



Topic:

The purpose of this TechNews is to provide updates on Fire Program Analysis (FPA) identified defects that are scheduled to be fixed along with changes in, or added functionality.

Defect:

Initial Response Simulator (IRS) – Head attack always fails: Regardless of the percent of Head Attack fires that are identified per Fire Workload Area (FWA), the IRS never attempted to contain a fire with a Head attack, it always used a Tail or Parallel Attack if defined.

Fix – IRS will model the user specified percent of Head Attack fires first, if Head attack fails the model will automatically try to contain the fire with a Tail Attack.

Expected result: A percentage of fires will be contained at a smaller size than with a Tail Attack.

Changes in Functionality:

Work Shift Limit – Work Shift Limit length will remain at 18 hours but the shift will start once a fire resource is dispatched to a fire event rather than at the start of their daily start time.

Expected result: A percentage of fire events with **Outrun** status and fire resource Activity being reported as “**reached Work Shift Length**” will be contained.

Discontinuous FWA Travel Time Point (TTP) calculation – The TTP calculation will be calculated based upon the polygon that has the largest number of ignitions, if the number of ignitions is equal for all polygons making up the FWA then the TTP will be calculated based upon the polygon that is largest in size.

Validation:

All Fire Planning Unit’s (FPU’s) should continue to work on Validation and review the output reports to determine the impact that the above defects and changes have on each FWA’s Initial Attack (IA) success.

- Take into consideration the percent of fires not contained due to the Defect and Changes described above while working toward validating each FWA and then your FPU.

- Continue with your validation efforts knowing that the percent of fires that are not being contained due to the above Defect and Changes will be contained once incorporated in an upcoming release. When you have obtained the percent IA Success that represents your historic level, assume those fire affected by the above will be contained.
- You should continue with developing your investment options starting with current and proceeding with Plus and Minus for Preparedness and Fuels.

Clarification of “Burn Index (BI)” as used in FPA- IRS:

Terms:

- **Crown fire** – A fire that burns in canopy fuels
- **Passive crown fire** – a crown fire in which individual or small groups of trees torch out, but solid flaming in the canopy cannot be maintained except for short periods
- **Active crown fire** – a crown fire in which the entire fuels complex becomes involved, but the crowning phase remains dependent on heat released from the surface fuels for continued spread.

Within the FPA Fire Event Scenario process, fire behavior is calculated for each fire event. The fire behavior attributes calculated are Rate of Spread (ROS) and Flame Length. **The Flame Length is used to calculate a Burning Index (BI) by multiplying it by 10 to provide a derived BI.**

- BI as found on FPA reports is not a National Fire Danger Rating System (NFDRS) calculated Burning Index rather a BI calculated using Flame Length multiplied by 10
- The NFDRS calculated BI divided by 10 equal Flame Length.

Using either of these processes allows the translation to be made between FBPS and NFDRS.

FPA is modeling potential crown fire not just surface fire; NFDRS does not consider the added potential energy and increased flame lengths associated with crown fire. Because NFDRS does not model crown fire FPA derived BI’s will not match any NFDRS calculated BI’s for fires with calculated fire behavior describing them as crown fire.

Below are examples of NFDRS and FPA Fire Behavior calculations demonstrating the difference in BI and derived BI, including a crown fire as calculated by FPA.

Inputs are as follows:

	NFDRS	FPA Fire Behavior
Fuel Model	I	165/TU5
1 hour	4.2	4.2
10hour	5.22	5.22
100hour	13.23	13.23
1000hour	15.0	15.0
Herb	4.20	4.20
Woody	60.00	60.00
Wind Speed	9	9
Slope	18	18
Stand Height	57.45ft	57.45ft
Crown Base Height	1.64ft	1.64ft
Canopy Cover	55%	55%
Crown Bulk Density	.03	.03

FPA Fire Behavior Calculations - Note: Fire Type and Crown Flame Length

The preceding calculations can be made using Personal Computer Historic Analysis (PCHA) Version 1.3.0, Patch 1j. Calculation module is found under the Utilities tab, FBPS Calculations.

NFDRS Calculations – Note: **Burn Index (BI)**

NFDRSCalculator

Site
Fuel Model: I - Heavy Slash
Slope Class: 2 : 26 - 40%
Use 88 Model:

Weather
Temperature: 95
20' Wind: 12
SOW: 0 - Clear

Fuel Moistures
1 - Hr FM: 4
10 - Hr FM: 5
100 - Hr FM: 13
1000 - Hr FM: 15
Herb FM: 76
Woody FM: 90

88 Model Inputs
Season: 3 - Summer
Woody Greenness: 20
KBDI: 100
Rain Event:
Deciduous Shrubs:

Calculated Indices
SC: 39
ERC: 286
BI: 220
IC: 58

Fuel Model Parameters KBDI Calculator Calculate

The National Fire Danger Rating System (NFDRS) calculations can be made using Fire Family Plus, Version 4.0, Beta 3