



NC Smoke Management Technote 15 – October 10th, 2008
Smoke Modeling Information Requirements
 Revised June 3rd, 2016



This Tech Note is intended to give natural resource practitioners a standardized form to use when requesting an Atmospheric Dispersion Model (ADM or Smoke Model). It is imperative that the information be as accurate and complete as possible. The form is the bare minimum needed, any additional information in describing the fuels, fuel conditions, etc. can only help your model run be as accurate as possible. If not, it can be “garbage in, garbage out”. It is essential to provide key information to the modeler. This includes: firing start time, fire progression timeline as to blackened acres, end time for firing, and status of flaming / smoldering combustion at the end of the burnout window. Also the accuracy of the smoke management burnout window needs to be evaluated (when it begins and when it ends).

- **Cumulative Ac's Blackened** – This needs to be a description of how many ac's are on fire and at what time. This allows the modeler to enter different release amounts into the model for smoke production. Example – 100 ac tract that is being fired by hand. You know as burn boss that it will take you 5 hours to burn this particular tract and that you will not be able to start firing until 1130 hours. Hour one, beside “local time” and under the “hour of active fire phase” should be 1230. Then you use your professional best judgment (PBJ) to determine how many acres you will be able to light throughout the 5 hour burning window. The acreage is cumulative, so your input should look something like Hr1 – 25 acres, Hr2 – 40 acres, Hr3 – 55 acres, Hr4 – 75 acres, & Hr5 – 100 acres.
- **Fuel Type** – You should use one of the standard 13 fuel models (Anderson), NFDRS models, or one of the “new” 40 fuel models (Scott & Burgan). Both publications can be found online or may be located at your district office. Remember to ask yourself, “What is carrying the fire?”
- **Slope Position & Aspect** – flat, bottom of the slope, mid slope, or ridge top.
- **Fuel Loading (tons/acre)** – How many tons per acre are on the tract/unit before you burn it? How did you determine this information? Fuel Characterization Classification System (FCCS), Fire Behavior Fuel Model, or NFDRS Fuel Models, or NCFS Smoke Management Guidelines.
- **Consumption (tons/acre)** – How much of that total fuel loading is going to burn? How are you determining this? NC Smoke Management Program (NC SMP), Photo Series.
- **Percent Fuel Moistures** – This data should be taken from your closest representative RAWS or by field sampling from the burn unit
- **Wind Direction (cardinal direction)** – Expected wind direction for day of the burn (this can be acquired from the NWS Fire Weather Forecast (FWF) or requested from a Spot Forecast).
- **Transport Wind Speed (miles per hour)** – Taken from burn plan or NWS FWF or Spot Forecast.
- **Mixing Height (feet)** – Be sure to list if mixing height is above ground (AGL) or mean sea level (MSL).
- **Mid-Flame Wind Speed During Active Burning (miles per hour)** – Remember to use the proper reduction factor to make your wind speed a “true” mid flame wind speed.
- **20 – Foot Wind Speed (miles per hour)** – This can be obtained from NWS FWF or Spot Forecast.
- **Humidity (percent), Minimum 24 Hour Value & Maximum 24 Hour Value** – Obtained from NWS FWF.
- **Temperature (°F) – Minimum 24 Hour Value & Maximum 24 Hour Value** – Obtained from NWS FWF.
- **When is Long Term Smoldering Predicted to End?** - Important when dealing with deep organics.
- **When Was The Last Time This Area Had a Prescribed Fire Or a Wildfire?** – How long has it been since this site has had any fire?
- **Does The Unit Have Downed Woody Material From Storm, Insect Damage or Silviculture Treatments?** – Any ice, heavy wind damage? Any dead and down beetle killed trees? If so, will it burn (what is its size & fuel moistures?) Has the area been thinned or any other forestry treatment that has caused woody debris to be on the ground? If so, will it burn (what is its size & fuel moisture)? Describe.

Atmospheric Dispersion Model Smoke Analysis Request Form

Name of Burn Unit				Date of Burn					
Lat./Long. (DD M.MMM)				Shapefile Attached?	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
<i>Smoke Burnout Window</i>	<i>Start Time</i>			<i>End Time</i>					
Planned Ignition Information	Hour of Active Fire Phase (add more hours if fire is active for more than 8 hours)								
	1	2	3	4	5	6	7	8	
Local Time									
Cumulative Acres Blackened									
Fuel Model (Fuel Type)									
Slope Position & Aspect									
Fuel Loading (tons/acre) Method Used?									
Consumption (tons/acre) Method Used?									
Percent Fuel Moisture	1-Hr		10-Hr		100-Hr		1000-Hr		Duff
Weather Forecast Information <input type="checkbox"/> NWS spot forecast <input type="checkbox"/> FWF <input type="checkbox"/> RAWS <input type="checkbox"/> PWF <input type="checkbox"/> Hourly Weather <input type="checkbox"/> Other _____									
Range in Wind Direction (degrees)	Transport Wind Speed (miles per hour)	Mixing Height (feet above ground level)			Mid-Flame Wind Speed during Active Fire (miles per hour)		20-Foot Wind Speed (miles per hour)		
Relative Humidity (%)					Temperature (°F)				
<i>Minimum 24-Hr Value</i>		<i>Maximum 24-Hr Value</i>			<i>Minimum 24-Hr Value</i>		<i>Maximum 24-Hr Value</i>		
Other Information									
When is <u>long-term smoldering</u> estimated to end?					Date		Time		
If long-term smoldering or flaming combustion is expected to continue through the night, evaluate for Super-Fog. Are indices or weather parameters meeting critical threshold values? If yes, when are they occurring and are they occurring at the same time?					Parameters	√	Hrs occurring	Sync Hrs	
					ADI				
					LVORI				
					Turner Stability				
					RH				
					Temperature				
20' Wind Speed									
% Cloud Cover									
When was the last time this area had a prescribed fire or a wildfire? Please describe.									
Does the unit have downed woody material from storm, insect damage, or silvicultural treatment? If yes, please describe.									