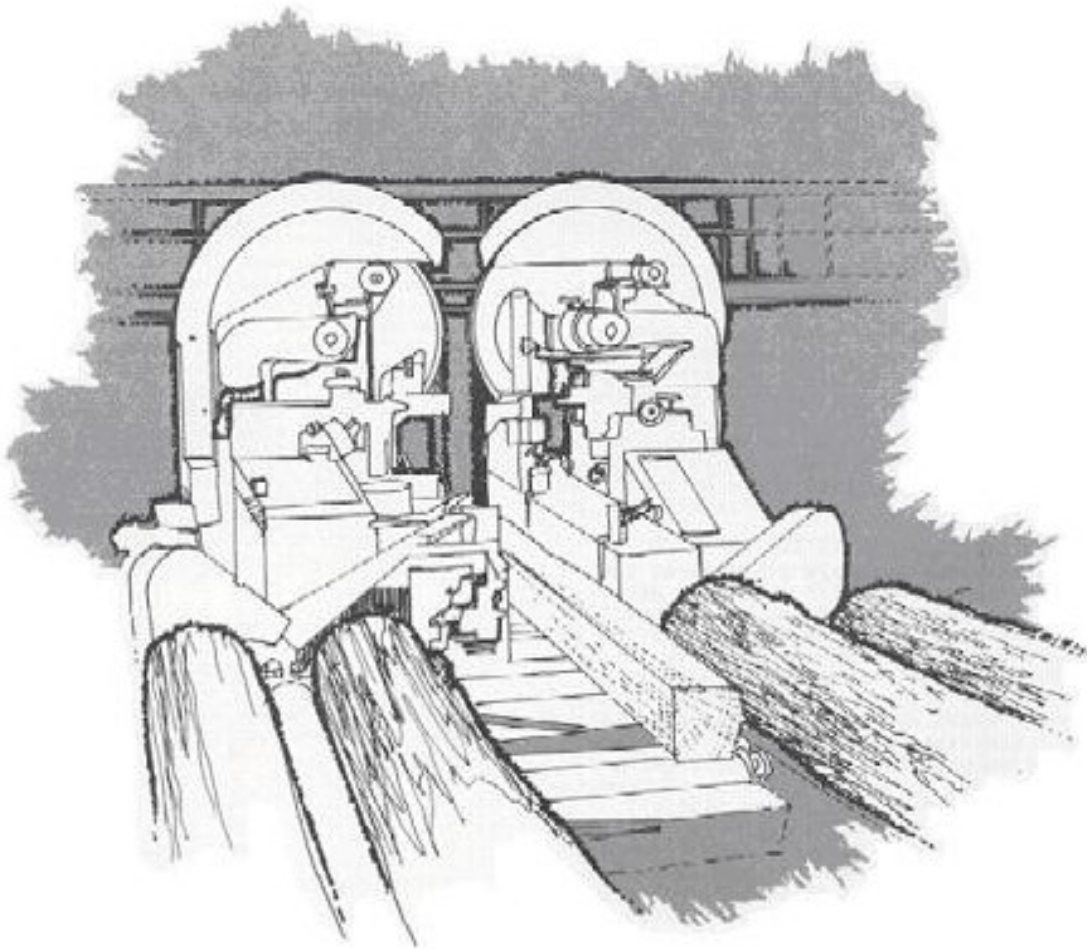


# SAWFEAS – Sawmill Financial Feasibility User’s Manual



Dr. Robert Govett, University of Wisconsin - Stevens Point<sup>1</sup>  
Rusty Damm, State & Private Forestry, Technology Marketing Unit  
Scott Bove, University of Wisconsin - Madison  
Terry Mace, Wisconsin Department of Natural Resources

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<sup>1</sup> Dr. Robert Govett, College of Natural Resources, University of Wisconsin – Stevens Point, Stevens Point, WI 54481. Phone: 715-346-4212; FAX: 715-346-4812. E-mail: [rgovett@uwsp.edu](mailto:rgovett@uwsp.edu)

## SAWMILL FINANCIAL FEASIBILITY ANALYSIS ("SAWFEAS") SPREADSHEET PROGRAM USER'S MANUAL

The Sawmill Financial Feasibility Analysis ("SAWFEAS") personal computer spreadsheet program for sawmill financial feasibility analysis existed in various forms and formats for a number of years. In an early precursor form, the program was primarily designed for use in classroom instruction in extension outreach efforts in the mid 1980s. But even in that somewhat primitive form it was also successfully used without modification in real-world sawmill financial feasibility analysis for small mills. Within the initial design and continued development of this program, an underlying objective has always been, to the degree possible, to allow users to relatively easily make program changes and modification, to better suit the model to their particular circumstances.

As the spreadsheet model evolved into a reasonably close representation of its current form in the late 1990s, the focus became less on use of the program as a teaching tool, and more in an evolution towards making the program more robust and more suitable for real-world use in providing preliminary financial feasibility analysis in the developmental planning of new sawmill operations - and obviously also for preliminary financial analyses related to the acquisition of existing sawmill operations. In recent years, changes and additions made to the program have continued to have been for the purposes of improving the program as a financial feasibility analysis tool. And over the years, the program in its various form has been used in that fashion for the analysis of a large number of ventures, including quite large and quite small as well as average sized operations.

In virtually all circumstances for companies using the SAWFEAS program, the purpose is in preliminary financial feasibility analysis, in most cases it is initially used prior to devoting too much extensive time, energy and expense in developing a detailed business plan. To this end, in some circumstances the program has demonstrated that what is contemplated as a business venture has little hope of success, even if inputs to the model are generated when viewed through rose-colored glasses – where this happens it allows for early re-focusing of efforts where flaws or weaknesses in plan logic may be discovered. In that type of use, in some cases the model has been used in testing a series of business venture ideas for a single individual and finally resting on a general strategy which appears to have good potential of success for that individual's circumstances. In working with the model in providing assistance to entrepreneurs, the greatest “fun” in using the model is in demonstrating there is good potential for the venture, and seeing the model results being used as a springboard through development of a full-blown business plan, and seeing the new mill constructed and people employed (and on occasion using the model to answer some of the questions of lenders and financiers). In some other cases, when the model demonstrates the proposed plan simply will not work, the idea for a mill start-up is simply abandoned – and discovering in advance that business failure is the most likely outcome is also an important use of the model. Although there is no joy in demonstrating to someone that their hopes and dreams as they have crafted them to be an independent sawmill owner are not going to work out - there is considerable satisfaction in being able to walk them through to that conclusion, step by step, before they have taken a second mortgage on their house and invested in a sawmill operation - particularly where you have experience in working with people having gone down that path and knowing it could have been prevented with better preliminary analysis.

In many circumstances, what might have appeared to be a good concept for a business had not been fully thought through to reach a more logical conclusion that the concept was actually flawed. And frequently, it is clear that some important facets of the whole operation might not even have been considered prior. An important benefit of using the SAWFEAS program is that it “forces” a more holistic consideration to those important elements of the proposed operation that might have been forgotten or ignored.

The normal way in which the SAWFEAS program is first used is in a preliminary analysis form, to develop a reasonably functional working model of the planned operation. In doing this, required variable inputs may range in quality from being carefully calculated or “known” quantities to very rough guesses. Variables that are first entered in to the model will frequently need to be refined at a later time (except in some few cases where, starting with only a relatively few “solid” variable inputs, generous “good case” to “best case” assumptions for all important unknowns may project an unattractive outcome, where much further data input refinement is probably not necessary). The working model (although it will typically contain some fairly “rough” estimates), provides an excellent starting point for further more holistic study of the proposed enterprise. There is a tendency on the part of many people (perhaps most people) to focus on what interests them most as related to business planning, and in so doing to give less attention to a less-interesting aspect that may be critically important. This tends to quickly happen where the appropriate value of some key variables may be unknown at that point in time, but a reasonable range could be easily estimated – using the model in a heuristic process (i.e. performing a series of “what if” entries), the businesses sensitivity to that variable outcome becomes better understood. Some users of the model have commented that this utility in helping them to better identify and then focus on what is most important in their data collection is one of the most powerful aspects of the model.

In working directly with some persons who are interested in using the SAWFEAS model; once a functional working model of the business venture may inputted into the SAWFEAS model, and the person who will be using the model is trained in how the model works (and they understand what variables need to be refined) - the model is in their hands to carry forward in performing more detailed analysis. Alternatively, users have been trained in use of the model through industry and extension short-courses (a number of which have been conducted in the past five years) and based on that experience have an understanding such that they are usually able to then perform initial model set-up on their own. Development of this user’s manual was undertaken with the encouragement and support of the United States Forest Service personnel, and others, to spread the model to a wider audience where someone reasonably well versed in analyses of this type could get beyond the hurdle of being a first time user without training by having access to this basic user’s manual.

The SAWFEAS model is not designed to serve as the pro-forma financial statements in a business plan – rather it is most commonly used as a pre-cursor to the development of those aspects of the plan. The SAWFEAS model does readily serve a companion to (but is not a substitute for), suitable pro-forma financial statements prepared by an accounting professional, and in many cases elements of the pro-forma financials have been estimated from using the SAWFEAS model results as a starting point. In terms of example of differences, a major difference between the SAWFEAS model and what is commonly found in the pro-forma

financials of a typical business plan would include that the SAWFEAS model is designed to consider a 20 year period on an annual period basis, while most business plans (designed to meet the requirements of a typical lender) consider the pro-forma financial statements for a three year period, with the first year on a monthly basis, and the subsequent years on a quarterly summary basis. Also it may be noted that the SAWFEAS model does some fairly detailed calculations in some cases (e.g. for different species, costs, etc.) that are typically much more generalized within most business pro-forma financial statements. As noted the SAWFEAS model is a suitable and useful spring-board to carry forward with the business plan's pro-forma financial statements – additionally, the SAWFEAS model can be an excellent tool to better understand some estimates used as elements within the business plan, and it is an excellent mechanism for checking and corroborating elements of the business plan. It is in this function where it can provide an additional measure of comfort to lenders and decision makers who might be reviewing the final business plan. (Note: If the model is used in a corroboration role, it is generally advised that an unmodified version of the model be used for that purpose.)

Although use as a teaching tool is no longer of key use with the SAWFEAS model, the underlying objective to allow easy changes and modification remains. There is a significant added dimension to the model where a capable and experienced analyst may (as a user of the model), “fine tune” it to fit some specific circumstance of their analysis. Experience has demonstrated that modification of this spreadsheet should only be undertaken by someone with superior knowledge of topic, the program logic, and spreadsheet programming, but that is frequently the case for experienced professionals such as accountants or engineers who have spent a little time in using the model. The SAWFEAS model is a useful tool in the hands of a user who understands the model and has the kind of background necessary to perform such analyses. It is not advised that the SAWFEAS spreadsheet be used as the sole decision criteria as a “go-ahead”, in important analyses - except in the hands of experienced user with considerable background and expertise in such analyses. It should be noted that in most cases where someone with some expertise or knowledge in analyses of this type might have a reasonable desire that the model perform something in a different way, or be in some way expanded or contracted a bit, that same person can typically also understand how the model could be modified in that fashion.

Important estimates for data entry in the SAWFEAS model regarding lumber and residual yields if not readily available from historic operational data may be developed using the "PROYIELD" spreadsheet program. (Note: the PROYIELD program projects yields of lumber and residuals based upon different assumptions regarding process, product and log distribution variables.) It should also be mentioned that in using the SAWFEAS program in a mill analysis, the primary lumber product produced may be in either a green rough condition, or in a dry form. In the case of hardwoods, where product may readily be sold in a green or dry condition, in the event lumber drying is a significant element of the production analysis, it is suggested further detailed analysis be conducted. A companion spreadsheet program, "DRYFEAS" may be used to conduct a robust analysis of the lumber drying operation. In using both the SAWFEAS and DRYFEAS programs together, this will ultimately provide "stand-alone" feasibility analyses for each of the two sides of the operation and avoid the potential for “masking” problems where it might not otherwise be obvious that one side of the operation might be subsidizing the other. The two separate analyses (sawmill and dry kiln) may be easily considered in separate analyses as independent profit centers or they may be considered as separate but related business entities, or as an alternative, a

summary of the key information from the DRYFEAS program may be incorporated directly into the SAWFEAS program.

This user's manual will follow the SAWFEAS model, from top to bottom, explaining what entries are required and what is being done in the various parts of the spreadsheet (with some key warnings as needed) – section headings and row labels will be taken exactly as they are on the spreadsheet itself to allow for ease in going between the model and this manual, both in a hard copy format, or the manual may be used in a hard-copy format while following along with the spreadsheet – or just as simply – the manual may be viewed as an active window in your word processing program as you shift back and forth between the manual text and the active spreadsheet. Items taken directly from the model for explanation in this manual *will generally be displayed in the manual in italics format (like this) in the manual*, for clarity that it is directly within the spreadsheet model.

#### SOME BASICS TO BE MENTIONED BEFORE BEGINNING:

The SAWFEAS model is typically found in an Excel workbooks format; however, the basic model (as it will be described here) is all contained within a single worksheet in a fully functional form. This form of the spreadsheet is also available in an older version of Excel worksheet format (Version 4) and it is also fully functional within Lotus 1-2-3 Version 4. These spreadsheet “standards” of the mid 1990s which were frequently run under Windows formats as old as Windows Version 3.1 should represent the extreme of older aged of spreadsheet software which might be encountered today. The program in its present form is not functional within the earlier (mid 1980s) spreadsheet “standard” of Lotus 1-2-3 Version #1 (i.e. having an extension .wk1) but an older version of the program with more basic features is available in that older format.

As within any spreadsheet model of this type, it is advised that the user save the file under its standard name as it is received or down-loaded (to serve as a “master” backup), and then save the file under a different (or slightly modified) name and use that (different named file) as the working copy. The program file will easily fit on standard floppy-disk storage medium as a backup to file storage on the computer's hard-drive. In first time review and use of the program, it is suggested to first scroll down through the program to get a feel for what will be required and what the outputs will be, then go back to the top of the spreadsheet model and more carefully look at the requirements before making entries.

A number of rows at the top of the SAWFEAS model contain basic contact and background information for the user who might not have other background (such as is contained in this manual). These rows of “boilerplate” are unnecessary for in-house use or where the model is going between users that are familiar with it, however, the “identity” may be useful where the model is passed along to others, who may then become aware this manual exists. When using the model with lenders as a preliminary discussion item, or as corroboration to pro-forma financials in a final business plan, the initial label rows are typically desirable, where many lenders are comfortable where a “canned” program is being used in those purposes. The closure point for this background introductory information reflects the following:

*NOTE: Except where otherwise specified, all production input information is to be estimated for the first full year of operation. This permits production data inputs to be easily estimated for an initial partial production year (period #1) as some percentage of the first full year (period #2) of operation. For the second full year and later years (period #3 and greater) summary and key item variables are also easily modified based upon percentage changes. If greater precision in data input is desired for any or all periods, the basic input matrix may be used and copied as input values for any period of interest.*

The model considers that the initial period of operation for a proposed business start-up will rarely be the full fiscal or calendar year, representing other periods of the model. For this reason, the full-year estimates which are used pertain to the first FULL year (i.e. period #2, or the second year). The first year, almost always a partial year with regard to production etc., will be represented as a percentage fraction of the (period #2) first full year. Over the years this has generally been demonstrated to be an easy and efficient way to deal with the partial year start-up issues. The exception is that the user needs to remember that initial estimates of costs and prices are really to be represented for the first full year (i.e. not necessarily current prices/costs) and that the partial year start-up costs and prices will be represented as percentage fractions of the “year #2” entries.

*(note: an "e>>" in column A indicates an entry is required in one or more cells in that row the "e>>" notes in any other column amplifies some flags.)*

As indicated the “flag” in column A that is shown as "e>>" indicates an entry is required in one or more cells in that row. In many places throughout the model this is a single entry required, however, within the financial section, in many cases entries are needed for the full 20 year period and within the production section, entries are required for all species or species groups which are listed as product items.

Title: *SAMPLE ANALYSIS FOR HYPOTHETICAL SAWMILL COMPLEX*

This title can (and should) be modified or changed to describe your analysis, and of course moved elsewhere on the spreadsheet if desired. Generally though, other major labels and titles should not be changed or moved if a person reading or using your adaptations to the model might be trying to simultaneously use this manual.

Major Section: *DEFINITION OF VARIABLES FOR SPECIES TO PROCESSED*

Up to 20 rows in this section are used to define what is being assumed with regard to the species to be processed. Within column C there is an entry to be made for *Variable ID* and in column D for *Comments* – in the illustration example provided in the model, less than half of the 20 potential variables are used, and a fairly clear picture should be provided how the entries could be used. Within the entry for *Variable ID*, the length of the entry should in each case be made short enough to serve as the column headers for that species or species group under the following section. The user simply enters the variable names as desired (Caution – if the existing example labels are something you want to use and to move, or if you move them after entry – be cautious

not to “CUT and paste” as other cells are linked – rather COPY and paste.) It is entirely the user’s choice as to how detailed or generalized the variable identification entries might be, certainly all the mill’s key species (and/or species groups) should be represented, and it is entirely possible that for very important species two or more entries might be justified (e.g. for red oak, it is possible that an entry could be made for northern red oak, and for other red oak group, such as black or pin, further, for very important species, it is entirely possible that projections at the log grade level in that species may be desired), for species that represent a very minor percentage of production an “other” aggregation might be desired, or at the other extreme, if desired, the spreadsheet could be modified to consider a huge array of variables. Before getting too carried away with such things, it is important to recognize that production assumptions and projections will be needed for each variable. At a beginning point, it may be desirable to keep the variable array limited and to expand it later. The *Comments* entered in column D for each corresponding variable in column C are simply whatever might be desired sufficient to describe the variable for reference – the *Comments* entries are not used elsewhere.

#### Major Section: *PRODUCTION INFORMATION*

This major section requires the input of a variety of important information about the defined species variables which were entered above – these data will be used in various calculations. Within this section, a labeling convention used throughout the spreadsheet becomes obvious that is now worth explaining. In addition to the “flag” in column A shown as "e>>" that indicates an entry is required in one or more cells in that row, the label for that row in column B will be (primarily) **In Lower Case Letters** (and when working within a Excel spreadsheet program the label for that row in column B will not be in a bold format). In contrast, there are many rows with data where entries are clearly not required but there is information in the row other than explanatory notes or headings. In these rows the data in cells in that row are calculated and the label for that row in column B will be (primarily) **In UPPER CASE LETTERS** (and when working within a Excel spreadsheet program the label for that row in column B will be in a bold format).

*Volume MBF/RM units per year input:* This row requires an input in each cell for which there is a defined species variable – the input is the volume input of raw material (e.g. logs or bolts) for that variable. The units are user choice, the units could be in thousand board feet (MBF), cords, cunits – whatever you normally use - the program can deal with any of them and if you really feel the desire, you can mix and match with different units for different variables, such as MBF logs and cords (more succinctly and correctly though, the program doesn’t “know” nor is it capable of “caring” regarding what units you use – you just need to be careful that your subsequent entries for that variable are as they should be). It is HIGHLY desirable to keep all variable inputs in the same units (e.g. all in MBF log scale, OR, all in cords) – if this is not done, some follow-on overall summaries and aggregations become impossible. Within the example entries in the model, all are expressed in MBF. In this particular example, the entries are in MBF Scribner Decimal C log scale. As mentioned before, the program can “deal with” the mix and match with different units for different variables, and this includes different log rules such as Scribner Decimal C, International ¼ and Doyle, or various significant conventions of a rule, such as Scribner Decimal C using the Eastside convention and Scribner Decimal C using the Westside convention – you just need to be careful that your subsequent entries for that variable make sense). Also, as mentioned before - it is HIGHLY desirable to keep all variable inputs in the

same units – in the case of mixing log rules, some follow-on overall summaries and aggregations may not be “impossible”, but they will reflect a mix of apples and oranges in a confusing fruit salad, and this problem may be particularly pronounced with variable diameters.

*Lumber yield in MBF per input unit:* This simply represents the yield factor expressed as a decimal fraction, or more simply the volume of lumber in thousand board feet (MBF) that is recovered per input unit. For example, if for 1,000 board feet of log input (1.0 MBF log scale), a total of 1,150 board feet of lumber (1.15 MBF lumber) was sawn, the overrun (difference between lumber tally and log scale expressed as a percent of scale) would be 15% - the yield factor would be 115% - or 1.150 - meaning for every 1,000 board feet of logs sawn, 1,150 board feet of lumber would be recovered. In a similar vein, assume there was an underrun: for example; if for 1,000 board feet of log input (1.0 MBF log scale), a total of 900 board feet of lumber (0.900 MBF lumber) was recovered, the overrun (difference between lumber tally and log scale expressed as a percent of scale) would be a negative 10% (-10%) which would normally be expressed as a 10% underrun - the yield factor would be 90% - or 0.900 - meaning for every 1,000 board feet of logs sawn, 900 board feet of lumber would be recovered. The lumber yield in the SAWFEAS program MUST be expressed as a yield factor in the form of a decimal fraction of the MBF of lumber recovered per unit of logs sawn. In the examples above, for the 15% overrun or 1,150 board feet of lumber per MBF log sawn, the variable entry for *Lumber yield in MBF per input unit:* MUST be expressed as a yield factor in the form of a decimal fraction of the MBF of lumber as 1.150. The same convention of expression for *Lumber yield in MBF per input unit:* MUST be used if other log input units such as cords or cunits are used. In terms of example, if cords are the input unit, and assuming that 450 board feet of lumber was recovered per cord the variable entry for *Lumber yield in MBF per input unit:* MUST be expressed as a yield factor in the form of a decimal fraction of the MBF of lumber as 0.450. This may seem somewhat odd or unusual if the only way you are accustomed to expressing yield is in overrun/underrun, but this convention may be learned in (literally) a matter of minutes. Some years ago some precursor versions of the program were designed to accept overrun inputs for yield. However, that was found to be overly restrictive, confusing to some, and added difficulty to program modifications, so this mechanism of yield expression was adopted and has worked very well.

*Residual BDUs per input unit* – is a key variable from which the residual production will be estimated. The input unit here is the number of BDUs (i.e. 2,400 dry pound equivalent) in total (saleable) residue that is generated. The BDU is used as a common variable, under which, sawdust, bark, planer shavings and chips may all be aggregated. These estimations in aggregation may be made using the PROYIELD model or other models. Another common unit to express all residuals may be used in the form of another dry weight basis (dry tons or kilos), or volume – all that is required is that subsequent labels be changed – what is important is a single method (common to all forms of residuals) that captures the quantity of residuals generated per unit of input volume for each species. The convention in the model is to “capture” all residuals in a single variable, then assign a weighted average price to estimate a value. Within the convention of the model, it could be at the analyst’s discretion that the entire volume would be “sold” (even if some residuals were used for fuel), with internal cost transfers recapturing the fuel cost of residuals retained. Alternately, in developing the weighted average price, zero value could be assigned to some types of residue (used locally as fuel) and the “costs” of acquiring those residues for fuel would also be ignored. The suggested mechanism would be to use the



convention assumed in the model is to “capture” all residuals in a single variable, then assign a weighted average price (using real market values) to estimate a value and assume all residues are “sold” while those used within the manufacturing process are “purchased” at a market transfer price. Ultimately it is the analyst’s decision with regard to what convention to use, but it is generally considered as being better to keep costs where they may be seen, versus buried and forgotten under the assumption that they don’t matter or are simply “off-setting” in some fashion.

*TOTAL LUMBER YIELD MBF/YEAR*

*TOTAL RESIDUAL YIELD BDUs/YEAR* – these rows are simply summary aggregates of lumber and residual production volume by the user defined species variables, based on volume of logs processed and yield/recovery data which are entered.

*# of Months/Yr item is sawn* – this row asks for an estimate of the months per year the variable item will be sawn and will be used in later calculations. For example, with hard maple, there may be a real effort to avoid sawing the species in summer months due to potential for loss with stain. In the case of a high-value species sawn on a more seasonal basis, log and lumber inventory values may mushroom during those months the item is sawn, as compared to a “normal” or “year-round” average month.

*Average # days logs held prior to sawing*

*Average # days lumber held after sawing* – these rows ask for estimates of days held for the purposes of estimating log and lumber inventory values in later calculations. The “*Average # days logs held prior to sawing*” is straight-forward. It is the users choice with regard to “*Average # days lumber held after sawing*” if this may include days the item is held, or include days in shipment, or even if a decision may be made to include the days the item may be reflected in an “accounts receivable” status awaiting payment (that may be highly desirable). The user (ideally) should be consistent and should remember what is being expressed (although by the number of days shown, it should be obvious given knowledge of the operation being modeled).

*Average Price \$/RM units logs*

*Average Price \$/MBF lumber*

*Average Price \$/BDU residuals* – these rows ask for straight-forward estimates of raw material costs and product selling prices. Weighted average prices will obviously need to be estimated or calculated for products, and also for logs where different grades in a delivered mix might be included in a variable definition.

*Working Capital Cost for Inventory (%/yr)* – this row ask for an estimate of the working capital cost required to carry the inventory. In most cases this would reflect the expected interest rate to be paid on a line of credit used to support inventory and accounts receivable, or the cost of long-term debt.

*AVERAGE \$/MBF LUMBER & RESIDUAL REVENUE ADDED* - these rows display a calculated summary aggregate of a combined lumber and residual value on the basis of one thousand board feet (1 MBF) of lumber production volume

*TOTAL RM LOG COST*

*TOTAL VALUE LUMBER*

*TOTAL VALUE RESIDUALS*

*TOTAL VALUE LUMBER & RESIDUALS* - these rows display a calculated overall cost or value for raw materials or products as labeled.

*TOTAL ITEM GROSS MARGIN (RM cost only)* - this row displays a calculated overall gross margin for the species variable. This is simply the projected revenue received minus the basic raw material cost (i.e. it is calculated using raw material costs only).

*INVENTORY (working capital.) INTEREST COST LOGS*

*INVENTORY (working capital) INTEREST COST LUMBER*

*TOTAL INVENTORY (working capital) COST* - these rows display a calculated cost of holding log inventory, lumber inventory and log and lumber inventory combined, based on values, and interest carrying costs.

*TOTAL ITEM GROSS MARGIN (RM & WC COSTS)* – like the “*TOTAL ITEM GROSS MARGIN (RM cost only)*” - this row displays a calculated overall gross margin for the species variable, but in addition to raw material costs, the working capital costs are also included. This is simply the projected revenue received minus the basic raw material cost and the associated working capital cost. (Note: other variable manufacturing costs, such as labor, electricity etc. and contribution to fixed costs are not yet considered)

*ITEM AS % OF TOTAL UNITS ALL LOGS SAWN* – this row displays a straight-forward calculated species variable “item as percentage of total” as labeled.

Major Section: *LOG INVENTORY ESTIMATES* - This section provides item summary calculations for log inventory for each of the species variables that have been entered. It is worth mentioning that a convention is first used in this section that will be used in a number of places in the spreadsheet. Formulas used in cell calculations are straight-forward except for a tiny number being added within the formula. The purpose of this is to simply ensure that in any unused columns where entries are not made, the result, with a calculation including a division by “0” where the formula would display an error “flag” of some kind will instead simply display a zero value. In each case where this is done, the tiny number is too small to have any significant affect on the outcome, however, its presence prevents the alternate circumstance of error display. These displays are of no concern to anyone with any reasonable familiarity and experience with spreadsheets, however, where it is almost certain that someone lacking that background will be exposed to the model or its output, it greatly increases their level of comfort, where they are not exposed to seeing what is in their eyes a “warning sign” of an “error” being displayed. This convention will be used in a number of places in the spreadsheet without further mention.

*LOG ITEM INVENTORY VALUE (\$) FOR AVERAGE MONTH ITEM SAWN* - this row displays a calculated average log inventory value during the months in the year the item is sawn. This will be higher than the year-round average for any species variables that are not processed year round. This is calculated to provide some insight where additional working capital might be required to support more costly inventory which is not carried year round, the interpretation requires inspection and consideration by the analyst.

*LOG ITEM INVENTORY VALUE (\$) YEAR-ROUND AVERAGE* - this row displays a calculated average log inventory value during an “average” month in the year, or the average log inventory value for the species variable item to be sawn. This will be less than the “*LOG ITEM INVENTORY VALUE (\$) FOR AVERAGE MONTH ITEM SAWN*” if the item is not processed year round, the same if it is. This is calculated to provide an estimate of average working capital might be required to support the inventory. This is used to provide an estimate of the total of working capital required to support log inventories.

Major Section: *LUMBER INVENTORY ESTIMATES*

This section provides item summary calculations for log inventory for each of the species variables that have been entered.

*LUMBER ITEM INVENTORY VALUE (\$) FOR AVERAGE MONTH ITEM SAWN* - this row displays a calculated average lumber inventory value during the months in the year the item is sawn. This will be higher than the year-round average for any species variables that are not processed year round. This is calculated to provide some insight where additional working capital might be required to support more costly inventory which is not carried year round, the interpretation requires inspection and consideration by the analyst.

*LUMBER ITEM INVENTORY VALUE (\$) YEAR-ROUND AVERAGE* - this row displays a calculated average lumber inventory value during an “average” month in the year, or the average log inventory value for the species variable item to be sawn. This will be less than the “*LUMBER ITEM INVENTORY VALUE (\$) FOR AVERAGE MONTH ITEM SAWN*” if the item is not processed year round, the same if it is. This is calculated to provide an estimate of average working capital might be required to support the inventory. This is used to provide an estimate of the total of working capital required to support lumber inventories.

Major Section: *REVIEW OF INPUT ASSUMPTIONS*

This section provides overall item summary and some calculations for each of the species variables that have been entered. In some cases these are listed in rows above and are brought together for summary purposes, in others, new elements are now calculated or displayed.

*TOTAL VOLUME RM UNITS (LOGS)/YR*

*TOTAL LUMBER YIELD MBF/YR*

*AVERAGE \$/MBF PRODUCT LUMBER & RESIDUAL*

*TOTAL RAW MATERIAL COST*

*TOTAL LUMBER REVENUE*

*TOTAL RESIDUAL REVENUE*

*TOTAL LUMBER & RESIDUAL REVENUE* - these rows display a straight-forward calculated overall volume, value or average as labeled.

*TOTAL ITEM GROSS MARGIN (RM cost only)* – as noted and displayed above - this row displays a calculated overall gross margin for the species variable. This is simply the projected

revenue received minus the basic raw material cost (i.e. it is calculated using raw material costs only).

*GROSS MARGIN in \$/MBF Log Scale or other RM unit (RM cost only)* - this row displays a calculated overall basic gross margin for the species variable per unit of raw material input (such as per thousand board feet of log input, or per cord) only raw material costs are considered as costs. This is simply the projected revenue received minus the basic raw material cost on a per unit of product input. (Note: other variable manufacturing costs, such as labor, electricity etc. and contribution to fixed costs are not yet considered).

*TOTAL ITEM GROSS MARGIN (RM & WC COSTS)* – as noted and displayed above - this row displays a calculated overall gross margin for the species variable, but in addition to raw material costs, the working capital costs are also included. This is simply the projected revenue received minus the basic raw material cost and the associated working capital cost. (Note: other variable manufacturing costs, such as labor, electricity etc. and contribution to fixed costs are not yet considered)

*GROSS MARGIN in \$/MBF Log Scale or other RM unit (RM & WC COSTS)* - this row displays a calculated overall basic gross margin for the species variable per unit of raw material input (such as per thousand board feet of log input, or per cord) with raw material costs and working capital both considered as costs. This is simply the projected revenue received minus the basic raw material and working capital cost on a per unit of product input. (Note: As above, other variable manufacturing costs, such as labor, electricity etc. and contribution to fixed costs are not yet considered.) In general, all other things being equal, the species variable exhibiting the higher gross margins are probably the most attractive species to process if capacity constraints become an issue (assuming that other variable manufacturing costs per input raw material unit, and reasonable expectations of comparable contributions to fixed cost apply across species. The analyst should consider that species represented here should have sufficient positive gross margin to cover required other variable manufacturing costs (at a minimum) and (ideally) some contribution to fixed cost too. If that is not the case, it would be prudent to consider if the variable could be removed or the circumstance improved in some way.

*ITEM AS % OF TOTAL UNITS ALL LOGS SAWN*

*ITEM AS % TOTAL COST OF LOGS*

*ITEM AS % TOTAL VALUE PRODUCTS*

*ITEM AS A % TOTAL GROSS MARGIN (RM & WC COSTS)* - these rows display a straightforward calculated species variable “item as percentage of total” as labeled.

Major Section: *KEY INFORMATION SUMMARY*

This section provides an overall summary where all key data for each of the species variables that have been entered are brought together in a single aggregation or in a weighted average value. In some cases these data are displayed primarily for descriptive summary purposes, in others cases these calculated summary data will be used as key inputs in the financial analysis section.

*TOTAL MBF (or OTHER RM UNITS) LOGS SAWN*

*TOTAL MBF LUMBER PRODUCED*

*TOTAL LOG COST* - these cells display a straight-forward calculated overall volume or value as labeled.

*AVERAGE \$/MBF LOG (or OTHER RM UNIT) LOG COST*- this cell displays a calculated overall average cost of logs in \$/MBF log scale, OR in \$/cord or other input units as may be used. This calculation is valid ONLY if ALL the species variables entered use the SAME input units. If raw material input units are mixed (e.g. more than one MBF log scale, MBF log scale and cord scale, etc.) this calculated average is meaningless.

*AVERAGE LOG COST/MBF LUMBER PRODUCED* - this cell displays a calculated overall average cost of logs in \$/MBF lumber scale. This calculation is valid even if there is a mixing of the species variables entered in different input units.

*TOTAL VALUE LUMBER*

*TOTAL VALUE RESIDUALS*

*TOTAL VALUE LUMBER & RESIDUALS* - these cells display a straight-forward calculated overall volume or value as labeled.

*AVERAGE \$/MBF LUMBER* - this cell displays a straight-forward calculated average value as labeled as the weighted average price of lumber per MBF of lumber produced.

*AVERAGE \$/MBF LUMBER & RESIDUALS* – this cell displays a straight-forward calculated average value (as labeled) as the weighted average price of lumber per MBF of lumber produced, BUT also includes the value of the residuals produced, apportioned on the basis of the relationship of their value to MBF of lumber production. This allows for a combined product value (lumber and residual) on a per MBF product basis to be considered in financial analyses.

*GROSS MARGIN RM Cost Only* - this cell displays a straight-forward calculated overall value as labeled.

*AVERAGE GROSS MARGIN (RM Cost Only) per MBF LUMBER* - - this cell displays a straight-forward calculated average value as labeled as the weighted average of the gross margins (considering raw material cost only) per MBF of lumber produced across all species variables input.

*AVERAGE GROSS MARGIN (RM Cost Only) per MBF LOG or RM UNIT* - this cell displays a straight-forward calculated average value as labeled as the weighted average of the gross margin (considering raw material cost only) per MBF of logs or other raw material unit under which the species variables might be purchased. Similar to before, this calculation is valid ONLY if ALL the species variables entered use the SAME input units. If raw material input units are mixed (e.g. more than one MBF log scale, MBF log scale and cord scale, etc.) this calculated average is meaningless.

*AVERAGE OVERALL YIELD MBF LUMBER per MBF LOG or RM UNIT*- this cell displays a straight-forward calculated average value as labeled as the weighted average of the key entry

variable “*Lumber yield in MBF per input unit*” described prior as “...the yield factor expressed as a decimal fraction, or more simply the volume of lumber in thousand board feet (MBF) that is recovered per input unit...”. Similar to before, this calculation is valid ONLY if ALL the species variables entered use the SAME input units. If raw material input units are mixed (e.g. more than one MBF log scale, MBF log scale and cord scale, etc.) this calculated average is meaningless.

#### *AVERAGE LOG INVENTORY*

*AVERAGE LUMBER INVENTORY* - these cells display a straight-forward calculated overall value as labeled – this is calculated using the year-round inventory averages in each case.

#### Major Section: *MANUFACTURING COST DATA*

This section provides for input of labor requirements (in “*PAYROLL DATA*” section), variable costs other than raw material costs (in “*OTHER VARIABLE MANUFACTURING COSTS*” section), and operating fixed costs.

*PAYROLL DATA* - This section provides for entry of production labor/payroll data, and performs summary calculations.

*Average # of production employees used 1st shift*

*Average # of production employees used 2nd shift*

*Average # of production employees used 3rd shift*

*Average # of production employees used 4th shift* – these cells are for entry of the number of employees for each of up to 4 shifts. In most cases this would be on a full time equivalent (fte) or decimal fraction of fte.

*AVERAGE # OF EMPLOYEES, ALL SHIFTS COMBINED* - this calculated cell sums the entries for the number of employees on shifts to a combined total.

*Average # of days (not including overtime) an employee works per year*

*Average base hourly wage of production employees*

*Fringe benefits for production employees as a % of base hourly wage*

*Overtime premium for production employees as a % of base hourly wage*

*Fringe benefits for overtime hours a % of the overtime hourly wage*

*Normal # of paid hours per shift (not including overtime)*

*Average # of overtime hours per employee per month* – these cells are for the entry of items such as days worked per year, base wages, etc. – all in a straight-forward fashion. Where there is variability (e.g. employees at different pay scales) a weighted average would be an appropriate entry.

*AVERAGE # OF OVERTIME HOURS PER EMPLOYEE PER YEAR*- this cell is calculated from data entered above.

*Average # of days temporary employees are used per month* – this cell is for a straight-forward entry. It is separate from above inputs as different fringe benefits etc. might likely apply, among other things.

*TOTAL # OF DAYS TEMPORARY EMPLOYEES USED PER YEAR*- this cell is calculated from data entered above.

*Average number of temporary employees used per day when employed*

*Total temporary employee hourly wage rate with fringe benefits included* – these cells are for straight-forward entries. Again, these are separate from above inputs as different fringe benefits etc. might likely apply, among other things.

*SUMMARY OF ESTIMATED ANNUAL LABOR COSTS FIRST FULL YEAR*

*ANNUAL PAYROLL BREAKDOWN*

*BASE WAGES*

*FRINGE BENEFITS*

*OVERTIME WAGES*

*OVERTIME FRINGE*

*TEMPORARY WAGES*

*TOTAL PAYROLL*

*LABOR \$/MBF LUMBER SAWN* - the calculated cells in these rows provide total sums and percentage breakdowns as appropriate. The key calculation of “*LABOR \$/MBF LUMBER SAWN*” will be used in financial analysis later.

*OTHER VARIABLE COSTS PER MILLION BOARD FEET OF LUMBER SAWN IN FIRST FULL YEAR* - This section provides for entry of variable cost data associated with production, other than raw material and production labor costs. All costs are to be recorded in dollars per MILLION board feet of lumber produced (\$/MMBF). Over time it has been found that this is generally an easier way for most people to think of these costs, as compared to a dollars per thousand board feet of lumber (\$/MBF) basis. Part of this is because some of these costs might be quite small numbers (often ignored) on a \$/MBF basis, and part of this is because some of these costs are more frequently “considered” in terms of how they might occur for payment (e.g. electricity) in billing on a periodic basis. Where this occurs, many people are more used to thinking of these costs in terms of dollars per month of normal production (or a cost occurring once or twice a year in terms of some maintenance activities). Where costs might seem too low for many people to wish to consider on a \$/MBF basis, they generally have demonstrated to better recognize the importance on a \$/MMBF basis, and they are fairly easily estimated in that fashion. Some key variable costs are included for consideration in entry, and a number of “other” lines where the costs can be labeled as desired (and of course any of the labeled costs could be relabeled).

*Electricity*

*Rolling Stock Maintenance/Repair*

*Yard Maintenance/Repair*

*Other Maintenance/Repair*

*Bolsters*

*Chemicals (e.g. anti-stain chemicals, end seal, etc.)*

*Operating Supplies*

*Fuel for Rolling Stock*

*Other - OVC #1*

*Other - OVC #2*

*Other - OVC #3*

*All other variable costs in \$/MMBF* - All appropriate variable costs for inclusion are to be recorded in dollars per MILLION board feet of lumber produced (\$/MMBF) in the cells in column C. Any variables can be re-labeled as desired, but the basis under which costs are to be recorded, in dollars per MILLION board feet of lumber produced (\$/MMBF) should not be changed. For entries made in any of the “other” categories of variable cost entries, a companion cell in column E is for explanation of what is represented in that cost item.

*TOTAL OTHER VARIABLE COST \$/MMBF* - the calculated cell in this rows provides a total sum of the variable costs entered on a \$/MMBF lumber basis. The calculated “*TOTAL OTHER VARIABLE COST \$/MMBF*” will be used in financial analysis later.

*OPERATING FIXED COSTS FOR FIRST FULL YEAR* - This section provides for entry of fixed costs data associated with the operation. It includes total non-production labor costs (e.g. office and management) and all fixed costs EXCEPT any loan payments (interest and/or principal) and depreciation are not to be entered here (they will be dealt with later in the model). All costs are to be recorded in dollars per year.

*Insurance*

*Property Taxes*

*Security*

*Administrative/Accounting/Legal*

*Salary & Benefits (office & management)*

*Other - OFC #1*

*Other - OFC #2*

*Other - OFC #3*

*Other - OFC #4*

*Other - OFC #5*

*All other fixed costs in \$/year* - All appropriate fixed costs for inclusion are to be recorded in total dollars per year. Any variables can be re-labeled as desired, but the basis under which costs are to be recorded (i.e. in dollars per year) should not be changed and it should be remembered any loan payments (interest and/or principal) and depreciation are not to be entered here (they will be dealt with later in the model). For entries made in any of the “other” categories of fixed cost entries, a companion cell in column E is for explanation of what is represented in that cost item.

*TOTAL FIXED COSTS \$/YEAR* - the calculated cell in this rows provides a total sum of the fixed costs entered on a \$/year basis. The calculated “*TOTAL FIXED COSTS \$/YEAR*” will be used in financial analysis later.

Major Section: *SUMMARY OF INPUTS INTO ANALYSIS FOR PERIOD # 2 (FIRST FULL YEAR)* This apparently small but important major section marks the divide between key production and other operational estimates made in the first half of the model, and uses these as a



foundation to provide for key inputs into the latter half of the model within financial analyses. This major section is shown in its entirety below, including a column of CALCULATED items (which appear in column C in the spreadsheet), and the column of ENTRY items (which appear in column E in the spreadsheet) are used to make actual base entries into the model for the first full year of the analysis (i.e. period #2). The reason behind this apparent duplication between the two columns is to allow for easy connection and also for easy breakage of the link between the first half of the model with its production and other operational estimates, and the financial analyses in the second half of the model. In its base form, the cell for the CALCULATED item (which appears in column C in the spreadsheet) is linked by being address to the corresponding cell in the column for the ENTRY item (which appear in column E in the spreadsheet). As long as this linkage is maintained (i.e. as long as a cell in the ENTRY column contains the address of the corresponding cell in the CALCULATED column), all estimates which appear in the CALCULATED items' column will be reflected directly as items in the ENTRY column and then go as an entry into further calculations. In most cases this is the way the user would wish for the model to perform, however, there are exceptions. Consider for example that some basic heuristic analyses might be desired - for examples, it might be desired to examine "what if?" for what the effect may be on financial feasibility raw material costs were to be increased across all species considered by some percentage, or if production were to be similarly adjusted (raised or lowered by some percentage across all species), or that different considerations might be desired in variable or fixed costs, or inventories. Without some easy mechanism for change, this would require the analyst to go into the first half of the model, make a considerable array of changes (and then probably have to go back to those areas (after completion) to change them back to the original estimates after the heuristic analyses have been completed). The additional ENTRY column in this section permits making the desired changes directly into the ENTRY column as an overall change (that would result from a number of small component changes), and to accomplish that in a very quick and direct fashion, while showing directly (in side-by-side comparison) how much the entry compares to (or is changed from) the prior calculated values.

*SUMMARY OF INPUTS INTO ANALYSIS FOR PERIOD # 2 (FIRST FULL YEAR)*

*(NOTE: Items under column "entry" are automatically set as a relative address of items which are under column "calculated".)  
(If adjustments to first full year (period #2) are desired they should be made directly as an entry within the "entry" column.)*

*e>> (IMPORTANT! see note above)*

	<i>CALCULATED</i>	<i>ENTRY</i>
<i>TOTAL MBF LUMBER PRODUCED</i>	<i>14,069</i>	<i>14,069</i>
<i>AVERAGE LOG COST/MBF LUMBER</i>	<i>\$303.87</i>	<i>\$303.87</i>
<i>AVERAGE \$/MBF LUMBER &amp; RESIDUALS</i>	<i>\$511.60</i>	<i>\$511.60</i>
<i>AVERAGE VALUE LOG INVENTORY</i>	<i>\$850,174</i>	<i>N/A</i>
<i>AVERAGE LOG INVENTORY (as % TOTAL LOG COST \$/YEAR)</i>	<i>19.89%</i>	<i>19.89%</i>
<i>AVERAGE LUMBER INVENTORY</i>	<i>\$180,535</i>	<i>N/A</i>
<i>AVERAGE LUMBER INVENTORY (as % TOTAL LUMBER &amp; RESIDUALS \$/YR)</i>	<i>2.51%</i>	<i>2.51%</i>
<i>LABOR \$/MBF LUMBER SAWN</i>	<i>\$46.50</i>	<i>\$46.50</i>
<i>TOTAL OTHER VARIABLE COST \$/MBF</i>	<i>\$23.85</i>	<i>\$23.85</i>
<i>TOTAL FIXED COST \$/YR (except int &amp; dep)</i>	<i>\$479,000</i>	<i>\$479,000</i>

The entry inputs in the *SUMMARY OF INPUTS INTO ANALYSIS FOR PERIOD # 2 (FIRST FULL YEAR)* will be used directly as the period #2 (first full year) inputs into the financial analysis section of the model. Different period inputs for a 20 year analysis will be created in a following section based on percentage change entries as related to the first full year data that are entered. The key variables considered row by row in both a calculated and user specified entries within the "*SUMMARY OF INPUTS INTO ANALYSIS FOR PERIOD # 2 (FIRST FULL YEAR)*" section of the model are as follows:

*TOTAL MBF LUMBER PRODUCED*  
*AVERAGE LOG COST/MBF LUMBER*  
*AVERAGE \$/MBF LUMBER & RESIDUALS*

*AVERAGE VALUE LOG INVENTORY* – are all items taken directly from the section titled “*KEY INFORMATION SUMMARY*” and have been explained prior. The entry for *AVERAGE VALUE LOG INVENTORY* is simply a display of what was calculated within the *CALCULATED* column and does not have a corresponding cell in the *ENTRY* column as the entry will be recalculated using an input explained below.

*AVERAGE LOG INVENTORY (as % TOTAL LOG COST \$/YEAR)* – this is a calculated value that simply expresses the log inventory as a percentage of the estimated total raw material costs. The percentage expression if unchanged will relate inventory values directly to increasing (or otherwise changing) log costs in their (first full year) established “normal” relationship - and as costs increase, with the percentage change, inventory will commensurately increase. Additionally the percentage allows for easy and more logical adjustments to inventory for unusual circumstances. For example, in the first year, as a startup period, inventory requirements will not be at a full level of production, but probably should be higher than would be expected based on the reduced percentage of production, due to the inefficiency of start-up – the percentage adjustment is designed to make that relatively easy for such adjustments without side-channel calculations.

*AVERAGE LUMBER INVENTORY* – is taken directly from the section titled “*KEY INFORMATION SUMMARY*” and has been explained prior. As with the entry for *AVERAGE VALUE LOG INVENTORY* the entry for *AVERAGE LUMBER INVENTORY* is simply a display of what was calculated within the *CALCULATED* column and does not have a corresponding cell in the *ENTRY* column as the entry will be recalculated using an input explained below.

*AVERAGE LUMBER INVENTORY (as % TOTAL LUMBER & RESIDUALS \$/YR)* – this is a calculated value that simply expresses the lumber inventory as a percentage of the estimated total value of production of lumber and residuals. The percentage expression if unchanged will relate inventory values directly to increasing (or otherwise changing) lumber values in their (first full year) established “normal” relationship, and as values increase, with the percentage change, inventory will commensurately increase. Additionally the percentage allows for easy and more logical adjustments to inventory for unusual circumstances such as the startup year.

*LABOR \$/MBF LUMBER SAWN*  
*TOTAL OTHER VARIABLE COST \$/MBF*

*TOTAL FIXED COST \$/YR (except int & dep)* - are all items taken from the associated entry sections which have been explained prior. The items are taken directly in the case of the entry from the associated *PAYROLL* section ending with *SUMMARY OF ESTIMATED ANNUAL LABOR COSTS FIRST FULL YEAR* and the section *OPERATING FIXED COSTS FOR FIRST FULL YEAR*. The *CALCULATED* cell entry for *TOTAL OTHER VARIABLE COST \$/MBF* is a simple conversion from the *OTHER VARIABLE MANUFACTURING COSTS* section where it was calculated on a \$/MMBF basis.

Section: *PERIOD INPUTS INTO ECONOMIC MODEL* – This section is where the majority of production assumption entries are made into the model. The data for period #2 (the first full year) are shown as a volume of production, a dollar value or a percentage as appropriate for the variable, and these are the same data which were reflected for entry within the ENTRY column as explained above. For the first period (most likely a partial production year due to the start-up) and for the year-periods #3 through #20, entry is required for each of the eight items for the 19 periods (i.e. year #1 and years #3-20). In each case the entry is made as a percentage value of the entry for year # 2).

*TOTAL MBF LUMBER PRODUCED*

*AVERAGE LOG COST/MBF LUMBER*

*AVERAGE \$/MBF LUMBER & RESIDUALS*

*AVERAGE LOG INVENTORY (as % TOTAL LOG COST \$/YEAR)*

*AVERAGE LUMBER INVENTORY (as % TOTAL LUMBER & RESIDUALS \$/YR)*

*LABOR \$/MBF LUMBER SAWN*

*TOTAL OTHER VARIABLE COST \$/MBF*

*TOTAL FIXED COST \$/YR (except interest & depreciation)* – these cells are for straight-forward entries. In many (perhaps most) cases the total production “*TOTAL MBF LUMBER PRODUCED*” will be significantly below normal for the first (partial) year, then may be unchanged following year #2. The other variables might be expected to change. It is fairly easy to create a formula in any cell following year #3 where the variable may be increased by a percentage basis from the prior period, and then copy that formula to cells representing the following year (an example would be provided in the sample data in the model starting in year #4 for any of the variables other than inventory).

Section: *KEY PRODUCTION DATA FOR ENTRY INTO MODEL* – This section is where the production assumption entries which were made above are transformed into data that are directly entered into the model. The data for period #2 (the first full year) are of course unchanged from the first entries made in the ENTRY column, except that entries for “*AVERAGE LOG INVENTORY (as % TOTAL LOG COST \$/YEAR)*” and for “*AVERAGE LUMBER INVENTORY (as % TOTAL LUMBER & RESIDUALS \$/YR)*” which were entered as a percentage value are now transformed by calculations into dollar values representing (respectively) “*AVERAGE VALUE LOG INVENTORY*” and “*AVERAGE VALUE LUMBER INVENTORY*” for all 20 of the year-periods. The other variables are simply transformed into the appropriate number (representing lumber production) and dollar values for all other variables, for the first period (partial year start-up) and for the year-periods #3 through #20.

*TOTAL MBF LUMBER PRODUCED*

*AVERAGE LOG COST/MBF LUMBER*

*AVERAGE \$/MBF LUMBER & RESIDUALS*

*AVERAGE VALUE LOG INVENTORY*

*AVERAGE VALUE LUMBER INVENTORY*

*PRODUCTION LABOR TOTAL \$*

*TOTAL OTHER VARIABLE COST \$*

*TOTAL FIXED COST \$/YR (except interest & depreciation)* – all variables explained earlier and no entries are required in any columns, all data are calculated from prior inputs.

Major Section: CAPITAL INVESTMENTS AND SIMPLIFIED ESTIMATION OF DEPRECIATION – This major section is where investment and depreciation assumptions (for tax purposes) are entered into the model. The model is designed to “automatically” (or most routinely) accommodate what should be most common in its effects on taxes. The model estimates depreciation for investments in the different property classes using the Modified Accelerated Cost Recovery System (MACRS) General Depreciation System (GDS) system with the 200% Declining Balance (DB) and half-year convention. A detailed discussion of property class assignment is well beyond this manual, but in simplification, suitable for use as a starting point in initial pre-feasibility runs ONLY – until you have better information, you may wish to do your first trial run where you assign building structures (but not kilns) as 20 year property; land improvements as 15 year property; over the road tractor units as 3 year property; trucks, office equipment (including computers) and cars as 5 year property; and the vast majority of equipment, including virtually all production equipment should probably be assumed to be 7 year property. (Note: For detailed information on this see Internal Revenue Service Publication 946 including information regarding what property class applies to different types of property, and the associated recovery periods for those classes (which are imbedded into the model)). As noted in explanation within the model, the total INITIAL investment in each of the different property classes is simply entered in column C as appropriate to use this (relatively standard) form of depreciation within the analysis. In each case the entry made in column C is calculated as a percentage of total investment in column D. If it is preferred to use another form of depreciation for analysis (i.e. other than the MACRS GDS system with the 200% DB and half-year convention, entries may be ignored (i.e. change the entry to a value of “0” or zero) in all six of the “# Year Recovery GDS (MACRS) Property” cells below, but non-depreciable property and working capital should both still be recorded where it is indicated they belong.

*INVESTMENT AND DEPRECIATION INFORMATION (label only)*

*Total in MACRS year category GDS System 200% (label only)*

*3 Year Recovery GDS (MACRS) Property*

*5 Year Recovery GDS (MACRS) Property*

*7 Year Recovery GDS (MACRS) Property*

*10 Year Recovery GDS (MACRS) Property*

*15 Year Recovery GDS (MACRS) Property*

*20 Year Recovery GDS (MACRS) Property*

*Non-Depreciable (e.g. land) – make dollar entry as appropriate in property class.*

*TOTAL INITIAL INVESTMENT (except working capital) >>>* - is a calculated total of the above entries.

*Initial Working Capital* – requires a dollar value entry for initial working capital. Immediately below this row, in column F is a number that has a label to its left in the spreadsheet model as: “NOTE: THE ANALYSIS ENTERED ABOVE ESTIMATED LOG \$ LUMBER INVENTORY FOR PERIOD #2 AS BEING >>>” this value is the estimated first full year value of log and lumber

inventory. It is reasonable to assume that the value presented should probably represent a lower end assumption for required working capital.

Immediately following this input section is a display section with a header label indicating *ASSUMED % DEPRECIATION TAKEN IN PERIOD (first yr in service = year #1, second year in service = year #2, etc.)*

Then a breakdown label “*PROPERTY TYPE*” and the following rows:

*3 YEAR RECOVERY GDS (MACRS) PROPERTY*

*5 YEAR RECOVERY GDS (MACRS) PROPERTY*

*7 YEAR RECOVERY GDS (MACRS) PROPERTY*

*10 YEAR RECOVERY GDS (MACRS) PROPERTY*

*15 YEAR RECOVERY GDS (MACRS) PROPERTY*

*20 YEAR RECOVERY GDS (MACRS) PROPERTY* – within this section, no entry is required,

what is displayed is the percentage of the value of the associated class of property that is taken as depreciation in each of the year-periods. In each case, the number of periods or years over which depreciation is actually taken exceeds the nominal years in that class name by one period. This is because using the half-year convention, a half-year of depreciation is taken for the first and last years. The percentages which are entered in the various year categories are the percentages which are actually used in the calculation of depreciation for items entered into the depreciation section. By investigation of how these cells are used in calculations to obtain total depreciation in each year, someone who is a reasonably advanced spreadsheet user with some reasonable knowledge of the topical area may quickly ascertain that if they might wish to make alterations to the model to suit their particular circumstance; that would be fairly easy to accomplish.

Summary and Entry Section: “*TOTAL VALUE OF DEPRECIATION ENTERED INTO MODEL FOR YEAR*” is a section heading label, and has a cell immediately below which labels

“*DEPRECIATION VALUES FOR YEAR*” followed by cells representing the years’ numbers in the row. The next row, labeled:

“*INITIAL INVESTMENT GDS (MACRS) PROPERTY ACQUIRED YEAR #1*” - contains automatic entries that have been calculated for each year based upon entries that have been made for investments in each of the MACRS property classes. This is calculated by taking the investment value assigned to each property class, and then multiplying it by the percentage (expressed as a decimal fraction) for the period, then adding these values for each of the depreciation classes. These automatic entries apply for investments made in the initial period only within the standard entry cells as described above. Two following rows are labeled as:

*Other Depreciation in Year (optional entry)*

*Other Depreciation in Year (optional entry)* – are rows for other entries which may be used as appropriate, if desired, and:

*TOTAL DEPRECIATION IN YEAR* – which simply provides a summation of the depreciation entries made in the three rows above, including the summation of all MACRS class entries (year by year) and in the two “other” rows.

There are what should be obvious (and what might not be immediately obvious) ways of using the optional entry rows. What should be an obvious way to use the rows “*Other Depreciation in Year (optional entry)*” would be to separately calculate the depreciation (using any method that might be desired) and to make a direct dollar value entry into each year as appropriate. This

would (of course) be something that could be done regardless of what type of depreciation someone might want to use and regardless of the year the property is placed in service. Another perhaps not so obvious way in which the entry rows for “Other Depreciation in Year (optional entry)” would be for later investments to be made in the period of analysis using depreciation with the (standard) MACRS depreciation system. In terms of example, it is likely most of the 7 year property class property should physically last for the twenty year period of the analysis; however, some of it could be replaced, and with almost certainty, some of the 5 year property class property will not be expected to physically last for the twenty year period of the analysis and some of it will almost certainly need to be replaced; so assume as an example, that investments in both 5 and 7 year class property might be made in year 11 to replace worn out equipment, and that the analyst desires to use the (standard) MACRS depreciation system. That kind of an entry is actually very easy to make. To do this, the person using the model would simply FIRST enter the investment information for the later investment as if it was an initial investment - in this example, the appropriate assumed investments for year 11 would be entered as values in the MACRS entry section, and this should be done BEFORE any initial investment data are entered (NO OTHER INVESTMENT DATA REPRESENTING INITIAL INVESTMENTS SHOULD BE IN THE CELLS), and it should be done using the nominal value that is expected for the investment at that time in the future. In doing this, the model will generate the appropriate depreciation values to be taken year by year beginning at the time the new property is purchased and placed in service in the future (in this example year #11) – BUT – what should represent the value for that depreciation in year #11 is actually shown in the row titled “*INITIAL INVESTMENT GDS (MACRS) PROPERTY ACQUIRED YEAR #1*” in year #1, and the value for year #12 is shown in year #2, and so on. All the user needs to do to put these into the appropriate place is to use the spreadsheet to COPY these values AS A VALUE into the years where they belong. To do this use the COPY command to copy the string of numbers, and then (beginning in the appropriate cell on a following row for “*Other Depreciation in Year (optional entry)*”) do a PASTE SPECIAL and indicate you are doing it as a VALUE. Once the appropriate values for the future investments are in their appropriate places in the “other” rows, the user can then simply enter all the appropriate data for all classes of property for the initial investment. For someone with a little spreadsheet experience this is quite easy to understand, and it may be hard to remember times past when they themselves didn’t understand the differences between “cut” and “copy” or between the copying of formulas or values – for other users, the following is suggested: before you try this, SAVE your spreadsheet. Then try to perform the operations as explained – as a reminder, you want to do the future investments first, before any entries are made for the present. Use the future investment values in entry, and the results will appear in the row titled “*INITIAL INVESTMENT GDS (MACRS) PROPERTY ACQUIRED YEAR #1*” as explained earlier. Then simply highlight the appropriate string of cells (e.g. it should have values in cells representing years #1 to #8 if 7 year property is considered and use the command to “COPY” the highlighted area. Then put you cursor on the cell (e.g. in year #11 in one of the “*Other Depreciation in Year (optional entry)*” rows – BUT – DO NOT simply do a command to “PASTE” – what you want to do is a command called “PASTE SPECIAL” and then you will have a number of items to select from in terms of what you want to paste the information as, and the one you want to chose is “VALUES”. If at first you don’t succeed, that is why you saved, but it is not too difficult to learn.

As indicated prior the summation row “*TOTAL DEPRECIATION IN YEAR*” will provide a summation of the three rows above, including the initial investment with MACRS and the two “other” rows. Obviously a user could insert additional rows if needed and adjust the summation, or with most spreadsheets, if the inserted rows are between rows above (e.g. between the two “other” rows) the spreadsheet should automatically adjust the summation function for the “*TOTAL DEPRECIATION IN YEAR*” row.

Entry Section: “*METHOD FOR HANDLING EXCESS DEPRECIATION IN YEAR*” Within this section the user will make a selection for treatment of “excess depreciation”. Excess depreciation exists in a circumstance in which the depreciation that may be taken in the year exceeds the net income before depreciation and tax. In this case, if the full measure of depreciation were taken, this would cause a before-tax loss to occur, with the amount of excess depreciation being equal to the amount of before tax loss due to taking depreciation. Since depreciation is an expense you “pay to yourself” - its purpose being simply to shield some allowed portion of revenue from tax to allow for the recovery of the cost of depreciable investment in before-tax dollars – too much “depreciation expense” in a year can result in a circumstance wherein there is “excess depreciation”, or simply the allowance for depreciation exceeds the net income before depreciation and tax. If this is ignored, it is simply an opportunity lost, and the loss can be significant as it equals a contribution to after-tax net cash flow equal to the amount of excess depreciation multiplied by the tax rate. Excess depreciation can and does occur in businesses that have considerable potential for success – said differently – a circumstance where a before-tax “loss” occurs due to depreciation does not necessarily imply a serious problem. This can (and does) occur with some degree of frequency and is particularly common in circumstances wherein the depreciation expense in early years (or the startup year) may be relatively high (as it frequently is) and net income before depreciation and tax may be relatively low (as it frequently is). An example of a very common circumstance where this occurs is in a short (less than 12 month) start-up year where production is low and costs may be relatively high, and this can carry over into the following year. Consequently three choices are made available to deal with any excess depreciation, they are:

Choice #1: “*Excess depreciation for the year (that is depreciation in excess of taxable income) is to be "lost" without carryovers or adjustments.*” Or...

Choice #2: “*Excess depreciation for the year to be carried over to the next year.*” Or...

Choice #3: “*Excess depreciation for the year to be treated equivalent to being a reduction in taxable income for a related operation in the same year.*”

The user selects which of these three options is desired by entering the number of the choice (1,2 or 3) in the cell in Column C as shown in example where option #2 is chosen:

*e>> Enter #1, 2 or 3 for Excess Depreciation Treatment Choice >>>> 2*

The two rows immediately following “flag” the user as to the selection, as in example:

“*NOTE: The number you have entered in the cell above reflects the excess depreciation treatment below, if this is not correct, make another choice, 1, 2 or 3*” then in the following row: “*NOTE: THIS IS SELECTION FOR TREATMENT>>>>*” followed by “*Excess depreciation for the year to be carried over to the next year.*”

In the event something other than one of the three selection numbers is chosen, this final message will be “*SELECT THE DESIRED METHOD FOR HANDLING EXCESS*”

*DEPRECIATION IN YEAR BY SELECTING NUMBER OF CHOICE, 1, 2 OR 3*” instead of a description of one of the three selections.

How any excess depreciation will be handled will be based on which of the three choices is selected, explained as follows:

Choice #1: “*Excess depreciation for the year (that is depreciation in excess of taxable income) is to be "lost" without carryovers or adjustments.*” This is an extremely conservative choice in which the potential benefit of any excess depreciation will be assumed to permanently lost.

Choice #2: “*Excess depreciation for the year to be carried over to the next year.*” This is a very logical choice for what might be considered in planning for what is essentially a “stand-alone” operation, or for an operation which may be an expansion to a much smaller existing operation or to an existing operation that does not have significant income subject to tax. In this choice any excess depreciation in a given year will be “carried-over” to the following year reflecting an increase by that amount for the depreciation expense in the following year. This carry-over will keep going in accumulation until the depreciation is used.

Choice #3: “*Excess depreciation for the year to be treated equivalent to being a reduction in taxable income for a related operation in the same year.*” This is a very logical choice for what might be considered in planning for what is essentially an “add-on” operation, or for an operation which may be an expansion to a large existing operation or to an existing operation that does have significant income subject to tax. In this choice it is assumed that any excess depreciation in a given year will be used to reduce income before tax in another part of the larger operation, having the same net affect on the operation as a whole as if the depreciation expense was taken in that year within the feasibility analysis. This is accomplished by multiplying the excess depreciation by the tax rate (on income) and adding that to the operational after tax net cash flow in an adjusting entry.

Summary and Entry Section: “*CAPITAL INVESTMENT SUMMARY*” is a major summary and entry section heading label, and has a cell immediately below which labels (*NOTE: All standard Year #1 investments, including year #1 working capital, are entered automatically. Total investments in all other years (if any) must be manually entered.*) which relates to the next row of data. Except as noted, all entries in this section are in column C.

*INVESTMENT IN YEAR (manually enter investments after year #1 only)* – for year #1 (column C) an entry is automatically created based upon the standard investment entries including the summation of all MACRS class entries and initial working capital. For investments in all other years the entry should be made directly in the column for the appropriate year. If additional investments (other than the standard MACRS class entries and initial working capital) are to be made for year #1, the value of those additional investments should be added to the formula in column C (cell C292), to do this, simply edit the cell formula, enter a plus sign (+) to the formula and then enter the value (e.g., the formula in the cell is: =C267+C268, edit this formula to reflect =C267+C268+the other investment in the year not reflected in the other two cells in the formula. *TOTAL INVESTMENTS ALL YEARS* – as indicated, this is a simple (non-discounted) summation of all investments in all years recorded in the prior row.

*NPV TOTAL INVESTMENT IN EACH YEAR* – this is the prior row of *INVESTMENT IN YEAR* with each investment discounted to the equivalent Net Present Value (NPV) for that year’s investment (based on the discount rate of the cost of capital which will be entered by the user later in program, and as that interest rate is changed by the user these and other value will



change). Where there are investments made after year #1, this value will be different than the value for *TOTAL INVESTMENTS ALL YEARS*, reflecting the effect of discounting future investments.

*NPV TOTAL INVESTMENTS ALL YEARS*– as indicated, this is counted) summation of all investments in all years recorded in the prior row. Where there are investments made after year #1, this value will be different than the value for *TOTAL INVESTMENTS ALL YEARS*, reflecting the effect of discounting future investments.

*TOTAL DEPRECIATION ALL YEARS* - as indicated, this is a simple (non-discounted) summation of all depreciation recorded for all investments in all years

*INITIAL WORKING CAPITAL* – value entered prior by user

*NON-DEPRECIABLE ASSETS* – value entered prior by user

Estimated Salvage Value of Non-Depreciable Assets – the user enters what the estimated salvage value will be off all non-depreciable assets (e.g. land) at the end of the 20 year analysis period (the difference in value would be subject to capital gains tax in the analysis)

*RESIDUAL "BOOK" VALUE OF DEPRECIABLE ASSETS* – this is a calculated value which expresses the difference (residual value) between investments made in depreciable assets compared to the depreciation which is taken in the 20 year analysis.

*Estimated Salvage Value of Depreciable Assets* - this entry value is made by the user estimating the value of all depreciable assets at the end of the 20 year analysis period. In many circumstances equipment might have some value for continued use (or for sale) long after the equipment has been depreciated to a “zero” book value (this difference in value of estimated salvage value as compared to book value would be subject to capital gains tax in the analysis).

*ASSETS SUBJECT TO CAPITAL GAINS TAX* – this is a calculated value which sums the calculated value of assets that would be subject to capital gains tax at the end of the 20 year analysis. This value will automatically be considered within the analysis; it will be treated as an inflow subject to capital gains tax for purposes of the analysis in providing a closure for the difference of factual values versus the book values.

*Corporate tax rate as a % of income and Capital Gains Tax Rate* – call for entries in the respective cells in column C to be used in the analysis. Regarding the corporate tax rate on income, the combined tax rates (e.g. federal and state) need to be considered and incorporated into the analysis. This is simplified to having the blended tax on net income expressed as a single percentage versus using rate tables or some other complicated lookup schema and should be suitable for pre-feasibility analyses. A problem with tables is the vain hope they could ever adequately be kept, and the complication of dealing with a considerable number of states. Balance this with the consideration that even if that was structured into a complicated model – how this might change in the future is simply a guess. An additional complication which will be mentioned later deals with how tax (and also depreciation) is to be considered for periods where a loss may occur. Regarding the capital gains tax – this is also of course a guess – the principal effect is largely for residual value different from book at then end of the analysis period, and the effect is likely minor regardless, except perhaps in circumstances where enormous increases might occur in value over the analysis period (e.g. land with some potential future value that is very high). These simplified entries have been demonstrated to be straight-forward and suitable over a few years now for the use for which the model was designed. Greater detail can be accomplished if desired by direct entry in later rows as appropriate.

Major Section - *LOAN INFORMATION (AMOUNT, INTEREST, MINIMUM P&I, ETC.)* – this is the section where basic long-term loan estimates will be made. For purposes of simplicity (and more important clarity) within initial pre-feasibility analyses, the model deals with a single assumption regarding a long term loan in dealing with a major lender as a source of debt capital. The simplified assumption is that principal and interest are recovered in equivalent end of period payments at the end of each year – as approximate equivalence on the calculated effective annual interest rate. It is well recognized that in most circumstances new ventures of any size will typically have a menu array of debt financing through various programs which can ultimately be quite confusing to an average person in terms of overall effect – the simplification here has over the years been demonstrated to be very suitable for its purpose of use in pre-feasibility analyses, with the complicating elements more thoroughly dealt with in the actual financials of the business plan.

*Original Loan* – this is simply the user entry of the principal amount of the loan.

*Nominal interest rate per year* – this is the user entry of the nominal interest rate (before period compounding) of the loan.

*# Compounding periods/yr* – this is the user entry of the annual compounding periods – usually this is “defined in the rate quote.

*EFFECTIVE ANNUAL INTEREST RATE* – the nominal interest rate of the loan as quoted on a nominal rate per-annum basis will commonly be compounded at some rate (e.g. monthly), whereby the nominal rate will be divided by the number of compounding periods in the year, and then interest will compound each period to the calculated effective annual interest rate. This *EFFECTIVE ANNUAL INTEREST RATE* will be used as the annual interest rate in the calculation. As an example, with 12% annual interest compounded monthly, the nominal rate per annum is 12%, but the loan is really on the basis of 1% interest each month with compounding, so the nominal 12% per annum in the example would really be the same as 12.6825% as an effective annual rate.

*Period of Loan (years)* - this is the user entry of the term of the loan – usually this would be less than the 20 year period of the analysis, and it should not typically be more.

*REQUIRED P&I PAYMENT/YEAR (annual payment estimate)* – this is the estimated equivalent end of year annual loan payment (P&I) that would retire the loan within the term at the effective interest rate specified. Specific breakdown of components will be shown later where appropriate.

Major Section - *FINANCIAL SUMMARY ANALYSIS* – as implied this is a major overall summary section based on preceding items and associated calculations. The majority of these rows are self-explanatory in title heading, amplification and explanation are only desirable or necessary for a few items

*TOTAL MBF LUMBER PRODUCED*

*REVENUE FROM NORMAL OPERATIONS (from lumber and residuals)*

*VARIABLE RAW MATERIAL COST*

*VARIABLE LABOR COST*

*OTHER VARIABLE COST* - are all self-explanatory in title heading.

*GROSS MARGIN in \$ (operational revenues - variable cost)* – the may be defined somewhat differently in various areas, hence the definition used here is virtually defined within the heading as representing the difference between total operational revenues and total variable costs in a total dollar amount. Other programs used in industry (e.g. the GRADEYIELD program) calculate this defined gross margin on a \$/MBF basis by grades and species in basic contribution

to profitability analyses and this is something which most in industry (particularly within the hardwood industry) have become familiar.

*GROSS MARGIN as % of REVENUE FROM OPERATIONS* – this is simply the same gross margin as above expressed as a percentage of revenue from operations.

*other net revenue subject to normal tax* – as implied this would be used for entry of any other net revenue (i.e. revenue minus cost) which would be subject to normal tax rates (i.e. not subject to capital gains tax). Such required entries might be expected to be unusual at best in most cases, and some thought might be required to even imagine a circumstance where such an entry might be appropriate. One example of such an entry could be in the reselling of some logs (e.g. veneer logs) at a profit, where it would be desired to establish an entry separate from simply reflecting a reduced log cost for logs retained and sawn.

*TOTAL REVENUE*

*TOTAL VARIABLE COST*

*TOTAL FIXED COSTS (except loan)*

*INTEREST ON LOAN*

*NET PROFIT BEFORE DEPRECIATION & TAX* - are all self-explanatory in title heading.

*STANDARD DEPRECIATION FOR YEAR* – this amount is the total depreciation expense for the year as originally calculated before the potential effects of any carryovers.

*DEPRECIATION CARRYOVER FROM PRIOR YEAR (if selection 2)* if Choice #2: “*Excess depreciation for the year to be carried over to the next year.*” has been selected earlier in the spreadsheet, then any excess depreciation in a given year will be automatically “carried-over” to the following year and entered in this row in the following year.

*TOTAL DEPRECIATION EXPENSE AVAILABLE* – This is the sum of “*STANDARD DEPRECIATION FOR YEAR*” and “*DEPRECIATION CARRYOVER FROM PRIOR YEAR (if selection 2)*” this reflects the total depreciation expense available in the year. If the total depreciation expense cannot be used, the carry-over will keep going in accumulation until the depreciation is used.

*"EXCESS" DEPRECIATION FOR YEAR (in excess of profit)* - this simply identifies the total excess depreciation expense for the year in comparing *NET PROFIT BEFORE DEPRECIATION & TAX* with *TOTAL DEPRECIATION EXPENSE AVAILABLE* this is displayed for reference regardless if the excess amount will be subject to adjustment if selection 2 or 3 is chosen, or not.

*EXCESS DEPRECIATION ADJUSTMENT (if selection 2 or 3)* - if selection 2 or 3 is chosen, and there is excess depreciation, this amount of excess depreciation will be adjusted to either carry-over or equivalence value.

*DESIGNATED DEPRECIATION FOR YEAR* - this simply identifies the total depreciation expense for the year. If selection 2 or 3 is chosen, any excess depreciation will have been adjusted to either carry-over or equivalence value. Consequently, the size of the depreciation expense is limited to a maximum of the net income before depreciation and tax. As a result the taxable income will not be reduced below a “zero” value (i.e. it will not be reduced to the point of becoming a loss) as a result of excess depreciation expense. This does not mean a loss cannot occur in the selection 2 or 3 choices, simply it means that it will not occur due to excess depreciation. If the other option of selection 1 is chosen no adjustment is made and the full amount of the “*STANDARD DEPRECIATION FOR YEAR*” is applied.

*CALCULATED TAXABLE INCOME* – is self-explanatory, representing revenue minus expenses. This will be a negative number (reflecting a loss) if expenses exceed revenues, unless the

difference can be (and is) accounted for in adjustments to depreciation expense taken in the year in which case it will have a minimum “zero” value.

*CALCULATED TAX ON INCOME FROM OPERATIONS AND OTHER REVENUE* - is self-explanatory, consisting of the taxable income multiplied by the percentage tax rate which was entered earlier for “*Corporate tax rate as a % of income*”. If “*CALCULATED TAXABLE INCOME*” has a negative (or zero) value, the calculated tax will be assigned a “zero” value.

*adjustments to normal tax liabilities (e.g. credits, etc.)* – is self-explanatory, simply allowing for special manual adjustments, such as for tax credits.

*TAX ON INCOME FROM OPERATIONS AND OTHER REVENUE* – is simply *CALCULATED TAX ON INCOME FROM OPERATIONS AND OTHER REVENUE* considered along with *adjustments to normal tax liabilities (e.g. credits, etc.)* if adjustments are made.

*(operational) AFTER TAX PROFIT (LOSS)* – is self-explanatory, simply the taxable income minus tax (with adjustments)

*(operational) AFTER TAX NET CASH FLOW (ATNCF)* – is “*(operational) AFTER TAX PROFIT (LOSS)*” with the “*DESIGNATED DEPRECIATION FOR YEAR*” added to it. Since the depreciation was in actuality an expense the operation paid to itself, this expense represents a cash flow into versus out-of the operation and is available for other uses. If the effect of an adjustment to deal with excess depreciation is not fully understood, it may be noted that the effect of having excess depreciation will not directly affect the value of “*(operational) AFTER TAX NET CASH FLOW (ATNCF)*”. The excess depreciation reduces the “*CALCULATED TAXABLE INCOME*” to a negative value (which is not subject to additional tax) then when the (larger) depreciation value including the excess is added back to the “*(operational) AFTER TAX PROFIT (LOSS)*” the “*(operational) AFTER TAX NET CASH FLOW (ATNCF)*” will assume the same value. However, since an opportunity to shield other taxable income from tax was foregone by not doing the adjustment, this would preclude using that for reduction of tax in the future (in the case of a carry-over) or from assuming that benefit for another part of the company.

*EXCESS DEPRECIATION ADJUSTMENT TO ATNCF (if selection 3)* – is selection 3 is chosen for dealing with excess depreciation – i.e. “*Excess depreciation for the year to be treated equivalent to being a reduction in taxable income for a related operation in the same year.*” - which is what might be considered in planning for essentially an “add-on” operation, or to an existing operation with significant income subject to tax. This represents that adjustment for excess depreciation in a given year being used to reduce income before tax in another part of the larger operation, having the same net affect on the operation as a whole as if the depreciation expense was taken in that year within the feasibility analysis. This is accomplished by multiplying the excess depreciation by the tax rate (on income) and adding that to the operational after tax net cash flow in an adjusting entry.

*ADJUSTED (operational) AFTER TAX NET CASH FLOW (ATNCF)* – this is simply the “*(operational) AFTER TAX NET CASH FLOW (ATNCF)*” with the “*EXCESS DEPRECIATION ADJUSTMENT TO ATNCF (if selection 3)*” adjustment (if any) included.

*other revenue NOT subject to capital gains tax (AUTO FOR YEAR 20)* - this allows for inclusion of any net revenue for the period that is not subject tax in any year, but the primary need for this row is the analysis adjustment wherein the model assumes that inventory and assets are "sold" in year 20, and the residual book value of depreciable assets, and the basis values of inventory and non-depreciable assets are essentially treated as revenues but not subject to tax. This is automatically handled for year 20 in the end of the analysis.

*other net revenue subject to capital gains tax (AUTO FOR YEAR 20)* - this allows for inclusion of any net revenue for any year that will be subject capital gains tax in that year, but the primary need for this row is the analysis adjustment wherein the model assumes that inventory and assets are "sold" in year 20, and the appreciated fraction of value of non-depreciable assets and inventory is subject to capital gains tax. This is automatically handled for year 20 in the end of the analysis.

*CAPITAL GAINS TAX* - this is simply the calculated value in multiplication of "*other net revenue subject to capital gains tax (AUTO FOR YEAR 20)*" by the value assigned prior to "*Capital Gains Tax Rate*".

*AFTER TAX NET CASH FLOW (ATNCF) FOR YEAR* – this is simply the calculated value for "*ADJUSTED (operational) AFTER TAX NET CASH FLOW (ATNCF)*" with all other adjusting entries included representing the final value of the "*AFTER TAX NET CASH FLOW (ATNCF) FOR YEAR*" calculated prior to principal repayments on the loan.

*MINIMUM LOAN PRINCIPAL REPAYMENT* – this is the fraction of the annualized loan P&I annuity that is attributable to representing principal for the year on the original loan.

*Additional loan principal repayment* – this allows for early repayment of principal on the loan in excess of the required fraction of principal within the annualized loan P&I annuity that is attributable to representing principal for the year on the original loan. If any such payments are made, the P&I fractions within subsequent annuity payments will be automatically readjusted with the annuity held constant, resulting in either early retirement of the loan or a smaller than projected final payment.

*Any Other Net Direct Additions or (Subtractions) to ATNCF* – this allows a final adjustment directly to the after tax net cash flow. This would likely be a very unusual adjusting entry, as typically additions would be accomplished prior as "*other revenue NOT subject to capital gains tax*" or as "*other net revenue subject to capital gains tax*" as virtual "catch-alls" for final additions reflecting also in the final after tax net cash flow as appropriate. The case of a subtraction to ATNCF to reduce the net addition to retained earnings would be more likely (but still unusual for an analysis of this type) in the form of dealing with the effects of an additional loan with associated principal repayment.

*NET ADDITION (SUBTRACTION) TO RETAINED EARNINGS IN YEAR* – this is simply the "*AFTER TAX NET CASH FLOW (ATNCF) FOR YEAR*" less any principal repayments on loan and any other adjusting entries. The number can assume a negative value which represents an outflow from retained earnings. In terms of example, a required principal repayment on the loan that is in excess of the "*AFTER TAX NET CASH FLOW (ATNCF) FOR YEAR*" will drive this number to negativity and define an appropriate reduction to retained earnings.

*CUMULATIVE RETAINED EARNINGS* – is self-explanatory, simply the "*NET ADDITION (SUBTRACTION) TO RETAINED EARNINGS IN YEAR*" applied to the existing (prior) value for "*CUMULATIVE RETAINED EARNINGS*" at the start of year (or end of prior year) or to "0" in the first year.

Minor Section: *SUMMARY OF LOAN INFORMATION* – this simple section provides a summary of the loan in a combined format just below the prior section "*FINANCIAL SUMMARY ANALYSIS*". Experience has shown that lenders tend to greatly appreciate having this comprehensive simple summary in this location.

*BEGINNING PRINCIPAL DUE*

*MINIMUM PRINCIPAL REPAYMENT (in year end payment)*

*ADDITIONAL PRINCIPAL REPAYMENT (in year end payment)*  
*ENDING PRINCIPAL DUE*

*INTEREST PAYMENTS (in year end payment)* - are all self-explanatory in title heading.

Major Section: *SUMMARIES AND FINAL REQUIRED ENTRY FOR CALCULATION OF NET PRESENT VALUE (NPV) & INTERNAL RATE OF RETURN (IRR) & NON-DISCOUNTED CUMULATIVE SUMMARY OF THE AFTER TAX NET CASH FLOWS* – this major section has four sub-sections related to in one sub-section raw summary presentation and calculations and in the other three some overall summaries which can give the analyst insight indicative of the potential overall financial performance of the operation as a whole for the full twenty year analysis period, or fraction thereof.

Sub-Section: *STREAM OF EQUIVALENT PRESENT VALUE OF INVESTMENT OUTFLOWS AND THE AFTER TAX NET CASH FLOW INFLOWS EACH YEAR (INCLUDING RESULTS OF YEAR 20 DIVESTURE)* – this sub-section simply brings in one single row in a logical format for spreadsheet financial use the *EQUIVALENT NPV OUTFLOW OF INVESTMENTS IN ALL YEARS* (expressed as a negative cash flow in Column B) and the end-of-year equivalent after tax net cash flows for the full 20 years of the analysis. Where investments may be made at other times in addition to the beginning of the analysis all are discounted to an equivalent “time zero”. This figure is reduced by a discounted value of the initial cash in excess of inventory to represent an appropriate equivalent present value of that amount recovered at the end of year 20 (versus nominal value) to reflect a reasonable approximation of the opportunity cost in holding that cash. These data will be used in subsequent calculations and are available to the analyst and others for review.

Sub-Section: *OTHER SUMMARIES AND FINAL REQUIRED ENTRY FOR CALCULATION OF NPV AND IRR OF THE AFTER TAX NET CASH FLOWS* – all items in this sub-section in Column D are calculated, or simply presented again for summary, except for the selection of a discount rate to be entered by the analyst/user.

*TOTAL INITIAL INVESTMENT INCLUDING WORKING CAPITAL*

*APPROXIMATE NET PRESENT VALUE OF INVESTMENTS IN ALL YEARS* – are simply items calculated and presented earlier included here for review summary

*PRESENT VALUE OF INITIAL WORKING CAPITAL LESS INITIAL INVENTORY* – this considers the opportunity cost associated with holding cash. The residual of working capital in excess of initial inventory is deemed to represent the required minimum cash on hand for operations. This value is recovered by the analysis at the end of year 20, however its discounted value is calculated to represent the opportunity cost associated with holding that amount for use as working capital.

*Cost Of Capital to use as "i" in NPV Calculation* – this is the user selected discount rate that will be used in all discounting in the analysis, including within the calculation of the Net Present Value of the After Tax Net Cash Flow. It is also used as the initial trial rate in the Internal Rate of Return calculation.

*PRESENT VALUE OF ATNCF NET CASH FLOW (ATNCF PV)* – this is the Present Value of the After Tax Net Cash Flow values for years #1 through #20 inclusive, discounted to an equivalent “time zero” value using the assigned interest rate “i” as a cost of capital in discounting. This is a simple Present Value of the After Tax Net Cash Flows in the years as indicated. It is not adjusted

to reflect the equivalent “time zero” cash outflows representative of the investments in the operation.

*SUM OF DEPRECIATION (TOTAL FOR YEARS 1-20)* – this is self-explanatory, a simple (non-discounted) summation of the scheduled depreciation.

Sub-Section: *CALCULATION OF NET PRESENT VALUE (NPV) AND INTERNAL RATE OF RETURN (IRR) OF THE AFTER TAX NET CASH FLOWS* – this section contains the overall approximation of the financial performance of the operation using discounted returns to consider the effects of non-gratuitous use of capital. Paying greater attention to these measures of performance as compared to non-discounted methods (e.g. approximate Payback years) is suggested.

*APPROXIMATE FINAL NPV OF AFTER TAX NET CASH FLOW* – The results of the Net Present Value analysis compares the cash outflows in investment (in equivalent “time zero” value) to the discounted After Tax Net cash Flows over the twenty year analysis period. The effect of discounting (using the user specified “*Cost Of Capital to use as "i" in NPV Calculation*”) to convert these future dollars into their “time zero” equivalent allows for direct comparison of the cash outflows and the cash inflows. As a decision criteria for the analyst, a positive Net Present Value is considered to be acceptable or “good” – this means the investment is recovered with the appropriate return of “interest” as required in the specified cost of capital. In contrast a negative Net Present Value is considered to be unacceptable or “bad” – this means the investment is not recovered with the appropriate return of “interest” as required in the specified cost of capital. It IS possible to have an operation that is profitable and has positive ATNCF overall, but has a negative Net Present Value because the performance is not sufficient to meet the required interest rate specified by the cost of capital. It may be noted that reductions in the interest rate “*i*” will have the effect of increasing the NPV of the ATNCF, while increase will have the opposite effect.

*APPROXIMATE INTERNAL RATE OF RETURN (INVESTMENT & ATNCF)* – the approximate Internal Rate of Return of the operation in analysis of the investment and ATNCF dollar outflow/inflow is included for analysts who prefer that measure of performance (which is favored by some primarily in the engineering community). The calculation of IRR in this case essentially is an iterative process in finding the interest rate “*i*” that will set the NPV exactly equal to zero. Generally regarding the decision criteria in use of IRR, if the IRR exceeds the operation’s specified cost of capital, that is favorable – this assumes a single IRR value. One caution in use of the IRR as compared to the NPV measure, in the event of sign changes in the ATNCF stream (e.g. alternation of the stream from one or more years each within a sequence of changing signs, such as a stream, that is negative-positive-negative, or, positive-negative-positive) will result in multiple internal rates of return with much more complicated decision criteria.

Sub-Section: *SIMPLIFIED NON-DISCOUNTED ESTIMATES OF THE TIME-FRAME REQUIRED TO RECOVER INVESTMENT* – this sub-section is for the analyst (or their supervisor or associate) who simply cannot live without their “Payback Analysis”. A “Payback” is not itself calculated precisely to the fraction of a period – however casual examination will quickly show the year in which “Payback” occurs, where the cumulative ATNCF equals investment.

*CUMULATIVE AFTER TAX NET CASH FLOW (Cumulative ATNCF)*  
*CUMULATIVE ATNCF AS % of TOTAL INITIAL INVESTMENT*

*CUMULATIVE ATNCF AS % of NPV INVESTMENTS ALL YEARS* - are all self-explanatory in title heading.

Major Section: *SUPPLIMENTAL CASH FLOW TABLE (FOR ADDITIONAL ESTIMATES REGARDING THE AFFECTS OF THE TIMING OF CASH INFLOWS AND OUTFLOWS AND POTENTIAL LOSS DUE TO BAD DEBTS)* – this section provides some information regarding cash-flows for the operation, primarily useful in looking at a more coarse idea of the cash-flow situation given the limitation of full year periods. This should not be considered an acceptable substitute for more detailed cash flow forecasting as the business plan is further developed. *INITIAL WORKING CAPITAL INVESTMENT* – this is an automatic entry from prior user specification.

*Percent Annual Sales Revenue Received in Next Year*

*Percent of Annual Raw Material Purchases Paid in Next Period*

*Percent of Period Variable Manufacturing Costs Paid in Next Period*

*Percent of Sales Revenue Lost Due to Bad Debts, etc.* - are all self-explanatory in title heading – it must be remembered in all estimations that the period being considered is one year in length, hence the fraction of total payments and receipts lagged to the next period should likely be a fairly small percentage fraction of the total value.

*BEGINNING CASH (beginning of year)*

*RECEIVABLES FROM OPERATIONS DUE IN YEAR AND OTHER REVENUE*

*INVESTMENT IN LOG & LUMBER INVENTORY*

*PAYMENT FOR RAW MATERIAL PURCHASES DUE IN YEAR*

*PAYMENT FOR OTHER VARIABLE COSTS DUE IN YEAR*

*PAYMENTS FOR FIXED COSTS*

*LOSS DUE TO BAD DEBTS*

*TAX PAYMENTS ON INCOME AND CAPITAL GAINS*

*other cash in (or out) AUTOMATIC FOR YEAR 20*

*PRINCIPAL & INTEREST REPAYMENT*

*ESTIMATED ENDING CASH (end of year)* - are all self-explanatory in title heading and all are calculated values except for the optional adjusting entry for other cash in or out.

As further indicated in explanatory notes for this section: For end of year 20 at end of analysis, there are automatic entries that are made in "*other cash in (or out) AUTOMATIC FOR YEAR 20*" which will reflect (for purposes of "bookkeeping in the analysis) the selling off inventory, divestiture of assets and normal collections and payments that would be expected to occur after the end of operations. In almost all circumstances the ending cash value in the "*SUPPLIMENTAL CASH FLOW TABLE - ESTMATED ENDING CASH*" table will not equal the Cumulative ATNCF or the Cumulative Retained Earnings. This difference compared to ATNCF is because the model calculates ATNCF as before principal payment of loan. The difference in the ending cash "*ESTIMATED ENDING CASH*" in this table and the "*Cumulative Retained Earnings*" where both include the payment of Principal on Loan, is due to the "*ESTIMATED ENDING CASH*" also reflecting the "lags" in payments/receipts and loss due to bad debt. It should be noted that within this model the estimates which are entered in the cash flow table regarding lags in receipts and payments are only considered within the cash flow table "*SUPPLIMENTAL CASH FLOW TABLE*" and none of these are automatically entered in the model, further, estimates which are entered above regarding Lost Due to Bad Debts are also only considered within the cash flow table "*SUPPLIMENTAL CASH FLOW TABLE*" and none of are



automatically entered in the model. If any of these type of adjustment entries are required for loss due to bad debts these should be manually entered in the model above, within the section "*FINANCIAL SUMMARY ANALYSIS*" (e.g. as a negative entry in "other net revenue subject to normal tax" to reflect a reduction in before tax dollars)

#### NOTE ON PRINTING THE MODEL OUTPUT:

When the user is ready to print the output of the spreadsheet model, it is prudent to remember that, in addition the small entry flag column, there is a fairly wide column for the labeling of variables in a row, and then 20 columns are used to represent each year of the 20 year period of the model (or for other variable entries), and a summary column in some areas of the spreadsheet that also may or may not be of interest in a printed output. If an attempt is made to print most or all of the model columns within a standard "portrait" orientation – the results will be very tiny and wholly illegible output. However, the full 20 year model period can be printed in a very legible format by printing in a landscape mode (i.e. across the page) using at least a legal-sized sheet (i.e. 8 ½ inches by 14 inches) using a typical laser printer. The more the left and right margins may be reduced, the better the results will appear. If only a standard letter-sized sheet (i.e. 8 ½ inches by 11 inches) is used when printing in a landscape mode, using a typical laser printer, very small but still reasonably legible type will result if the full 20 year model is printed. It should be remembered that the model is in excess of 400 rows in length; consequently a considerable number of pages will be generated when printing results in the landscape mode. In terms of example, if ½ inch left and right margins are used along with more standard margins on the top and bottom, then a minimum of 6 to 7 pages of output would result, with the number increasing as desired page-breaks may be inserted. Because of this, it is strongly suggested that the print preview feature be used to ensure that page breaks can be checked and inserted if they do not occur in logical places for the desired output. Depending on what the printed output may be used for, if what is represented in the extreme right columns may not be required (or even desired) then printing to less than the full 20 years of the model (i.e. not printing out up to column V or beyond) reduces the constraints and limitations on printing.