in areas with very few stations that make routine 1, 3 or 6 hour observations of precipitation.

7. MDREST24

Description: This Technique controls the use of MDR derived precipitation for estimating missing station amounts. When turned on, MDR data will be used whenever available to estimate missing amounts for all stations that can use MDR rather than using data from surrounding stations to make the estimate.

The MDREST24 Technique has the following levels:

- o use MDR data only to fill in zero amounts

- o use MDR data to estimate precipitation up to a specified amount

- o use MDR data to estimate any amount

Guidelines: For user's that have a lot of criteria stations, the use of MDR to fill in zero amounts seems quite promising. Using MDR to estimate amounts greater than zero is questionable. There does not seem to be a consistently good correlation between observed precipitation and MDR derived precipitation.

8. MDREST6

Description: This Technique controls the use of MDR derived precipitation for estimating missing 6 hour station precipitation distribution values. When turned on, MDR data will be used to estimate missing 6 hour distributions for all stations with such data that can use MDR rather than using data from surrounding stations to make the estimate.

Guidelines: As with MDRDIST some experimentation is needed, but this Technique should be quite useful when stations that routinely have 6 hour summations are quite a distance apart.

9. NOEST6HR

Description: When this Technique is turned on, missing 6 hour station distributions are never estimated from surrounding stations. They can still be estimated from MDR data. If they are not estimated, the distribution of MAP is only based on observed 6 hour summations.

Guidelines: This Technique was added to see what was the CPU time cost and benefit of estimating missing 6 hour station distributions from surrounding stations. Until this is determined, it is recommended that Technique NOEST6HR be set to off (this is the Global default).