# CRSS Rules Documentation Guidelines

## Overview and Motivation

This document details new standards for documenting rule sets, their associated functions, and input data for CRSS. This effort is being undertaken to create a “living document” that users can access to understand the logic and operation of rule sets within CRSS.

## Rules

Within the model rules are documented by entering a *Description* in the Rule Editor. The description has three parts:

* **Execution Constraint**: the criteria which must be met for the rule to be evaluated.
  + E.g. Month is May.
* **Description**: a plain English explanation of what the rule does. If there is model input data referenced by the rule include the slot names where the data can be found and include the slot in the Input Data Report Group.
  + E.g. Sets the number of days at power plant capacity given the spring hydrologic classification. Each hydrologic classification has a range for the days at power plant capacity found in slot DaysAtPowerPlantCapacity.
* **Slots Set**: slots whose value the rule updates.

Rules may also have comments typed directly into the rule RPL text using Comment the ‘#’ operator as necessary.

E.g. The rule writer might enter comment *#For August* above a statement which calculates the outflow given certain criteria specific to the month of August.

## User Defined Functions

Functions, including global functions, defined by the user are documented within the model by entering a *Description* in the Function Editor. The description has four parts:

* **Arguments**: information the functions needs to execute. Arguments are listed in order and include a description of the units of the argument and the time step when appropriate. Not all functions will have arguments.
  + - E.g. Reservoir object, the current month and the previous storage of the reservoir
* **Description**: a plain English explanation of what the function does.
  + E.g. Calculates the number of days required to down ramp from power plant capacity to base flow.
* **Returns**: the value the function returns including the units. Functions can only return one value.
  + E.g. The outflow of Lake Mead in cfs.
* **Constraints**: maximum or minimum values the function will evaluate to should the constraint be exceeded.
  + **E**.g. Function returns the maximum reservoir release if the calculated release is greater.

Function may also have comments typed directly into the function RPL text using the ‘#’ operator as necessary.

## Input Data Slots

Slots called by rules, or rule specific functions, which contain important user input data should be documented by entering a *Description* in the **Slot Editor** and including them in the Input Data Report Group.

E.g. Slot contains flow values in cfs for the down ramp rate based on the hydrologic classification of the year.

## Rules Report

A Model Report generated using the Output Manager for the rule set. The report is layout is:

* **Text**: a header describing the contents of the report.
* **Table of Contents**
* **Rules Report Group**: all the rules listed in order of firing (reserve of their priority). This is order is chosen to make the report the most readable to someone unfamiliar with how the rules work since this is how the rules will execute.
* **Functions Report Group**: functions, including global functions, defined by the user that are referenced by the rules. Functions are listed in alphabetical order. Global functions called buy multiple rule sets maybe included in a separate place in the report.
* **Input Data Report Group**: slots called by rules, or rule specific functions, which contain important user input data.

The report is generated as an html document. Report Groups are configured using the RBS Ruleset Editor. All report groups should reference the Loaded Ruleset.