**PBAT Burn Plan Template**

**Users’ Manual**

**Introduction**

The PBAT burn plan template is designed to be self-instructional if used as an Excel spreadsheet. However, some of the tools used to assist the user depend upon at least a small degree of proficiency with Excel and a thorough understanding of prescribed burning techniques and science. The template is not intended to be a “cookbook” solution to writing a prescribed burn plan, but will be useful for trained individuals who may not have easy access to some of the reference material they studied in their class. The template will also help all users take a similar approach to preparing a plan. We hope this will lead to sharing ideas and experiences. The template will likely continue to be modified and improved, at least for a few years, until we reach some general agreement on its utility as it is at that time. The latest version of the template is always posted on the PBAT website at <http://pbatexas.org/Resources.aspx>. Look under Forms for the template and make sure you have the most recent one before you start a burn plan.

One of the features of Excel that we have used is Worksheet Protection. This is a feature that allows the user to only write in cells where it is okay to write. He or she cannot add or delete rows, columns, or cells accidentally. This makes it easier for the beginning Excel user to work with the spreadsheet without the fear of making a big mistake and not knowing how to recover. However, if you know how to work with Excel, you can unprotect the worksheet and make whatever changes you want. The password to unprotect the sheet is the number 6. A reminder of the password is at the bottom of the main worksheet.

Another feature of Excel is Cell Comments. These are notes that can be added to a cell that give suggestions on what is expected to be entered in the cell. Any cell with a small red triangle in its upper right corner will have a comment included. Just hover over the cell with the cursor, and the comment will pop up. If you have suggestions to improve the comments, or any other features of the template, please send them to the Dave Redden at [dredden00@gmail.com](mailto:dredden00@gmail.com).

When starting a new plan from a downloaded copy of the template, the first step should be to save the spreadsheet with a new file name. Usually this will involve the landowner’s last name and a date, such as Landowner John 120930.xls, where the date is YYMMDD that the plan was prepared or submitted for review. You can make up your on system for the file names. But remember that you will submit an after-burn version of the plan also. It could be the same file name with a different date. Both are posted on the PBAT website along with other documents that are used in preparation and execution of the burn.

**Page 1 – General Information, Previous Results, Burn Justification**

Much of this page is self-explanatory. Just hover over the cell and read the comments.



* Enter your PBA name at the top in the large merged cell (row 3) under PBAT Prescribed Burn Plan.
* The Plan Number is assigned when you submit a burn plan. You have to log in on the PBAT website to do this. All persons authorized to be plan reviewers or burn bosses and all PBAT representatives and officers and committee chairs have been given this authorization. However, they must log in themselves. If you need authorization to log in, contact your PBAT representative and request it.
* The TDA license number is not required unless the preparer is a Certified Prescribed Burn Manager. In most cases, the preparer is expected to be the landowner. However, some may request help from others. The plan must be reviewed and found complete before it is received and posted on the PBAT website. Trained and experienced persons in your PBA and approved by the PBA board or officers must review the plan. So, even though it is prepared by the landowner, who may not be trained in plan writing, he or she can make a first pass at it. This is educational for the landowner and makes it more likely that he or she understands the issues that are considered in planning the burn.
* The Date Plan Filed is the date the plan is posted on the PBAT website. This should be at least 24 hours before the burn and likely more than that. Some of the blanks cannot be filled in at that time. Those that cannot will be completed in the after-burn report*.*
* The Expiration Date is assigned by the PBA reviewer or burn boss and will be based on PBA practices and policies. Typically burn plans need to be resubmitted if seasons change or objectives of the burn cannot be met with the prescription used. Ninety days is often a reasonable time to get a burn done without a revised plan.
* County 1 is the primary county of the burn. If the burn unit crosses a county line, then show the second county in County 2.
* The GPS coordinates are for the address of the ranch. Typically this is the gate to the ranch or where emergency vehicles would come if they were needed. Although few VFDs currently use GPS, this will likely change in the near future. Also, it helps volunteers find a ranch if they are not familiar with the area but do have a GPS in their vehicle.
* GPS coordinates are recommended in decimal degrees, but you can use whatever units you prefer as long as you show the units clearly. Units are easy to convert. If you have Google Earth®, for example, use whatever units you prefer and you can switch your preference at any time.
* Burn boss or fire boss. Name the person you (the preparer) expect to be the burn boss. If that person changes after you submit the plan and it is posted, then you can resubmit the plan with the change prior to the burn. If a different burn boss is actually used on the day of the burn, then show who was actually in charge in the after-burn report.
* See cell comments for the rest of the page.

**Page 2 – Notifications Required**

Each county may have slightly different requirements for who needs to be notified when a prescribed burn is conducted. Let your plan reviewer or others in the PBA help you if you are unsure. Each PBA can prepare its own list of contacts and provide this for all members. A good way to do this would be to fill in all blanks common to a county or PBA and make a template for that county or PBA. The disadvantage of this is that each time a new PBAT template is released, the county or PBA templates will need to be redone.



* The columns for Talked To, Date, Time, and Notes probably will not be completed on the initial plan submitted. A revise plan with information may be submitted just before the burn or included in the after-burn report.
* Notifications during a burn ban, if you have permission to burn during a burn ban, will likely be different than they are when a burn ban is not in effect.
* See cell comments for more information.

**Page 3 – Description of the Burn Unit, Fuels, Firebreaks, Procedures Planned, Special Precautions**

The Cell Comments will likely guide you through most of this page.

* **Live Fuel (Type, Density, and Size)** -General description of the burn unit live fuel vegetation. Example: Sparse cedar (juniper) in dead pasture grasses with around 25 percent ground cover of cactus and mesquite.

Note that this is not where you need to get specific with your prescription. This is just the general description of what you plan to burn. Ranges of LFM and size and density of vegetation are okay. You can go to the Live Fuel Moisture worksheet (one of the Excel worksheets with the burn plan template) and there is a description of LFM with a link to a TFS site to get measured data around the state. This may be useful to get an idea of your LFM without having to measure it. <http://www.wrh.noaa.gov/mso/fireweather/nfdrs.php?wfo=mso&parameter=fm1_f>

* **Dead Fuels (Description, Moisture, and Time-Lag)**

Given a general description of the burn unit dead fuel vegetation. Example: Heavy dormant/dead native grass cover and other 1-hr fuels. Scattered 10-hr fuels and occasional brush piles. Several standing dead trees that may need to come down.

Time Lag is the time it takes for the fuel to reach equilibrium conditions following a change in relative humidity. Grass and other small dead vegetative matter less than 1/4-in diameter are 1-hr fuels. Twigs about 1/4-in to 1-in diameter are 10-hr fuels. 1-in to 3-in are 100-hr fuels. 3-in to 8-in are 1000-hr fuels. Please estimate the percent of each type of fuel in the burn unit.

Moisture: 1-hr fuel moisture can be estimated by dividing the relative humidity by 5. Fuel moisture can also be measured by weighing fuel samples before and after drying in a microwave oven. The difference in these two measurements is the amount of moisture. That amount divided by the dry fuel weight is the moisture percent.

Moisture of extinction is the moisture level that inhibits fire. For 1-hr fuels, that can be 12% (short grass) to 25% (tall grass) range. If your moisture level is above this range, the burn will be difficult to initiate and maintain.

* **Topography and Elevation**

Give a general description of the burn unit topography (elevation change). Example: Mostly flat with gentle rolling terrain. No more than 20 ft elevation change over whole burn unit with no steep rises.

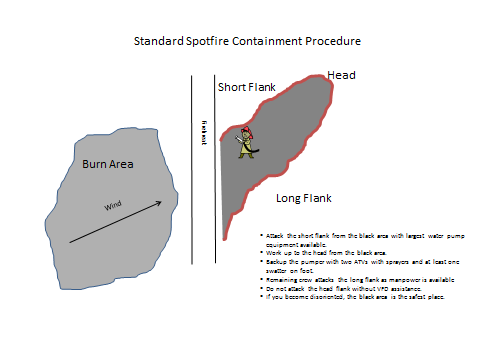
* **Preburn Factors -** These items need to be more specific. These are the conditions you will have before the burn boss gives the approval to start the burn.
  + **Fireguards: specify width, attach map -** See Cell Comments for various types of firebreaks. Fill in the width in feet of each type of firebreak that will be used. The “black line” blank applies to areas that are specifically preburned (usually between firebreaks of some sort) and are not the same as blacklines created by backburning that become flank fires and then a head fire. The backburn type of blackline must be initiated from one of the other types of firebreaks and only those should be shown in this section.

Under the “Other” category, please show width and type of fire break perimeter. This may be in addition to other fire breaks. Ranch roads or rivers, ponds are examples.

* + **Crew size, (minimum number required) -** Please indicate the minimum number of members of the crew required to execute the plan. Be careful and do not estimate too high based on the optimistic number you might expect to be there. If you say you need 10 crew members and you only have 9 show, you are out of your plan specifications. The question is, “What will it take to do this job safely?” If you show a range, such a 10-12, the number that matters is 12. The number of crew members should be consistent with the equipment required and the ignition sequence.
  + **Protection Needs (buildings, power lines, hunting blinds, feeders, etc., see map) -** Show on the map and describe here and special fire protection needs either inside or outside the burn unit. Indicate how you plan to address these needs.
  + **Ignition Procedures, (see map)** - Describe the ignition sequence. Show where the burn will start, how many drip torches are required, direction and path that drip torches will take and where they will stop for all steps of the burn, including backburn, strip fires, flank fires, and head fires. This information can also be show in the text box below the map or on a separate attachment if preferred.
  + **Smoke Sensitive Areas, (see map)** - Any smoke sensitive areas should be shown on the map (which may be a separate attachment). TCEQ guidelines for smoke management say that you cannot put smoke on sensitive receptors, which includes humans, animals, and plants that are adversely affected by the smoke. Further, if there are inhabited residences within 300 ft of the burn area, you must have the residents’ written permission to burn. Any residence within 300 ft of your burn perimeter should be identified on the map.

If you run a smoke model to forecast the smoke, please attach the results as a separate document.

* + **Special Precautions, (see map) -** Describe any special precautions other than the special fire protection needs described above. These might be nearby roads or airports that are a concern if smoke is blowing in their direction. Others may be special topography issues that could hinder maneuvering around the firebreaks, such as deep gullies or small streams. Another might be a reminder that a portion of the firebreak will depend on wetlines due to inadequacy of mineral soil breaks or other methods of firebreaks. Locked gates might require more wire cutters with crew members or alternative escape routes identified. Anything unexpected that might affect the safety of the crew or the success of the burn should be noted and reviewed with the crew. Minimize surprises.
  + **Contingency Plans (see attachment if required)** - If you have contingency plans for an escaped fire, describe them here or in an attachment. Some PBAs have fairly elaborate contingency plans due to the size of the properties they burn. These can involve how they will initially attack the escape, depending on whether it is on the landowner’s property or if it has gone onto someone else’s property. The plan may also indicate at what point the burn boss will call for VFD or other assistance. For other PBAs working with smaller burn units, the contingency plan is to immediately call for VFD assistance and fight the escape until help arrives. In all cases, the crew members need to understand a basic approach of wildfire fighting, which is to fight the fire from the black area.

****

* Attack the short flank from the black area with largest water pump equipment available.
* Work up to the head from the black area.
* Backup the pumper with two ATVs with sprayers and at least one swatter on foot.
* Remaining crew attacks the long flank as manpower is available
* Do not attack the head flank without VFD assistance.
* If you become disoriented, the black area is the safest place.



**Page 4 – Equipment Needs**

This section is where you identify all the equipment needs for the burn to be conducted safely. Note that there are two categories: 1) the red box checked means that the equipment is required or the burn cannot be conducted safely; 2) the green boxed checked means that you expect to have this equipment onsite, even though it may not all be required. It is extra equipment available and may be used, but the burn could be conducted safely without these extra items. Examples could be extra ATVs with sprayers or other equipment in excess of the minimum requirements. The green box checked items are not restricted to just what the landowner might have himself prior to the burn. They can be any items that are brought by crew members in excess of the minimum equipment requirements. These may not all be known until the day of the burn. The actual equipment onsite should be recorded her for the after-burn report.

* **Tanks and Sprayers Required** - Exclude backpack sprayers. These are vehicle or trailer mounted units.
  + **Capacity, gal -** Show how much the tank on the sprayer or other device will hold.
  + **Mounted or Drag -** Please indicate if the sprayer is mounted on mobile equipment such as an ATV, truck, tractor, or is a drag tank (on a trailer pulled by a vehicle)
  + **Support Vehicle -** Please show type of vehicle required, such as:
    - ATV (4 wheeler)
    - UTV (Gator, Mule, Polaris, etc.)
    - Pickup truck
    - Brush truck (fire fighting truck)
    - Engine (large fire fighting truck)
    - Specialty equipment
    - or write in your choice.
  + **GPM** - Please show minimum pump capacity in gallons per minute if known. Note that centrifugal pumps do not have a single value for GPM. It depends on the pressure (nozzle opening). Indicate approximate value for normal operations, not the rated capacity at zero pressure.
  + **Gas/Electric** - Please show whether sprayer is gasoline or electric (battery) powered.
* **Other Equipment Needs**
  + **Drafting Water Source** - If a source of water such as a pond or pool or stream is available on site, please indicate so in the comments and tell where it is. Also show the location on the map. Note that tanks with drafting capability often have their own pickup lines. Please note if separate drafting pumps and lines are with the water source to allow tanks to be filled.
  + **Water Hydrant** - If water hydrants are available onsite, please describe their location and show them on the map. Note that hoses will likely be needed to fill tanks from hydrants. Please note if they are available at each location.
  + **Other Items** - These are generally self-explanatory. A fire weather kit can be a Kestrel or similar device or it could be other non-electronic devices, such as a sling psychrometer, wind speed meter, compass, or weather radios.

Under “No. Required,” either show only the number actually required if it is required and will be onsite or show “No. Required/No. Onsite” so that it is clear how many of any particular item are considered required to do the job safely versus how many are expected or were actually there. For example, if you need at least two drip torches, but you know you will have at least four, either show 2 under No. Required or show 2/4 or 2(4).



**Page 5 – Preburn Protection Needs, Insurance Information**

This section is an area you can be more specific about the protection needs mentioned above on page 3. It is in a checklist form to help you think of things you may have overlooked.

At the bottom of the page, there is a place to enter information about the landowner’s insurance carrier. The name of the insurance company should go in the cell to the right (see Cell Comments). You can also use this space to make any comments regarding the insurance. If more space is needed to discuss insurance or special protection needs, use the cell below call “Other.”



**Page 6 –Prescriptive Burning Conditions**

The prescription is where you need to pay close attention to the ranges of conditions you choose to achieve your objectives. Allow yourself as much flexibility as is practical to meet your objectives and conduct the burn safely. You want to avoid being out of your prescription with either the forecast of the weather for the day of the burn or the actual weather recorded.

* **Desired Prescription Blacklines** - (lines 168 – 180). Blacklines may be created before the day of the main burn or at the beginning of the main burn. A backburn can create blacklines. Be careful if you are burning multiple patches/sections in a single day with backburns to create blacklines. Some of the backburns may be started late in the day when humidity, temperature, and time are similar to the head fire. Do not set your blackline limits so tight that you cannot stay in prescription for the later burns. This is where your training should be most helpful for selecting the appropriate conditions. If you are not comfortable with making these choices, consult with your reviewer or other trained members of your PBA. The values are usually shown in ranges (low to high).
  + **Temperature** - Typically blacklines are burned under conditions where the temperature is lower, humidity is higher and wind is lower than for the main burn (headfire). This provides an extra level of safety when trying to burn large areas. When a blackline is formed as part of a backburn on a smaller area, and the flank and headfire are a continuous progression of the backburn, then the weather conditions for both blacklines and headfire and very similar. In situations where a series of small units are burned sequentially, blacklines may be created for the last unit after the headfires are completed for the previous units. For these situations, the conditions for the blacklines and the headfires are likely to be the same.

A practical lower limit on temperature may be just above freezing, or around 40 deg F. You do not want to have water supplies frozen. An upper limit is probably more safety related and depends on your crew. Around 100 deg F it is very difficult for most non-professionals to function well. Spot fires are also more likely in high temperatures since air-transported embers can last slightly longer and set fire to dry fuels more easily. Humidity and wind speed may be more critical than temperature.

* + **Relative Humidity** - The same precautions apply for humidity as temperature. An upper limit of around 60% RH is a reasonable estimate. Above this level, it is difficult to get fine fuels to ignite. They are usually at their moisture of extinction. On the low end, it depends on the fuel level, wind speed, and the experience of the crew. Fire behavior can change rapidly between 30% RH decreasing to 20% RH. At less than 20% RH with even light winds and an experienced crew, there is little room for error.
  + **Wind Direction** - Enter the range of wind directions that your plan requires, such as SE to SW. That means that any wind coming from direction between these two extremes is suitable. It does not mean that the wind is blowing from the SE to the SW, which would be an east wind. If the wind direction is not important, show “any” or “all” in the blanks.
  + **Wind Speed** - The wind speed is probably one of the least-well-defined values in the prescription, but one of the most important. The wind speed varies with height above the ground. Typically, the reported “surface” wind on the weather forecast is measured at 10 meters, or about 33 ft. You can also get a 20-ft wind speed, and it will be less than the “surface wind speed” by a small amount. Neither will be the same as your measured wind speed at eye level, or about 6 ft. There are ways to estimate the wind speed at eye level or at mid-flame height using factors that take into account the local vegetation and their effect on the wind speed decline from the unobstructed height down to the ground. However, unless you are modeling flame front speed or perhaps some other behaviors, it may not matter.

State law (TCEQ) says that you cannot conduct prescribed burns unless you have a predicted wind speed of at least 6 mph and less than 23 mph. You need to stay within these limits. These limits are primarily for smoke management and not for fire safety. However, they do not specify the height at which the wind speeds should be measured. As a result, the rules are interpreted differently by different practitioners of prescribed burning.

One reasonable interpretation might be to use the typical forecast values from the NWS for the day of the burn. That is if NWS forecasts the wind speed to be less than 23 mph (at 10 m) and greater than 6 mph (at 10 m), then you are probably within TCEQ requirements. Yet when you are onsite that morning and measure the conditions, your minimum speed at 6 ft may be less than 6 mph. Similarly, if you actually get up to 23 mph wind speed at 6 ft elevation, it is very likely your 10-m speed will be in excess of 23 mph. For these reasons, many burn bosses limit their upper wind speed measured at 6 ft to around 15-19 mph if it is continuous. (Pick a number not a range to enter for the limit.) These limits are usually based on your experience at similar wind speeds and the knowledge that wind is hardly ever constant, so gusts will be higher. It is also tempered by whatever the humidity is. High wind combined with low humidity is not as comfortable for burning (for safety considerations) as high wind with moderate humidity.

* + **Fuel Load** - The fuel load for a prescribed burn is the amount of dry dead 1-hr fuels on the burn unit, expressed in lb/ac. This is estimated usually, but it can be measured by clipping, drying and weighing the fine fuels in representative samples of the area. The fuel load tends to be variable, so you either estimate the areal coverage for representative samples or you just estimate the overall average fuel load and show it as a range of values. Experience helps do this reasonably accurately. Experienced ranchers or hay farmers know about how many bales of hay they can get per acre and this leads to weight of dry fuel per ac. Of courses, bale sizes vary from 70-100 lb for square (rectangular) bales to 3000 lb for large round bales. A typical round bale in Texas can vary from 800-1200 lb. depending on the diameter and height of the bale.

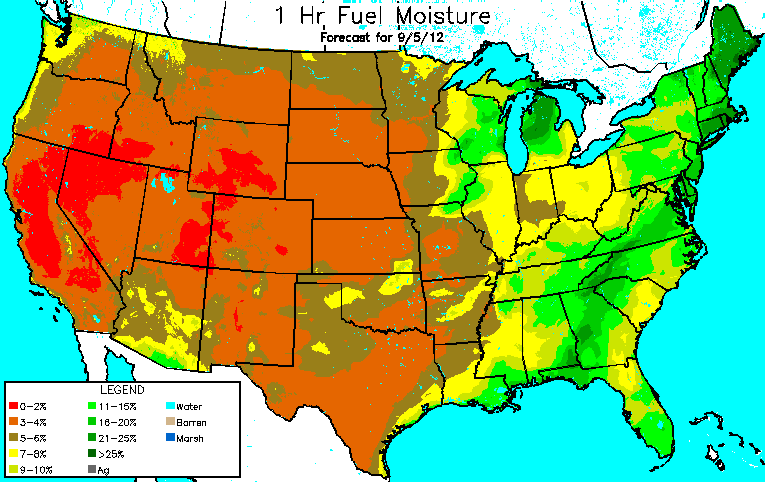
Precision in estimating fuel load may be no more important than knowing the exact wind speed at ground level. What you really need to know is whether you have enough fuel for a successful burn to meet you objectives. If your objective is to just get rid of rank grass and open up the area for new growth, then the fuel load only has to be sufficient to keep a fire going. Continuity of fuel is perhaps more important than the average amount overall. If you are trying to set back woody species (Juniper, mesquite, yaupon, huisache, etc.) or cactus, then you will need higher fuel loads. Less than 1000 lb/ac fuel load is unlikely to do much on species other than the fine fuels involved. Greater than 2000 lb/ac fuel load of continuous fuel makes a good fire that is likely to be effective for most purposes.

* + **Dead Fuel Moisture -** Dead fuel moisture can be estimated or measured. For fine fuels (1-hr fuel) the moisture can be estimated by dividing the relative humidity by 5. This does not work for 10-hr and 100-hr fuels. You can also measure the moisture by collecting samples, weighing them, the drying with an oven or microwave, and weighing the dry fuel.

[(Dead Fuel Wt – Dry Fuel Wt)/Dry Fuel Wt] x 100= DFM%

Fine fuel Dead Fuel Moisture can change over a fairly short time. That is why it is called a 1-hr fuel. It is what drives the fire. It is difficult to get the larger fuels burning if you do not have adequate fine fuels.

Typical 1-hr Dead Fuel Moisture can also be estimated by observing the maps provided by the NWS. <http://www.wrh.noaa.gov/mso/fireweather/nfdrs.php?wfo=mso&parameter=fm1_f>



Fort the blacklines, the 1-hr fuel moisture is the primary fuel concern (relative to the 10 and 100-hr fuels).

* + **Live Fuel Moisture -** LFM is unlikely to be a major concern for blacklines unless the moisture of the fine fuels (1-hr fuel) is too high to burn. If there is insufficient dead fuel to ignite and burn the live fuel, then the live fuel moisture needs to be low enough to burn. However, for blacklines, the objective is primarily to create a low fuel area to stop the headfire. Guidelines for live fuel moisture are shown below and are also provide on the burn plan template on a spate worksheet.

If the blackline is burned under similar conditions to the headfire and the fireguard where the blackline is started is based on live fuel (such as yaupon or cedar thickets), then LFM is important to be sure the firebreak is effective.

General Guidelines for Live Fuel Moisture

* + - Live Fuel Moisture is a minor concern for most rangeland prescribed burns, that is, not forests. There are two situations where it should be considered in this type of burn.
    - If your objective is to kill or top-kill a species of live plant, such as juniper, eastern red cedar, or yaupon, the burn will likely not be effective if LFM is greater than 75%. Even when LFM is less than 75%, considerable fine fuel (such as grass) may be required to achieve desired results.
    - If the objective is to use stands of live fuel such as a yaupon thicket or cedar/juniper thicket to serve as a firebreak or a backup firebreak for a grass fire, then the LFM of the plants should be greater than 75%.
    - Live Fuel Moisture can be measured by taking samples of the leaves of the plant and weighing them on a suitable scale in a paper bag. Then dry the sample in a microwave oven for 30-second intervals and re-weigh the sample. Repeat until the dry weight is stable.
    - LFM =[(Wet weight-Dry weight)/Dry weight]\*100%
    - Note that LFM can exceed 100% due to the way it is calculated if greater than half of the weight of the plant is water that is removed to get the dry weight.
    - To get LFM data from Texas Forest Service, go to: <http://72.32.186.224/nfmd/public/states_map.php?state=TX> and you may be able to find a location where data has been taken recently that is representative of your burn area. Click on the pin for that location and then select the data chart you want to see. If current actual data are available for your spot, choose the chart "Graph with Tables (Actual Data)." Scroll down to find the species of plant most common for your site and you can get an idea of the LFM trend for your area if you plan to burn in the near future.
* **Desired Prescription Range (headfire)** – (lines 182 – 194).Many of the comments above for the blacklines apply to the headfire also. If the blacklines and headfire are both going to be done on the same date, then use the same range of dates for the headfire as you did for the blacklines. However, the headfire entry for Time of Burn may be different from the blacklines if you are burning a single burn unit. In this case, the blackline may be done earlier in the day, as soon as humidity conditions are suitable, followed by the headfire, which will be delayed at least by the time it takes to get the blacklines burned. The range you show should be the earliest possible time you could start the headfire to the latest possible time.
  + For headfire Temperature, RH, Wind Direction, Wind Speed, Fuel Load, Dead Fuel Moisture and Live Fuel Moisture, see the comments above for blacklines.
  + **Category Day -** The Category Day is a measure of the suitability of the weather conditions for smoke rising and dispersion. Until recently (last few years prior to 2012) the Category Day was only published by the NWS twice a day in their Fire Weather reports for groups of counties. Now the Mixing Height and Transport Wind Speed are available as part of the spot forecast graphical reports from NWS, so a Category Day value can be calculated for multiple times during the day. Whichever method you choose to use, you should insure that you are at least in Category II – Category V, with Categories III and IV being the most preferred. At Category V, the surface wind speed may be too high to burn safely, if the transport wind speed is the main factor in achieving Category V status. Category I is typical of an inversion layer low to the ground and smoke will not rise.
    - Input the **Desired Minimum Conditions** for Transport Wind Speed and Mixing Height (lines 206 – 208) and the Ventilation Rate will automatically be calculated (line 209). You can then read the Category Day from the chart above (lines 198 – 202).
    - On the day of the burn, check the **Forecast Condition for the day of the Burn** prior to the burn and enter them on lines 206 – 208. If your forecast on the day of the burn is not up to your Desired Minimum Conditions, you may choose to not burn. If the forecast is for the conditions to be Category 1, you should not burn. For instructions on how to get the Hourly Weather Forecast for a specific location (the spot forecast), see Appendix A.

**Page 6 – Prescriptive Burning Conditions.** 

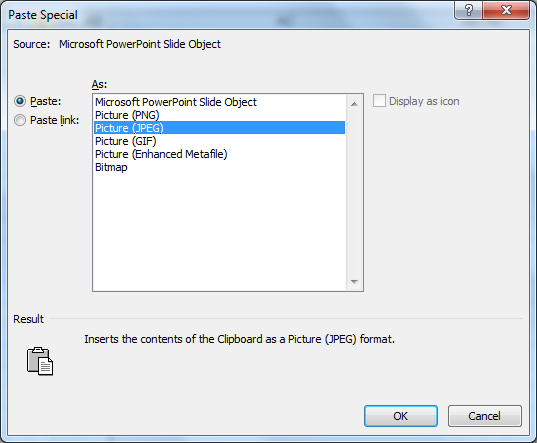
**Page 7 – Actual Fire-Weather**



* **Page 7 -Actual Fire-Weather Information** – (lines 211 – 239). On the day of the burn, record your observed weather conditions using handheld devices for wind speed (at approximately 6 ft), direction, and relative humidity. These data are useful to observe changes in conditions, but are not used for compliance with the plan. However, if the measured relative humidity is considerably lower that the prescription calls for, it would be good to check with the NWS for current conditions and expected changes. Record your **measured** readings and note any advice from NWS under Remarks (line 239). You may also
  + For fires taking more than a couple of hours to complete, readings should be taken approximately every 30 minutes or more often. For fires lasting only an hour or so, readings at the beginning and end may be sufficient unless significant changes are observed.
  + If the burn unit is large enough so that the spot where the readings were taken may affect the result, then note the location of the reading.
  + If the elevation changes significantly over the burn unit and may affect the measured wind speed or temperature, note the elevation consistent with the location. You may need to get this from topographical maps or similar map data sources after the burn.
  + Record the average wind speed (over 10-15 few seconds or longer) and approximate direction. Wind direction is customarily indicated by the compass direction that the wind is **coming from**.
* **Weather Compliance with the Plan**
  + According to TCEQ rules on outdoor burning, the **forecasted** weather conditions at the initiation of the burn and for the expected time period of the burn should be within the limits of the plan prescription and any other specific limits by TCEQ (such as wind speed, wind direction relative to sensitive receptors, and the Category Day indicator.) Therefore it is advantageous to record these forecasts shortly before the burn. One way to do this is on the morning of the burn to check the forecasts online at [www.weather.gov](http://www.weather.gov) and other sites. See Appendix B for suggested forecasts to record.

**Page 8 - Map of Area (burn unit**) – (lines 241 – 274). There are several ways to show map on the template. In its simplest form, the map could be hand-drawn on a printed copy of the form or on any piece of paper and then cut and pasted (or taped) onto the form. However, to store the plan electronically, it would then need to be scanned and saved as a picture or a PDF. The preferred way is to create a map using mapping software and picture editing (drawing) packages to create a picture of the burn unit that can be inserted into the Excel spreadsheet. There are several ways to do this also. Here is one way.

* Use Google Earth® to obtain a map of the area containing the burn unit. (See Appendix C.)
* Save a screen capture (picture) of the area in JPEG format or to the clipboard and import that into an application that allows you to do simple drawing. PowerPoint® is the example here.
* Edit the picture to show the burn unit, ignition sequence, water sources, smoke sensitive areas, special precaution areas, or whatever is appropriate for the burn plan.
* In PowerPoint, **copy** the slide in the **slide sorter view** or from the **normal view** using the small view of the slide in the left margin.
* Then **Paste Special** the slide into the Excel spreadsheet on page 8 under Map of Area using JPEG file format for the pasted picture.



Then you can stretch or shrink the picture to fit the area available on page 8 by selecting the picture (left click) and dragging the corners of the picture in or out.

* For use in the field on the day of the burn, you may find it useful to keep the PowerPoint file to use to make maps for the crew. Maps printed this way will be in full page size and will not have all the details of the plan that the crew members may not need.

**Page 8 - Ignition Sequence** – (line 275 text box). The ignition sequence can be described here, or on line 90, or attached separately, such as with the PowerPoint map. As a minimum, identify how many drip torches are required, beginning location for each drip torch, direction of travel for the drip torches, and whether strip firing or ring firing is planned. Since ignition sequence my need to be changed for the specific wind direction, speed, and relative humidity on the day of the burn, either avoid being too specific, or provide multiple scenarios for various conditions using attachments if required.

**Page 9 - Crew Members and Responsibilities** – (lines 282 – 303). This section is to be completed after the burn. It is helpful to record the information on everyone in the crew while onsite. Each person on the crew should be told in general terms or specifically, if possible, what he or she is expected to do. Inexperienced crew members should be shown how to use basic tools (flapper, sprayer, radios), what to do if the smoke gets too bad, what to do in an emergency situation, and how to attach an escape. The check box showing “Reviewed by Crew Member” should be completed by the Burn Boss when he has given the necessary instructions to the crew member.

**Page 9 – Mop-Up After Burning** – (lines 305 – 315). For many small burns it may be adequate for the landowner or his/her delegate and the burn boss to be responsible for mop-up activities. For larger burn units, especially ones with trees and brush piles or other fuels that may flare up after the burn, a crew may be required for several days. The burn boss is responsible for determining mop-up requirements and making sure they are implemented effectively.

Studies have shown that most prescribed burn escapes occur after the burn is complete. Fires can restart days later. Do not underestimate the importance of the mop-up activity.

**Page 10 – Reviews and Signature**

* **Reviewed by**- (line 332). Show the name of the person in the PBA that reviewed the plan and posted it to the PBAT web site. Reviewers must meet PBAT and the local PBA qualification requirements. As a minimum, that means that the reviewer must have completed the required state approved training for prescribed burn managers and have at least 10 prescribed burns of experience.
* **Date** – (line 332). Show the date that the final plan was posted on the PBAT web site as “received.”
* **Signature** – (line 333). We are not sure what will legally be required to make a “signature” electronically, but we are aware that some organizations allow the use of the phrase “signed electronically by email\_address@youremailprovider.com,” where you put your email address instead of the example shown. Another way is to sign a piece of paper, scan it to a jpeg file, and insert it where required, as shown here.  This looks more official, but may be no more legally valid. Another way is to just change the type font to something that looks like script, such as My Signature.
* **GPS Coordinates** – (lines 327 – 335). This is a carryover from earlier days when an insurance company that was providing coverage requested this level of identification of the burn unit. It is no longer required, but some PBAs choose to continue this practice. The location of the burn is identified by GPS coordinates on line 12 and is also identified on a map when posted on the PBAT web site.
* **Landowner or Lease Holder** – (lines 339 – 342). The landowner or lease holder should also sign and date the plan as reviewed and ready for posting on the PBAT web site.