IX.2.2B-SYSTEM ADDING OPERATIONAL FORECAST PROGRAM FUNCTIONS AND TECHNIQUES

This Section describes how to add Functions and Techniques to the Operational Forecast Program.

The structure of the Hydrologic Command Language allows new software to be added to the Operational Forecast Program. Testing of the basic computational logic should be done with a test driver program to execute the new Function independently of the Operational Forecast Program. The database read/write routines can be used for interfacing to the OFS data files if necessary.

When testing is complete, the new software is defined as a Local Function using the DEFINEL command. This provides an opportunity for final testing since the Function is available only to the developer.

If it is decided that the Function should be for general use for all users then it is defined as a Global Function using the DEFINEG command. The Function is then available to all users.

In a similar manner, Techniques are defined as Local which means their use is restricted to Local Functions. They can be redefined as Global Techniques when they are to be available to all users.

When a Function is written, Technique values can be used to check if a Technique is to be executed. These values can be local variables or contained in common blocks.

The value of Techniques and any Argument associated with the Technique can be obtained by calling routine HPASTA for Techniques that have Arguments or HPAST for those Techniques that have no Arguments (see Section IX.3.0B).

The Argument values in the array returned from HPASTA (IARRAY) are stored in the order defined with the Technique. The different types of Arguments (integer, real, character string, logical and date) may require special handling to extract the value from IARRAY:

- Integers - no special handling:

  Example: IN=IARRAY(1)

- Real - must be switched or equivalenced:

  Examples: CALL USWITC (IARRAY(1),RVAL)
  or
  EQUIVALENCE (IARRAY(2),RVAL)

- Character strings - call HGTSTR to expand the deblanked string (see Section IX.3.0B)

- Logical - no special handling

Example: L=IARRAY(7)

- Dates - call HSETDY to replace a '*' date with the date specified by the TODAY command or the System date (see Section IX.3.0B)

Universal Techniques are Techniques that are applied over a whole forecast area. Therefore, the Technique value can be set at the beginning of the Function and will not change. Call HPASTA once for each Technique to get the values.

Nonuniversal Techniques can be set according to identifiers (Segments, Forecast Groups, Carryover Groups or areas) specified in the SETOPT command.

The routine HIDCHK sets any Techniques and Arguments that match the specified identifier with values set by the SETOPT command and will return any MOD cards that match the identifier. See Section IX.3.0B for a description of routine HIDCHK.

When dealing with Nonuniversal Techniques, first call HIDCHK and then HPASTA for proper setting of Techniques and Arguments.

In summary, routines HIDCHK and HPASTA interface with a Function as follows:

- Each Function has default Technique values and associated Argument values for each Technique that are automatically preset before each Function is called.

- Using the SETOPT command at runtime, the user can override any default Technique or Argument value.

- When the COMPUTE command is run, a call to the routine for that Function is executed. The Function should call HPASTA once for each Universal Technique.

- The Function routine should call HIDCHK for each Segment, Forecast Group or Carryover Group to set the appropriate Techniques and Arguments and get the MODs which apply to that particular identifier and call HPASTA or HPAST to get the new values.

Function Linkage to HCL - Summary

The following is a summary of the steps required to integrate a Function into the Operational Forecast Program:

- Code and test Function using a test driver program.

- Identify Techniques and Arguments to be associated with Functions and Techniques.

- Modify Function code to include calls to HIDCHK for loop control

and HPASTA to get Technique and Argument values and to process MOD cards.

- Define the Techniques and Functions and note Function number (nnn).

- Modify Function by replacing Function routine name or entry point with FUNnnn or code a front end routine as SUBROUTINE FUNxxx with a call to the Function.

- Recompile and link the Operational Forecast Program with FUNxxx version of the Function or front-end routine.

How to Use HCL to Execute Functions

The following is a summary of the steps required to use an integrated Function:

- Set default values for Arguments and Techniques using the command SETLDFLT or SETGDFLT.

- Define any Named Options that are needed using the command DEFINEL OPTIONS. They are invoked at runtime with the INCLUDE 'name' subcommand of the SETOPT command.

- Define any Procedures that are needed using the command DEFINEG PROCEDURE or DEFINEL PROCEDURE.

- At runtime, a COMPUTE command will initiate a call to the Function routine. Techniques and Arguments are set to default values as specified when they were defined with the command SETLDFLT or SETGDFLT.

- When the Function routine calls HIDCHK, checks are made for options set for this run (from an INCLUDE 'name' command or specified directly). If the options are Universal, they replace any previous default values. If the option is specific to a Segment, Forecast Group or Carryover Group it is set only if it matches the name specified in the call to HIDCHK. Any MOD cards that are Universal or match the identifier will be returned.

- Subsequent calls to HIDCHK first reset options to defaults and then continue as described above.

- Options remain in effect for the entire run unless specifically cleared with the CLEAR command.

- Technique and Argument values are obtained by calling routine HPASTA or HPAST. The routine returns an array containing the Technique value and any Argument values in effect at that time.