DBC® Finance

Refund Tutorial

2021 Edition
Current as of Version 8.800

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Every effort has been made to supply complete and accurate information in this Tutorial. However, we assume no responsibility for how this Tutorial is used. If errors are detected in this Tutorial, we will utilize our best efforts to correct them in a timely manner.

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❖ PREFACE

This tutorial has been developed to assist a public finance professional in using *DBC Finance* to solve and analyze the problems common to an advance refunding issue: the entry and computation of the prior debt service to be refunded, the computation of the escrow requirements, and the sizing and structuring of the refunding bond issue. This tutorial will guide you through a basic advance refunding problem (or Case) using the three general approaches to investing refunding bond proceeds to fund the escrow deposit requirements: present value analysis, State and Local Government Securities (or SLGS), and open market securities. There will also be a wraparound refunding (similar to the wrap in the *Debt/Size* tutorial) and a lesson in using Batch Runs, a tremendous time saving feature for doing many variations of one analysis at one time. There is also background material on the problem solving process to assist newcomers to quantitative analysis in public finance. These suggestions do not apply for every problem but do represent a typical sequence of events, and should provide everyone with a good starting point for using *DBC Finance*.

For the experienced user, we have included some changes to the data as the tutorial progresses to demonstrate how easy it is to make changes after you've entered your initial information.

DBC Finance is updated regularly. If your version is more current than the one used in this Tutorial (Version 8.800), review the **Release Notes** (these are included with every mailed update or for downloaded files). They describe all the revisions and are the only notification of new features available for DBC users.

Please see page 171 for Product Support information including phone numbers.

<div style="border:1px solid">

PLEASE READ FIRST

</div>

Knowledge of *DBC Debt/Size* or **successful** completion of the *Debt/Size* Tutorial are prerequisites to the tutorial. If there are any gaps in your understanding of *Debt/Size*, please feel free to call DBC with your questions. Please follow the instructions in the *Refund* Tutorial keystroke by keystroke. We recommend you read each section carefully. Please, **do not jump ahead** unless you are sure of what you are doing. The sequence of commands is carefully planned to ensure a complete review of each feature being discussed.

❖ INTRODUCTION

DBC Refund was designed to be an easy to use tool for analyzing the economic viability of a tax-exempt advanced, current, and/or crossover refunding. The analytical technique is complicated because it is based on extensive federal tax regulations. *DBC Refund* is designed to structure a refunding bond issue with detailed cash flows including the escrow requirements, securities portfolio for the escrow, analysis of transferred proceeds penalties, accounting for the receipt and disbursement of transferred proceeds, yield analysis, as well as all bond issue reports. To use *DBC Refund* effectively, the user must understand the components of a refunding analysis as well as applicable tax law restrictions. The tutorial is set up to follow the same sequence of inputs that would take place if you were doing a real refunding. However, you will run three variations of a refunding and a more complex version of that same refundings. In addition, you will learn how to automate the process of doing multiple refundings for sensitivity analyses using batch runs.

There are several conventions in this tutorial:

HEADERS/DESCRIPTIONS:

On the first page of each new topic or dialog, there is the following header:

> ### ❖ BOND MATH PRIMER

In the case of dialogs, the header will describe which menu you are in, which item you are in within the menu, as well as which dialog within that item you are in. Each header is followed by a descriptive paragraph.

MENU ITEMS:

When an item from the *DBC Finance* menu is referenced, it will appear in Helvetica type in small caps letter as follows (for the Data menu):

> **in the DATA menu**

INPUT DIALOG:

The sample input dialogs appear, as they should AFTER the required data inputs are entered.

REQUIRED INPUTS:

Whenever there is data for you to enter, it will usually appear above and/or below the sample dialog in Helvetica bold typeface with a finger pointing to it. Note also, that it will not appear indented as it does below. Please, please, please read the paragraph BEFORE you start executing the commands.

> * **Press ENTER at the GENERAL option in the DATA menu. Type "7/1/20" (the last coupon before refunding delivery date) as the dated date.**

REQUIRED READING:

Whenever there are explanations that are critical to your understanding of what you have done, the hand will appear as below to warn you to stop and read.

> 🖐 **NOTE -** The delivery date must be entered correctly or the accrued interest will be wrong.

❖ SPECIAL FEATURES

DIALOG BOX

The three graphics below are dialog boxes and are displayed when additional information is required from the user to continue running. The buttons marked by the arrows require a user-response (one per dialog).
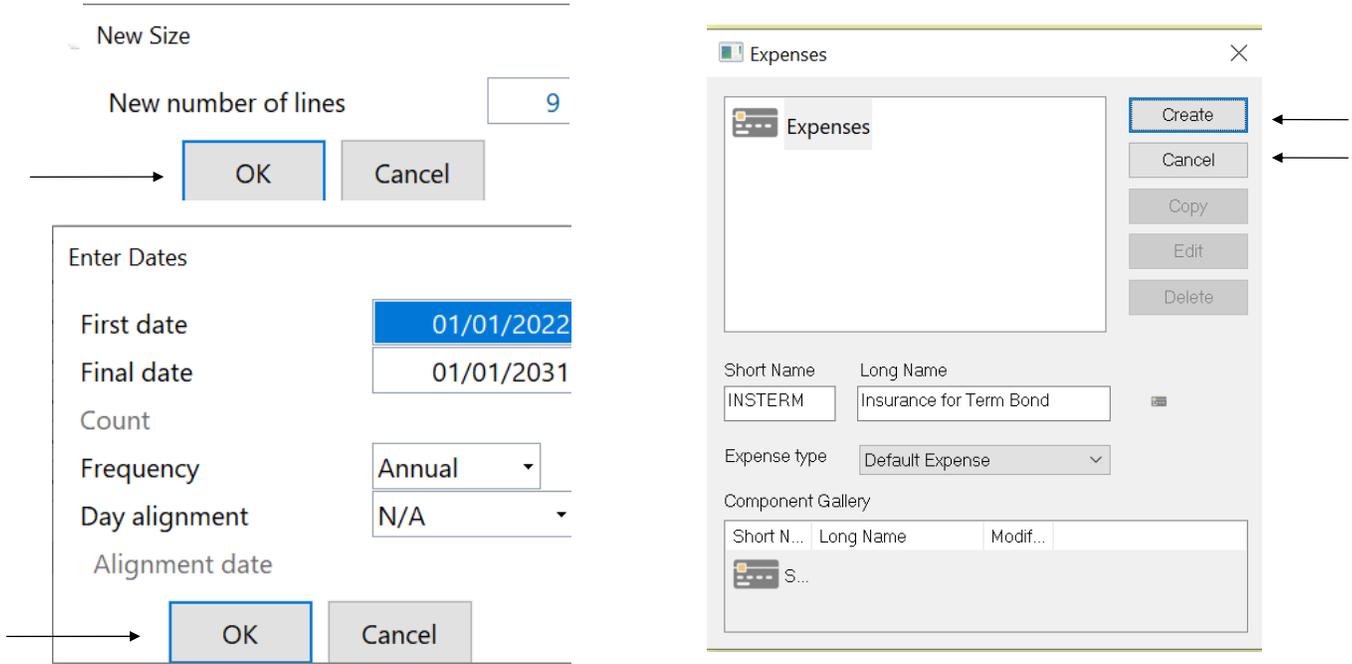
DATA MENU DIALOG

The dialog below shows a summary of the bond issue.

WARNINGS

The process of entering data in a dialog is completed by pressing the **OK** button on each dialog or **F10**. If you press the ESC key while in a dialog you have just made changes to, you will be warned as shown below. The warning prompts you to "OK" to discard the changes or "Cancel" to escape. Saying "Cancel" will leave you where you are and "OK" will take you out of the dialog and erase any changes you just made. Entering data into a blank dialog constitutes a change as does entering new data over existing data.
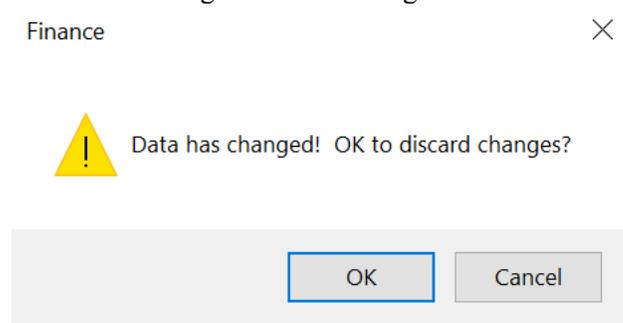
ADVANCED HELP FEATURES

F1 - HELP features now include extensive HOW-TO's and detailed descriptions of the input dialogs.

FUNCTION KEYS (also see page 173)

FUNCTION	
F1	Context-sensitive Help
F5	Edit Functions. Can also be accessed by **RIGHT MOUSE CLICK**
F7	Detailed information. Can also be accessed using ... button
F8	Advanced menu. Can also be accessed by clicking on **ADVANCED** button on input dialogs.
F9	Move to previous dialog. Can also be done using the < button on input dialogs
F10	Move to next dialog. Can also be done using the > button on input dialaogs
F11	Zoom Out. Can also be done using **Ctrl**+**Shift**+<
F12	Zoom In. Can also be done using **Ctrl**+**Shift**+>

❖ REFUNDING MATH PRIMER

This section is intended to review how to do a basic refunding by hand using a calculator. In this example, you will refund one maturity only using preset rates for the new bonds, the escrow, and the present value savings discount rate. You will not be structuring an actual escrow with securities but will, instead, be computing the cost of the escrow and the size of the refunding issue using present value amounts. Keep in mind that your goal is to determine what the lowest dollar amount is that can be invested as close to the arbitrage yield as possible to pay off the bonds until their call date. You will then size a refunding issue around this deposit and any other expenses payable at closing.

You will be presented with the following to help you:

> Assumptions (page 5)
> Outline of Present Value Refunding (page 7)
> Worksheet - Step-by-step Analysis (page 9)

ASSUMPTIONS

You will be refunding a $1,000,000 maturity at 10% due July 1, 2023, callable on July 1, 2021 at 103%. The new bond will also be due July 1, 2023 at 5% and the new costs of issuance are $10,000 and the spread is $20 per bond. The escrow rate is 5% and the savings rate is 5.5%. **For this example only,** assume **annual** compounding (semiannual is the norm). For purposes of computing time, the dated and delivery date is July 1, 2020. The escrow purchase date is the delivery date.

NOTE - Real-life information will usually be presented in an oral format and you will have to extract your input information from this data. If you are just starting to do refundings, it is highly recommended that you take all your assumptions and summarize them in some outline form that will help you see not only what data you have but also make it easier to determine what is missing. The following is an outline of the current problem:

OLD BONDS: $1,000,000 due July 1, 2023
        interest rate is 10% paid annual
        callable July 1, 2021 at 103%

NEW BONDS: dated and delivery dates are July 1, 2020
        PAR IS UNKNOWN due in July 1, 2023
        interest rate is 5% paid annual
        costs of issuance are $10,000
        spread is 2.0% of par ($20/$1,000)
        discount rate for sizing escrow is 5%
        discount rate for computing PV savings is 5.5%

SPECIAL: annual compounding

OUTLINE OF PRESENT VALUE REFUNDING

1.   Compute debt service to maturity on old bonds.
Determine what your existing liability is on the old bonds. You have to know what your current debt is costing you before you can evaluate refinancing it.

2.   Compute debt service to call on old bonds including cost of premium due on call date and any interest.
Determine what it would cost you to prepay the current liability. This cost is your escrow requirement and is the basis for sizing the new financing.

3.   Discount debt service to call from escrow start date at the specified escrow rate.
Since you have been given the earnings rate on the escrow, how much would you have to deposit today to pay your debt service to call in the future?

4.   Combine all fixed costs (i.e. cost of escrow - if fixed, costs of issuance, reserve requirements, etc.). NOTE - certain costs may be fixed in one circumstance and not in another.
You will be deriving the par amount of the new issue (how much to borrow to do the refinancing) using algebra. It is important that you aggregate all similar variables before you can compute par.

5.   Combine all costs, which have a common formula (i.e. function of par, function of debt service, etc.).

6.   Summarize the fixed and variable costs.

7.   Using basic algebra, derive what the total par would be.
Once you know what the fixed and the variable costs are, you can think of the bond issue as a large pie

Par = Fixed Costs + Variable Costs

FIXED COSTS

VARIABLE
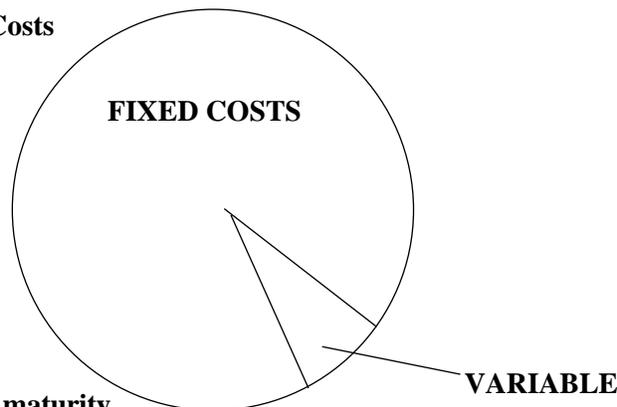
8.   Amortize the new debt to maturity.
The goal of this refinancing is to save money on your debt service payments. The only way you can know what your new payments are is by amortizing the new debt.

9.   Compare the debt service on the old bonds to the debt service on the new bonds.
In order to determine if there are savings, you have to compare what your old payments were vs. what your new payments would be.

10.   Compute the PV factor and multiply each future savings by this factor.
To properly value the savings or dissavings, as the case may be, you must calculate how much the savings incurred in each period are worth in today's dollars (PV). Keep in mind that a savings of $1,000 a year from now has a much higher value today than $1,000 twenty years from now (this assumes that both amounts are discounted at the same rate.)

11.   Total the PV Savings amounts and divide by the total par of the refunded bonds.
To determine whether the PV savings are sufficient to make it worthwhile to refinance, you must take the ratio of the PV savings to the total par of the refunded bonds. If you saved $1,000 and the refunded par was $10,000,000 the ratio would be .01% and would not be worth the effort but if the savings were $325,000, this would be worth considering. A safe minimum acceptable percentage tends to be from 3-5%.

WORKSHEET - STEP-BY-STEP ANALYSIS

1.   **Compute debt service to maturity on old bonds**

	Principal	Interest	Total D/S
7/1/21		100,000.00	100,000.00
7/1/22		100,000.00	100,000.00
7/1/23	1,000,000.00	100,000.00	1,100,000.00

2.   **Compute debt service to call on old bonds including cost of premium due on call date and any interest**

	Principal	Interest	Total D/S	Call Premium	Total Payment to Bondholders
7/1/21	1,000,000.00	100,000.00	1,100,000.00	30,000.00	1,130,000.00

3.   **Discount debt service to call from escrow start date at the specified escrow rate**

The amount due in one year is $1,130,000. The escrow rate is 5%. Remember that for this example only you are using ANNUAL compounding.

$$\text{Present Value} = \frac{\text{Future Value}}{(1 + \text{annual rate}/m)^{Nm}}$$

$m =$ number of times interest is compounded per year
$N =$ number of years

$$\text{Present Value} = \frac{\$1,130,000}{(1 + .05)^{1}} \quad \text{or} \quad \frac{\$1,130,000}{1.05} = \$1,076,190.48$$

4.   **Combine all fixed costs (i.e. cost of escrow - if fixed, costs of issuance, reserve requirements, etc.) NOTE - certain costs may be fixed in one circumstance and not in another.**

Escrow Cost	$1,076,190.48
Costs of Issuance	10,000.00
Total Fixed Costs	$1,086,190.48

5.   **Combine all costs, which have a common formula (i.e. function of par, function of debt service, etc.)**
                  Spread is 2.0% of par BUT par is still an unknown.

6.   **Summarize the fixed and variable costs.**

Total Fixed Costs	$1,086,190.48
Total Variable Costs	2% of par

7.   Using basic algebra, derive what the total par would be.

Since we know that the sum of our total fixed and variable costs equals 100% of the par amount and that our spread equals 2% of the par, we can conclude that the fixed costs equal the remaining 98% of the par.

$$\frac{\$1,086,190.48}{.98} = \$1,108,357.63$$

Since bonds are usually sold in $5,000 denominations, we will round up to $1,110,000.

8.   Amortize the new debt to maturity.

	Principal	Interest	Total D/S
7/1/21		55,500.00	55,500.00
7/1/22		55,500.00	55,500.00
7/1/23	1,110,000.00	55,500.00	1,165,500.00

9.   Compare the debt service on the old bonds to the debt service on the new bonds.

	Old Debt	New Debt	Savings
7/1/21	100,000.00	55,500.00	44,500.00
7/1/22	100,000.00	55,500.00	44,500.00
7/1/23	1,100,000.00	1,165,500.00	(65,500.00)

10.   Compute the PV factor and multiply each future savings by this factor.

To compute the PV factor, use the following formula:

$$\text{PV Factor} = \frac{1}{(1 + \text{annual rate}/m)^{Nm}}$$

$m =$ number of times interest is compounded per year
$N =$ number of years

$$\text{PV Factor} = \frac{1}{(1 + .055)^1} \text{ or } \frac{1}{1.055} = .94786730$$

	Savings	PV Factor	PV Savings
7/1/21	44,500.00	.94786730	42,180.09
7/1/22	44,500.00	.89845241	39,981.13
7/1/23	(65,500.00)	.85161366	(55,780.70)

11.   Total the PV Savings amounts and divide by the total par of the refunded bonds.

Total is $26,380.52   PV Savings as % of Refunded $= \frac{26,380.52}{1,110,000.00} = 2.377\%$

❖ DEFINITIONS OF TERMS

Accrued Interest - Interest that accrues on the bonds from the dated date up to, but not including, the delivery date. Since the bondholder does not own the bonds until the delivery date and will receive the first coupon interest payment, which is computed from the dated date, the bondholder must pay accrued interest as part of the purchase price of the bonds. The formula is:

$$\text{Accrued Interest} = \text{Interest Rate} \times \text{Par Value} \times \frac{\text{No. Days from Dated to Delivery}}{360}$$

Advance Refunding - The refunding of outstanding bonds by issuing new bonds whose proceeds are invested in an escrow account to pay interest and principal which will become due or is optionally redeemable more than 90 days after the issuance of the refunding bonds. The proceeds necessary to defease the prior debt are normally invested in a portfolio of securities which is yield restricted. In a refunding which produces economic savings to an issuer, the present value cost of the new debt service (which paid for the refunding) is less than the present value cost of the old debt service.

All-in TIC - This is the semiannual discount rate which equates the net proceeds of a bond issue to their respective debt service payments. From a financial management perspective this could be considered the true cost of money to the issuer because it takes into account all costs related to the financing, not just those which fall into the legal definition of the arbitrage yield or the industry standard definition of TIC.

Arbitrage Yield - This yield is legally defined by the IRS and is the internal rate of return on the bonds for tax purposes. It is the single discount rate applied to each debt service payment so that the sum of the present value (to the delivery date) of the payments at this rate will be equal to:

> Par Amount of the Bonds
> +   Accrued Interest
> -   Original Issue Discount
> +   Original Issue Premium
> -   Credit Enhancement Expenses

Call Provisions - The right of the issuer to prepay its debt prior to the specified maturity date and demand surrender of its bonds for redemption. The provisions are established at the time the bonds are originally issued, and include the dates and prices at which the bonds can be called. Generally, call provisions include both the mandatory and optional calls. The priority or order of bond calls are also determined by these provisions.

Crossover Refunding - A refunding where the revenue of the issuer continue to be applied to the payment of outstanding bonds until they are retired or redeemed. Refunding bond proceeds are deposited in an escrow and must earn sufficient moneys to pay the interest on the refunding bonds, and on the crossover date, are used to call the outstanding (prior) bonds. At the time of issuance of the refunding bonds, there is no legal defeasance of the outstanding or prior bonds.

Current Refunding - The refunding of outstanding bonds which are currently callable or will be callable within 90 days of the issuance of refunding bonds. Typically, the proceeds of a current refunding bond issue are used immediately to call the outstanding bonds, and no escrow securities need to be purchased.

Dated Date - The date from which the bonds begin to accrue interest.

Delivery Date - The date on which the bonds are delivered to and paid for by the original purchasers. Also known as the closing date.

Debt Service - These are the principal and interest payments paid by the issuer to the bondholders. Many times debt service (principal plus interest) is scheduled to be paid in equal installments, which is commonly referred to as "Level Debt Service". This is comparable to a home mortgage or a car loan, which also require a level monthly payment that pays some amount of the principal borrowed and all the interest due on the loan. Payments are sufficient to retire all of the principal by the final payment date.

Debt Service Fund - The issuer sets aside a specified amount on a monthly basis to pay debt service on the next principal and/or interest payment date. The specified monthly deposit is usually 1/6th of the next interest payment (based on semiannual interest) and 1/12th of the next principal payment (based on annual principal). This "monthly savings" requirement is typical for many types of revenue bonds, and is not usually found on general obligation bonds.

Debt Service Fund Transfer Proceeds - At the time of the refunding, these are the funds which have accumulated in the prior debt's Debt Service Fund. If these moneys are used to defease the prior debt, their investment will usually be yield restricted. These funds must be accounted for, in detail, when a prior issue is refunded according to the transferred proceeds rules.

Debt Service Reserve Transfer Proceeds - This is the amount of the debt service reserve fund of the prior issue which is attributable to the specific refunded maturities amounts. For arbitrage purposes these funds are initially considered bond proceeds of the prior debt and when these funds transfer from the prior issue to the refunding issue, they will be yield restricted. This is usually computed by comparing the debt service reserve requirements from before and after the refunding issue, for the prior series or indenture. That amount is then used as a cash transfer to the refunding issue.

Defeasance - By placement in an escrow sufficient funds to guarantee timely payment of principal and interest due on bonds to redemption or maturity. The debt is no longer a liability of the issuer. The defeasance provisions of the indenture detail the requirements of a legal defeasance, including the permitted investment securities.

Escrow Fund - The fund or trust account held by the escrow trustee, which is established by the Escrow Trust Agreement, and containing securities purchased for the purpose of paying debt service, and possibly a call premium, on a refunded bond. This trust is an irrevocable agreement between the trustee and the issuer.

Open Market Securities (OMS) - Securities available in the secondary market. In the context of refunding, the securities purchased would be deposited into the escrow account and used to meet the future debt service and redemption requirements of the bonds which are being refunded. Open Market Securities must meet the defeasance requirements of the indenture or must meet other escrow criteria, such as being non-callable.

Optional Redemption - This is a call provision which gives the issuer the option of exercising the right to call the bonds. There are usually several call dates each with a different call price. Bonds that are subject to optional redemption are typically callable ten years after the dated date at a redemption price greater than 100. Advance refunding transactions derive present value savings from refunding bonds which have optional call provisions.

Present Value (PV) Savings - This is the most commonly used representation of savings. It is the present value of the savings which will occur over time. The discount rate used is usually the rate which represents the issuer's cost of money. The present value savings is most informative when measured as a percentage against the amount of bonds which were refunded to generate the savings.

Redemption Premium - This is a premium paid to bondholders whose bonds are redeemed prior to their final maturity dates or mandatory redemption date via an optional redemption (or call). Bondholders whose bonds are redeemed via a mandatory redemption are not paid a premium.

Refunding - The sale of a new issue, the proceeds of which are to be used to pay debt service on and retire an outstanding issue. The purpose of refunding may be to save interest cost, extend the maturity of the debt or remove restrictive covenants in the indenture.

Savings (Gross) - This is the amount of money the issuer has saved as a result of the refunding transaction. It is the difference between the debt service the issuer would have paid on the prior debt to scheduled final maturity and the debt service of the refunding issue. Savings can also be computed by comparing the net debt service of the two issues. Gross Savings are more informative when considered on a periodic basis, such as annual saving when the financial objective of the refunding is level annual savings over the life of the issue or during the first two years after the refunding when the financial objective is up-front savings.

SLGS - Also known as State and Local Government Series, these are direct obligations of the US Government which are available in book entry form only. They are available in denominations of $100, and are available only to issuers of tax-exempt debt via subscription. The maximum interest rates are set by the Treasury each day based upon yields available for similar maturities in the secondary government securities market. SLGS were designed by the Treasury specifically for use in optimizing escrows, and providing an investment vehicle for yield restricted tax-exempt bond proceeds.

Zero SLGS - A SLG which carries a 0% interest rate. This particular SLG is used by issuers in escrows when a "positive arbitrage" situation occurs. Positive arbitrage occurs when the market of available interest rates on SLGs produces a yield on the portfolio of interest bearing SLGs which is exceeds the allowable yield (or Arbitrage Yield) of the Refunding Issue. In this situation the escrow yield must be reduced and Zero SLGS are purchased to replace certain interest bearing SLGs in order to produce a lower yield. Zero coupon SLGs are typically used to pay the longest escrow requirements, while maximum yielding SLGs are used for the shorter maturity investments. The objective is to obtain the maximum allowable yield for the escrow, while maintaining future flexibility for restructuring the escrow investments in the years where 0% SLGs would mature. The uncertainty of tax law changes over the years have lead issuers to use these techniques to maintain future flexibility, particularly for the treatment of transferred proceeds.

True Interest Cost (TIC) - A method of computing interest cost for new issues which is the semiannual discount rate that equates the purchase price (Par Amount plus accrued interest less Original Issue Discount plus Original Issue Premium less Underwriters Discount) of the bonds to the present value of the semi-annual debt service payments. Often called Canadian Interest Cost (CIC).

❖ ASSUMPTIONS FOR REFUNDING ANALYSIS

It is Summer 2020 and ABC County has noticed that current interest rates are considerably lower than when it sold its last two bond issues. The County is giving serious consideration to refinancing its outstanding debt. You have been asked to prepare a refunding analysis for a presentation to the Director of Finance for the County. The Director of Finance would like to see level savings.

In real-life situations, the sources of and the assumptions you would need to begin a refunding analysis would be:

From the banker/client:

outstanding debt (par, interest rates, accretion table if CABs, and call dates and prices)

timing for the refinancing (dated date, delivery date, etc.)

underwriter's discount and cost of issuance assumptions

rating of the issuer

credit enhancement costs, if any

recoverability of credit enhancement (in arbitrage yield)

debt service reserve requirement, if any, and investment rates

fund balances

From the municipal bond desk:

interest rate scale (provide the desk with the issuer name, its ratings, the term of the issue, and the purpose of the proposed financing, whether the issue/or part of issue is insured or not, potential insurer)

From any financial newspaper/the treasury desk/or DBC Bulletin Board:

treasury and other open market security rates, maturity dates, yields, prices

From the economic Bulletin Board:

SLGS rates, treasury bond and note maturity dates, yields, and prices

*   **Photocopy this page for use later in the tutorial.**

For this particular financing, the assumptions are as follows:

EXISTING BONDS

      Series 2011 Bonds (see pages from Official Statement on pages 16-17)

      Series 2013 Bonds (see pages from Official Statement on pages 18-21)

PROPOSED ISSUE - SERIES 2020 REFUNDING BONDS

Dated Date	7/1/20		
Delivery Date	7/15/20		
First Interest Date	1/1/21		
Spread	$7.50 Avg Takedown, $2.50 Expenses, $.50 Mgmt Fee		
Costs of Issuance	$250,000		
Int. Rate/Yield Scale	1/01/21	5%/ 1.1%	1/01/28	5%/ 1.31%
	1/01/22	5%/ 1.1%	1/01/29	5%/ 1.39%
	1/01/23	5% /1.11%	1/01/30	5%/ 1.47%
	1/01/24	5%/ 1.12%	1/01/31	CAB Yld 1.54%
	1/01/25	5%/ 1.13%	1/01/32	CAB Yld 1.61%
	1/01/26	5%/ 1.15%	1/01/33	CAB Yld 1.67%
	1/01/27	5%/ 1.23%	1/01/38 Term Bond 5.00%/ 1.73%	
			Sinking Fund starts 1/1/34	

Insurance for Term Bond due 2038	0.50% of total d/s (net of accrued interest), include in Arb, TIC, All-In TIC
Issuer Contribution	$75,000

                                        Be very careful how you express this
concept in the formula - THINK!!

NEW ISSUE   **OFFICIAL STATEMENT**

Interest on the Bonds will be excludable from gross income for Federal income tax purposes and will be exempt from Utopia State and ABC County personal income taxes under existing statutes, regulations and court decisions.

ABC
County

$100,000,000
ABC COUNTY
2011 REVENUE BONDS

Dated: January 1, 2011   **Due:** January 1, as shown below

The Bonds will be issued in registered form and, when issued, will be registered in the name of Seed & Co., as nominee of The DBC Trust Company, New York, New York, which will act as securities depository for the Bonds. Purchases of beneficial interests in the Bonds will be made in book-entry only form in the denomination of $5,000 or any integral multiple thereof. Purchasers will not receive certificates representing their ownership interest in the Bonds purchased. The Bonds will be dated January 1, 2011 and will be subject to redemption prior to maturity. Interest on the 2011 Bonds is payable on January 1 and July 1 of each year, commencing on July 1, 2011. The Bonds are subject to mandatory and optional redemptions.

$60,685,000 Serial Bonds

Maturity	Principal Amount	Interest Rate	Price or Yield	Maturity	Principal Amount	Interest Rate	Price or Yield
2012	$1,410,000	3.25%	100%	2022	2,775,000	4.60%	100%
2013	1,490,000	3.30%	100%	2023	3,010,000	4.70%	100%
2014	1,565,000	3.35%	100%	2024	3,270,000	4.95%	100%
2015	1,650,000	3.50%	100%	2025	3,555,000	5.10%	100%
2016	1,740,000	3.70%	100%	2026	3,865,000	5.25%	100%
2017	1,840,000	3.85%	100%	2027	4,210,000	5.40%	100%
2018	2,045,000	4.00%	100%	2028	4,590,000	5.50%	100%
2019	2,270,000	4.15%	100%	2029	5,005,000	5.65%	100%
2020	2,410,000	4.30%	100%	2030	5,460,000	5.80%	100%
2021	2,560,000	4.45%	100%	2031	5,965,000	6.00%	100%

(Plus accrued interest from January 1, 2011)

39,315,000 Term Bond due January 1, 2036
6.10% at par

The Bonds will be offered when, as and if issued by the State and received by the underwriters and subject to the receipt of an opinion by R.U. Lee Gull, Bond Counsel to the County. The Bonds will be available for delivery on or about January 10, 2011.

MICK E. MAUS INVESTMENTS   BOW GUS CAPITAL MARKETS

Sources and Uses of Funds

Par Amount	$100,000,000.00
Accrued Interest	<u>184,602.38</u>
Total Sources	$100,184,602.38
Project Construction Fund	$ 88,600,171.00
Debt Service Reserve Fund	10,000,000.00
Underwriters' Discount	1,175,000.00
Costs of Issuance	224,829.00
General Fund	<u>184,602.38</u>
Total Uses	$100,184,602.38

Optional Redemption

The Series 2011 Bonds maturing by their terms on or after January 1, 2022 are subject to call and redemption, at the option of the County, prior to their respective maturity dates, as a whole on any date or in part on any interest payment date on or after January 1, 2021 at the redemption prices (expressed as percentages of principal amount) set forth below plus accrued interest to the redemption date.

Redemption Dates	Redemption Prices
January 1, 2021 through December 31, 2021	102.0%
January 1, 2022 through December 31, 2022	101.5%
January 1, 2023 through December 31, 2023	101.0%
January 1, 2024 through December 31, 2024	100.5%
January 1, 2025 and thereafter	100.0%

Mandatory Sinking Fund Redemption

The Series 2011 Bonds maturing 2038 are subject to redemption beginning on January 1, 2035, and on January 1 in each year thereafter in part solely from money deposited by the County in the Series 2011 2035 Sinking Fund Account. Such redemption shall be at a redemption price of the principal amount thereof plus accrued interest to the redemption date.

Mandatory Sinking Fund Account Payment Date (January 1)	Mandatory Sinking Fund Redemption Amount
2032	6,525,000
2033	7,135,000
2034	7,805,000
2035	8,530,000
2036	9,320,000

NEW ISSUE   **OFFICIAL STATEMENT**

Interest on the Bonds will be excludable from gross income for Federal income tax purposes and will be exempt from Utopia State and ABC County personal income taxes under existing statutes, regulations and court decisions.

Name of Issuer

ABC
County

Name of Series

$150,000,683.65
ABC COUNTY
2013 REVENUE BONDS

Month and Day on which bonds mature

Dated: January 1, 2013   Original Dated Date   **Due:** January 1, as shown below

The Bonds will be issued in registered form and, when issued, will be registered in the name of Seedy & Co., as nominee of the DBC Trust Company, New York, New York, which will act as securities depository for the Bonds. Purchases of beneficial interests in the Bonds will be made in book-entry only form in the denomination of $5,000 or any integral multiple thereof. Purchasers will not receive certificates representing their ownership interest in the Bonds purchased. The Bonds will be dated January 1, 2013 and will be subject to redemption prior to maturity. Interest on the 2013 Bonds is payable on January 1 and July 1 of each year, commencing on July 1, 2013. The Bonds are subject to mandatory and optional redemptions.

Serial Bond Component

The new bonds are delivered on 7/15/20, therefore, all of these bonds will have matured & don't need to be recreated for the refunding analysis.

$84,350,000 Serial Bonds

Maturity	Principal Amount	Interest Rate	Price or Yield	Maturity	Principal Amount	Interest Rate	Price or Yield
2014	$3,550,000	3.60%	100%	2022	5,700,000	4.75%	100%
2015	3,750,000	3.75%	100%	2023	6,080,000	4.85%	100%
2016	3,965,000	3.85%	100%	2024	6,500,000	5.10%	100%
2017	4,200,000	4.00%	100%	2025	6,960,000	5.25%	100%
2018	4,450,000	4.15%	100%	2026	7,465,000	5.40%	100%
2019	4,725,000	4.30%	100%	2027	8,015,000	5.55%	100%
2020	5,020,000	4.45%	100%	2028	8,625,000	5.65%	5.75%
2021	5,345,000	4.60%	100%				

(Plus accrued interest from January 1, 2013)

First Interest Payment Date

This states the frequency on which interest is paid.

6.00% $54,450,000 Term Bond due January 1, 2033 (Yield 5.90%)
(Plus accrued interest from January 1, 2013)

Term Bond Component

6.05% $11,200,683.65 Capital Appreciation Term Bond due January 1, 2038

This indicates there are callable bonds in this issue

Yield & Accretion rate for CAB Term

CAB Term Bond Component

The Bonds will be offered when, as and if issued by the State and received by the underwriters and subject to the receipt of an opinion by Shur Itz LeGalle, Bond Counsel to the County. The Bonds will be available for delivery on or about January 13, 2013.

This is the original Delivery Date & is required only for CABs

FOR JED SECURITIES   **BYLO SELHI INCORPORATED**

Sources and Uses of Funds

Par Amount	$150,000,683.65
Accrued Interest	336,232.42
Total Sources	$150,336,916.07
Project Construction Fund	$134,295,544.94
Debt Service Reserve Fund	13,640,812.50
Underwriters' Discount	1,800,008.21
Costs of Issuance	264,318.00
General Fund	336,232.42
Total Uses	$150,336,916.07

This states which bonds are callable with the following provisions

Bonds are callable ON this date as well as AFTER

Optional Redemption

The Series 2013 Bonds, other than the 2038 Term Bond, maturing by their terms on or after January 1, 2024 are subject to call and redemption, at the option of the County, prior to their respective maturity dates, as a whole on any date or in part on any interest payment date on or after January 1, 2023 at the redemption prices (expressed as percentages of principal amount) set forth below plus accrued interest to the redemption date.

This is the first date on the specified callable bonds can be prepaid. If the bonds are called in later years, the redemption price changes (prepayment penalty)

This is the prepayment penalty paid to the bondholder for calling their bonds before maturity

Redemption Dates	Redemption Prices
January 1, 2023 through December 31, 2023	102.0%
January 1, 2024 through December 31, 2024	101.5%
January 1, 2025 through December 31, 2025	101.0%
January 1, 2026 through December 31, 2026	100.5%
January 1, 2027 and thereafter	100.0%

Mandatory Sinking Fund Redemption for 2033 Term Bond

The Series 2013 Bonds maturing 2033 are subject to redemption beginning on January 1, 2029, and on January 1 in each year thereafter in part solely from money deposited by the County in the Series 2013 2033 Sinking Fund Account. Such redemption shall be at a redemption price of the principal amount thereof plus accrued interest to the redemption date.

These are the sinking fund payments made on the term bond (like installments to reduce the outstanding debt

This is the final sinking fund payment AND the final maturity date of the term bond

This is the first sinking fund payment AND the first payment date of the term bond

Mandatory Sinking Fund Account Payment Date (January 1)	Mandatory Sinking Fund Redemption Amount
2029	$9,280,000
2030	10,025,000
2031	10,825,000
2032	11,690,000
2033	12,630,000

Optional Redemption for the 2038 Term Bond

The 2038 Term Bond (and its sinking funds) is subject to call and redemption, at the option of the County, prior to its maturity date, as a whole on any date or in part on any interest compounding date on or after January 1, 2028 at the redemption prices (expressed as percentages of accreted value) set forth below to the redemption date.

Redemption Dates	Redemption Prices
January 1, 2028 through December 31, 2028	103.0%
January 1, 2029 through December 31, 2029	102.0%
January 1, 2030 through December 31, 2030	101.0%
January 1, 2031 through December 31, 2031	100.0%

Mandatory Sinking Fund Redemption for 2038 Term Bond

The Series 2013 Bonds maturing 2038 are subject to redemption beginning on January 1, 2034, and on January 1 in each year thereafter in part solely from money deposited by the County in the Series 2013 2038 Sinking Fund Account. Such redemption shall be at the stated redemption price.

Mandatory Sinking Fund Account Payment Date (January 1)	Mandatory Sinking Fund Redemption Amount
2034	2,606,593.00
2035	2,409,356.15
2036	2,226,058.30
2037	2,057,396.60
2038	1,901,279.60

Accreted Value Table for 2038 Term Bond

BOND ACCRETED VALUE TABLE

ABC County
2013 $150,000,683 Revenue Bonds

Date	CAB Term Bond due 2038 6.05%
01/13/2013	1,129.00
07/01/2013	1,160.85
01/01/2014	1,195.95
07/01/2014	1,232.15
01/01/2015	1,269.40
07/01/2015	1,307.80
01/01/2016	1,347.35
07/01/2016	1,388.15
01/01/2017	1,430.10
07/01/2017	1,473.40
01/01/2018	1,517.95
07/01/2018	1,563.85
01/01/2019	1,611.20
07/01/2019	1,659.90
01/01/2020	1,710.15
07/01/2020	1,761.85
01/01/2021	1,815.15
07/01/2021	1,870.05
01/01/2022	1,926.65
07/01/2022	1,984.90
01/01/2023	2,044.95
07/01/2023	2,106.85
01/01/2024	2,170.55
07/01/2024	2,236.20
01/01/2025	2,303.85
07/01/2025	2,373.55
01/01/2026	2,445.35
07/01/2026	2,519.35
01/01/2027	2,595.55
07/01/2027	2,674.05
01/01/2028	2,754.95
07/01/2028	2,838.30
01/01/2029	2,924.15
07/01/2029	3,012.60
01/01/2030	3,103.75
07/01/2030	3,197.60
01/01/2031	3,294.35
07/01/2031	3,394.00
01/01/2032	3,496.70
07/01/2032	3,602.45
01/01/2033	3,711.45
07/01/2033	3,823.70
01/01/2034	3,939.35
07/01/2034	4,058.55
01/01/2035	4,181.30
07/01/2035	4,307.80
01/01/2036	4,438.10
07/01/2036	4,572.35
01/01/2037	4,710.65
07/01/2037	4,853.15
01/01/2038	5,000.00

This is the value on the delivery date of the CAB maturing 1/1/2038. It is computed by discounting the final maturity value (usually $5,000) at the yield from final maturity back to the delivery date.

This is the CAB on the call date. Bondholders expect this precise amount for each CAB they own if their CABs are called on 1/1/2028

❖ SUMMARY OF INPUT REQUIREMENTS

This chart summarizes the entries required to model outstanding issues, a refunding issue, and all assumptions related to the escrow.

Goal	Model outstanding issues	Model refunding issue	Model escrow, savings, and solution assumptions
File Menu	Datafile (create if nec.) Open Issuer (create if nec.) Series (create) Status of Actual or Actual Refunding	Open Issuer (select same) Series (create) Status of Proposed Ref	Open Issuer (select same) Case (create) OMS Datafile (download) or SLGS Datafile (download)
Data Menu	D/S Assumptions Bond Components Calls Call Tables Refund Provisions Additional Information Refund Escrows (only if prior issue has escrows outstanding) Save, CTRL-S, or File Save	D/S Assumptions Bond Components Project Funds (if any) Reserve/Cap Int Funds Expenses Additional Information Other Sources Other Uses Other D/S Reporting Options Save, CTRL-S, or File Save	Refund Assumptions Prior Debt (select bonds to refund) Savings Assumptions Datafile Selections (only if using OMS) Save, CTRL-S, or File Save
Calculate Menu	**THIS IS OPTIONAL** Calculate Print Dialog	**CALCULATIONS ARE DONE IN REFUND**	Solution Assumptions Calculate refund solution Print Dialog
Next Step	Set up refunding series (include all issuance costs, expenses, dates, interest rates, etc. related to sizing of refunding issue - not the escrow)	Set up case (enter assumptions related to the escrow such as yield limits, available securities, funds on hand, type of solution, etc.)	If data input is wrong, go edit the source file, save the edited file and return to Refund. You should be right back in the case you just solved. Recompute.

SETTING UP THE BONDS TO BE REFUNDED

❖ INPUTS REQUIRED FOR REFUNDED BONDS

The following is a checklist of inputs usually required to model existing bond issues.

INPUTS	DESCRIPTION
FILE MENU	
Open	Opens Datafiles and Finance Documents
Datafile	File in which data is stored
Issuer	Issuer name and description
Series	Series name, description, and status for refunding series
DATA MENU	
Debt/Size Assumptions	Dated/delivery dates and general issue data, spread and issuance costs
Bond Components	Maturity dates and scale for each group of bonds (i.e. serials)
Additional Information	
Refund Escrows	Only modeled if series is a refunding itself and has escrows funded with its proceeds

THIS STEP IS OPTIONAL AND NOT NECESSARY FOR THE REFUNDING ANALYSIS

TOOLS MENU	
Debt Service Calculator	Calculates debt service for the selected maturities, bond components, and series.

DBC Finance is designed to also serve as a datafile of an issuer's outstanding and proposed debt. There is no need to create a series for each different combination of maturities to refund when doing partial refundings. We recommend you model **ALL** outstanding maturities from either the last interest payment date before the refunding issue's delivery date or from the original dated date (more time consuming but will result in an archive of outstanding debt). In *Refund*, you select from the tree view (outline of bond issue) the series you wish to refund in addition to the bond components and maturities. *Refund* can also calculate the remaining outstanding debt service for use in calculations such as aggregate DSRF and wraparounds.

❖ **STARTING DBC FINANCE**

SKIP THIS PAGE IF DBC IS ALREADY LOADED

There are two ways to start *DBC Finance*. The simplest is to click on the DBC Finance icon on your desktop. The alternate method is to use the START - PROGRAMS feature.

This icon usually ⟶
appears on the desktop

* **Click on the icon shown above in your PC desktop to open DBC Finance. Skip no. 2 on the next page.**

❖ FILE MENU - CREATING THE REFUNDED SERIES

1. OPEN DOCUMENT (SKIP IF YOU JUST OPENED DBC FINANCE)

We will now model the existing series to be refunded.

Open Document ⟶ **Open   Save** ← Save Document
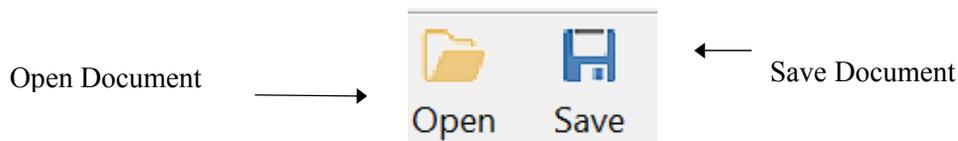
* **Click on the OPEN button.**

---

2. CHECK WHICH DATAFILE IS LOADED

This is the active
datafile loaded
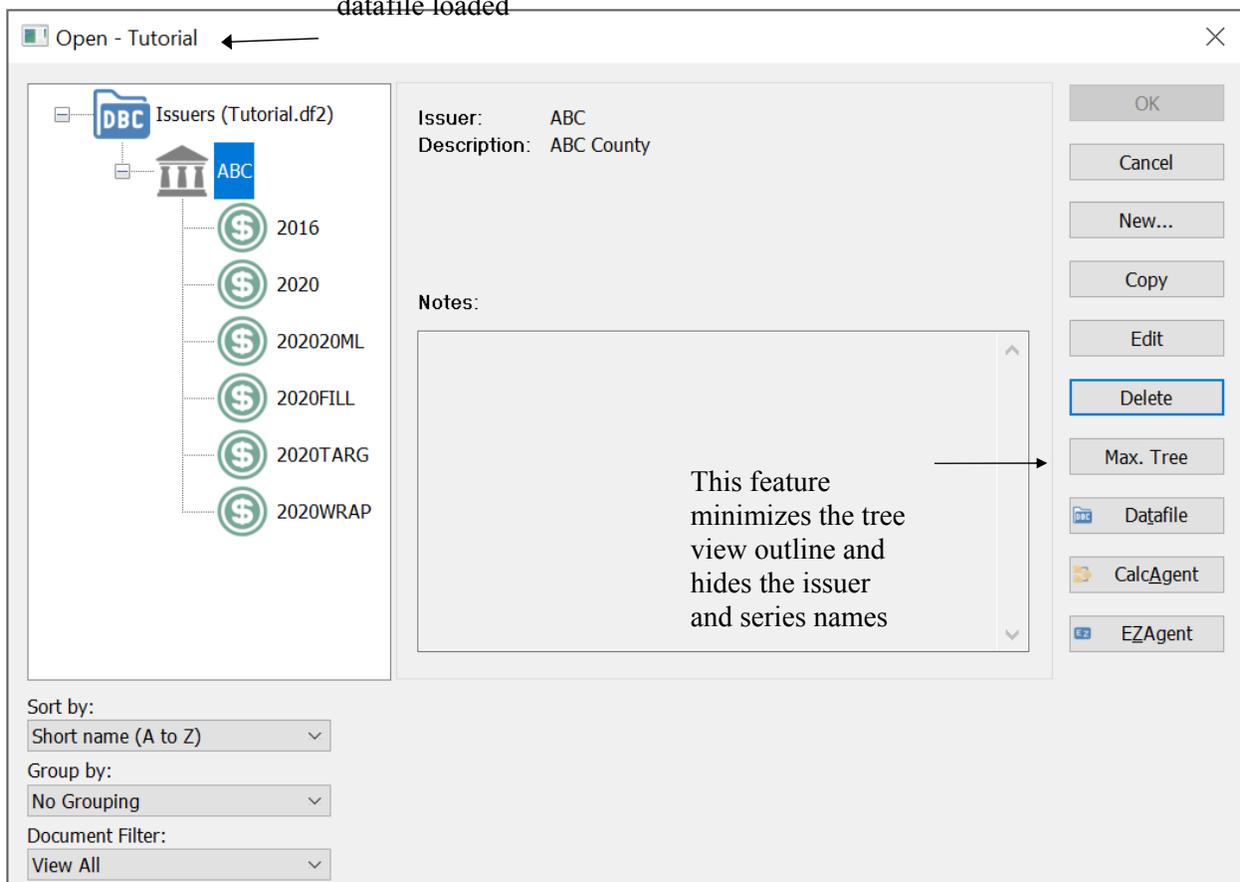
* **Check to see that the current datafile loaded is "TUTORIAL". You will only see the datafile, issuer, and series listed above if you ran the Debt/Size tutorial.**

BE CAREFUL HERE!

* **If TUTORIAL is not loaded, click on the DATAFILE button and go to the step 3.**
OR
If it is loaded, skip to step 5.

3.   CREATE THE DATAFILE

This is the subdirectory in the hard drive where the datafile is stored. Yours will probably be different.

This is the existing datafile. All datafiles are saved with a ".DF2" extension which is unique to DBC.

Only do this IF you have not previously created the TUTORIAL datafile in the Debt/Size tutorial.
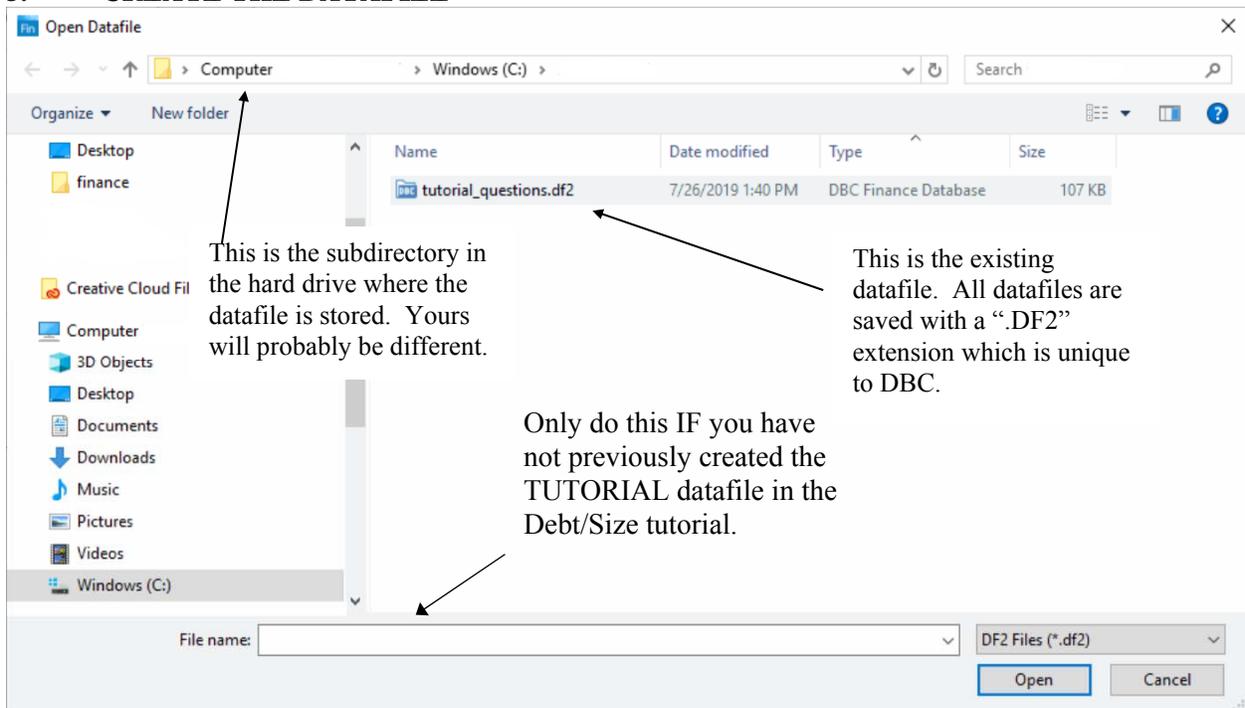
*   **Select (double click) TUTORIAL.DF2 if it appears in the list then <u>go to step 5</u>.**
OR
Create the datafile by typing "TUTORIAL" for the FILE NAME. Click on OPEN then NEW.

---

4.   CREATE THE ISSUER (SKIP IF YOU ALREADY HAVE ISSUER ABC)

Short/Long Name   The issuer and series have both a short name and a long name. The short name is used for quick reference while the long name is used for reports to provide a more detailed description of the entry. This convention applies throughout *DBC Finance* for items such as reserve funds, expenses, and escrow requirements. The Datafile only has a short name. Errors in any entries can be corrected using the **EDIT** command.

*   **Type "ABC" (short), press ENTER, and "ABC County" (long). Click on OK.**

5.   CREATE THE SERIES

Pressing **NEW** after highlighting the issuer will store the new document created as part of the issuer.
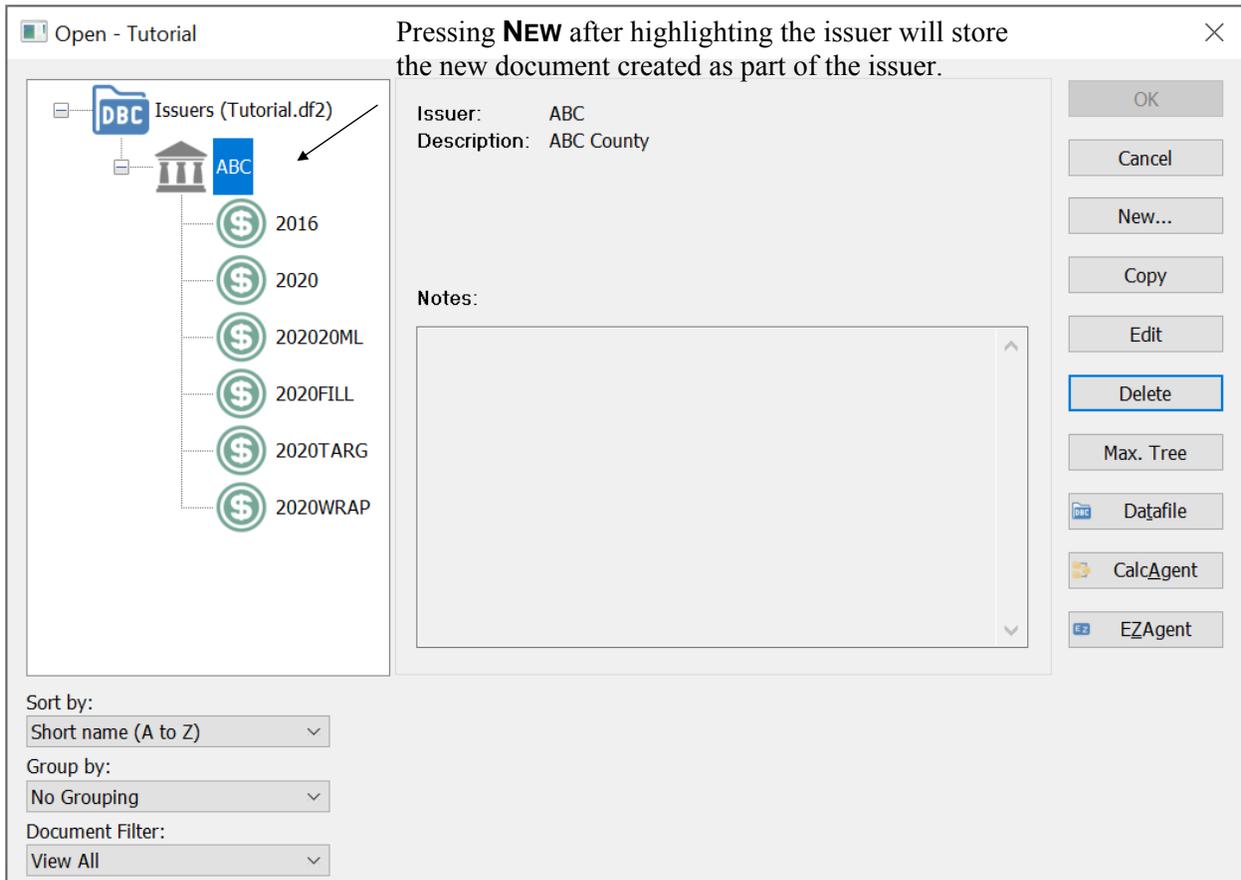
*   **Click on ABC County so it is shaded then click on NEW.**

The series will be saved under the issuer name you just selected from the menu, just like a folder being saved in a file drawer. It too has a short and a long name. Remember that the long name will be used as the second line in the default report titles.

This displays the issuing entity selected for the series.

*
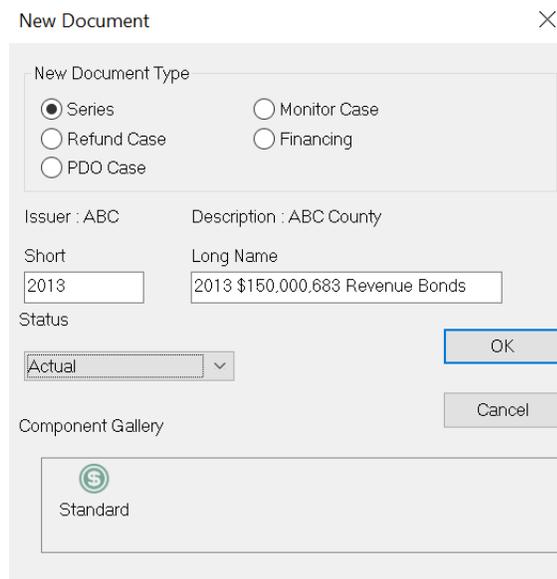
Type the following names for this series - "2013" (short), press ENTER, and "2013 $150,000,683 Revenue Bonds" (long). Set the STATUS to ACTUAL. Click on OK.

In **STATUS**, click on [Proposed ▼] to see the options. **STATUS** is used to pre-sort the series into bonds already issued (Actual and Actual Refunding) and proposed financings (Proposed and Proposed Refunding) so that when it comes time to select outstanding debt to include in escrow requirements for a refunding, only the series saved with a status of Actual or Actual Refunding will appear as options to choose from.

    Status   You can classify the series to be modeled as a Proposed issue (New Money), a Proposed Refunding, Actual (existing new money issue), or Actual Refunding (an existing refunding issue). You can also designate a series as being a Template series (you can use its basic structure over and over). This is particularly helpful for common plans of finance with many series which all have the same scale. You have the ability to link these series to the "Template" series. Once you update the Template series, all the other series linked to it would also automatically update. The Master status is for use in *DBC Project Finance* only.

❖ DATA MENU

The easiest way to access the Data inputs is using the first dialog below. However, you can also use the program menus and move around using the mouse.

This requires you to go to the actual program menu and select the Data.
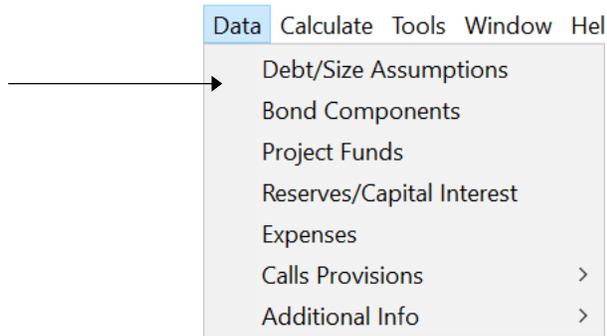
*   **In either of the above dialogs, click on or select DEBT/SIZE ASSUMPTIONS - SETUP to enter the dated, delivery date, and other basic information regarding the issue.**

When modeling a series to be refunded, the only **DATA** menu items you **must** enter are:

> **GENERAL** - Dated and delivery dates, interest frequency, and day count
> **BOND COMPONENTS** - Maturity dates, par amounts, interest rates
> **CALLS** - Call dates, prices and other provisions
> **ADDITIONAL INFORMATION -REFUND ESCROWS** - Outstanding escrow receipts, yield of escrow - only for transferred proceeds situations.

❖ DATA MENU - DEBT/SIZE ASSUMPTIONS - GENERAL INFORMATION

Here you enter dated and delivery date information as well as information such as first interest date and costs related to the issuance of the bonds. However, when modeling an issue that is to be refunded, the only relevant information is the date information. The costs of issuance and spread were paid on the original delivery date and are irrelevant for the refunding analysis.

Simply click on the appropriate tab or the arrows to see the different dialogs.

*   **Type "7/1/20" (the last coupon before refunding delivery date) as the dated date. The delivery date defaults to the dated date. Enter "1/1/21", the first interest payment date (next "old bond" interest date after the "new" refunding delivery date). Click OK to accept the entries.**

       Dates   Dates can be entered using commas, slashes, dashes, periods, or spaces to separate the month-day-year.

✋ **NOTE -** *DBC Finance* ignores all cash flow events (payments) before the new delivery date. You can enter the outstanding issue from its original issuance date or from the last coupon date BEFORE the new delivery date.

❖ DATA MENU – BOND COMPONENTS – SERIALS

DBC Finance permits you to model the term structure of the issue as you would find it on the cover of the Official Statement. An example would be serial bonds through 2028, a current interest term bond from 2029-2033, and a CAB term from 2034-2048. By permitting you to define each component on a stand – alone basis, you have maximum flexibility for structuring various types of bonds within one series including variable rate debt, CABs, convertible CABs, and overlapping maturities. This structure facilitates defining call provisions for each. In addition, these components can have completely unrelated payment schedules. There is no limit to the number of bond components you can define.

EXCERPT FROM 2013 OFFICIAL STATEMENT

$84,350,000 Serial Bonds

Maturity	Principal Amount	Interest Rate	Price or Yield	Maturity	Principal Amount	Interest Rate	Price or Yield
2014	$3,550,000	3.60%	100%	2022	5,700,000	4.75%	100%
2015	3,750,000	3.75%	100%	2023	6,080,000	4.85%	100%
2016	3,965,000	3.85%	100%	2024	6,500,000	5.10%	100%
2017	4,200,000	4.00%	100%	2025	6,960,000	5.25%	100%
2018	4,450,000	4.15%	100%	2026	7,465,000	5.40%	100%
2019	4,725,000	4.30%	100%	2027	8,015,000	5.55%	100%
2020	5,020,000	4.45%	100%	2028	8,625,000	5.65%	5.75%
2021	5,345,000	4.60%	100%				

(Plus accrued interest from January 1, 2013)

6.00% $54,450,000 Term Bond due January 1, 2033 (Yield 5.90%)
(Plus accrued interest from January 1, 2029)

6.05% $11,200,683.65 Capital Appreciation Term Bond due January 1, 2038

✋ **NOTE –** You will note that there are three bond components or discrete "chunks" of bonds that were sold. These can usually be identified by the bold heading which includes the total par amount for that piece of the issue as well as a description of the type of bonds (i.e. current interest, CAB, serial, etc.).

* **Click on BOND COMPONENTS-DETAIL in the DATA menu.**

* **Type "SERIALS" (short name), press ENTER, then type "Serial Bonds through 2028" (long name). Press CREATE when finished.**

✋ **NOTE -** We strongly recommend that you model each bond component separately. You could, theoretically, create one component for all current interest bonds BUT your reports will lack the detailed description by component. CAB bonds always have to be modeled in separate components because they compound interest and the parameters that control how they accrete in value are specific to each component.

❖ **DATA MENU - BOND COMPONENT INFORMATION - SERIALS**

The dated, delivery, and first interest dates are defaulted from your entries in the **DEBT/SIZE ASSUMPTIONS** dialog. To make changes to this information that are particular to this component, simply type over the default information. *DBC Finance* has four interest payment options: interest paid until maturity, compounded until maturity, compounded until a final compounding date (for convertible CABs), and at maturity (for notes). The program has certain industry standards entered as defaults. The inputs most likely to be changed are the first interest payment date, interest frequency, interest payment option, and Serial/Term selection.

These tabs represent different input dialogs.

These arrows move you through the input dialogs.

*   **Make sure the INTEREST FREQUENCY is set to SEMIANNUAL and the INTEREST PAYMENT OPTION is set to PAID UNTIL MATURITY DATE as we are modeling the current interest serial bonds in this component. In addition, be sure that the SERIAL/TERM SELECTION is set to SERIAL BOND.**

   Current
   Interest Bond A current interest bond pays interest periodically to the bondholder until maturity or redemption, whichever comes first.

*   **Click on the right arrow or MATURITY STRUCTURE tab to go to the next inputs.**

❖ DATA MENU - BOND COMPONENT MATURITY DATA - SERIALS

This dialog permits entry of basic date information in a grid. This dialog usually appears and can also be invoked in grids for use in modeling a regularly occurring schedule of payments. The very first time you enter this dialog, you see the **ENTER DATES** dialog shown below where you enter the first and final dates, frequency of maturity and, if any, the day of the week on which maturities must occur. There are several other ways to manipulate the dates: you can change the size of the grid and type the dates in directly, with or without using the Copy command; you can insert and delete dates. All these functions are available via the **RIGHT MOUSE CLICK** or the **F5** key.

> **Serial Bonds**   For serial bonds, you would enter the first and final payment dates in the inset box.

Enter Dates	
First date	01/01/2021
Final date	01/01/2028
Count	
Frequency	Annual ▾
Day alignment	N/A ▾
Alignment date	
	OK Cancel

*   **See the front page of the official statement (page 18) for the 2013 Serial maturity dates, par amounts, and interest rates. In the ENTER DATES dialog, enter the first refundable principal maturity date (2021) after the refunding bonds' delivery date and press ENTER. Enter the final maturity date of the serials (2028). You do not have to type all the digits in 2028 - you can just type "28" for 2028. Click OK.**

✋ **NOTE -** If you accidentally press ESC or ENTER too many times and the date dialog disappears, simply click on the right mouse button or press **F5** and select **E** for **ENTER DATES**.

Bond Component-SERIALS

General Information   Maturity Structure

	Maturity Date	Issue Amount	Interest Rate	Yield	Price	Takedown ($/bond)	Issuance Denom	Minimum Amount	Maximum Amount	Call Date	Ca
1	01/01/2021	5,345.	4.600000000%	4.600000%	100.00000000		5.				
2	01/01/2022	5,700.	4.750000000%	4.750000%	100.00000000		5.				
3	01/01/2023	6,080.	4.850000000%	4.850000%	100.00000000		5.				
4	01/01/2024	6,500.	5.100000000%	5.100000%	100.00000000		5.				
5	01/01/2025	6,960.	5.250000000%	5.250000%	100.00000000		5.				
6	01/01/2026	7,465.	5.400000000%	5.400000%	100.00000000		5.				
7	01/01/2027	8,015.	5.550000000%	5.550000%	100.00000000		5.				
8	01/01/2028	8,625.	5.650000000%	5.750000%	99.39700000		5.				
		54,690.									

OK   Cancel   Advanced

*   **Enter the par amounts in the Issue AMOUNT column and the interest rates in the INTEREST RATE column for the serial bonds only. DO NOT enter the call provisions in the columns to the right of the dialog. Click OK when done.**

Yield and price are irrelevant when modeling the debt service of outstanding **current interest** bonds because the debt service to call and maturity will be the same whether you take into account the yield and price or not.

The call date and price columns in this dialog permit you to model specific call dates and prices for each maturity. We recommend you use this section to model call provisions ONLY for situations such as:

- Call provisions where the premium is a function of the amount of time between the call date and the final maturity date of each bond, thereby necessitating the ability to model different call prices for each maturity being called on the same call date.

- Having serials bonds which are all callable except for one or two which are non-callable (i.e. serials 2023-2038 are all callable except for the 2034 and 2036 maturities). This is similar to situations where you decide **not to call** specific maturities that are callable.

🖐 **NOTE** - We **RECOMMEND** you use the **CALLS** section of the **DATA** menu to model all situations where one call price applies for all the callable bonds in a component for one specific call date. Call information entered in the **BOND COMPONENT** will override any call information entered in the **CALL TABLES** (to be discussed later).

❖ DATA MENU - BOND COMPONENTS - TERM BOND

After you name the first input item in a section (bond component in this example), you will note that the previous entries appear in the order you entered them. The serial bonds just entered appear in the dialog below.

* **Click on BOND COMPONENTS - DETAIL.**
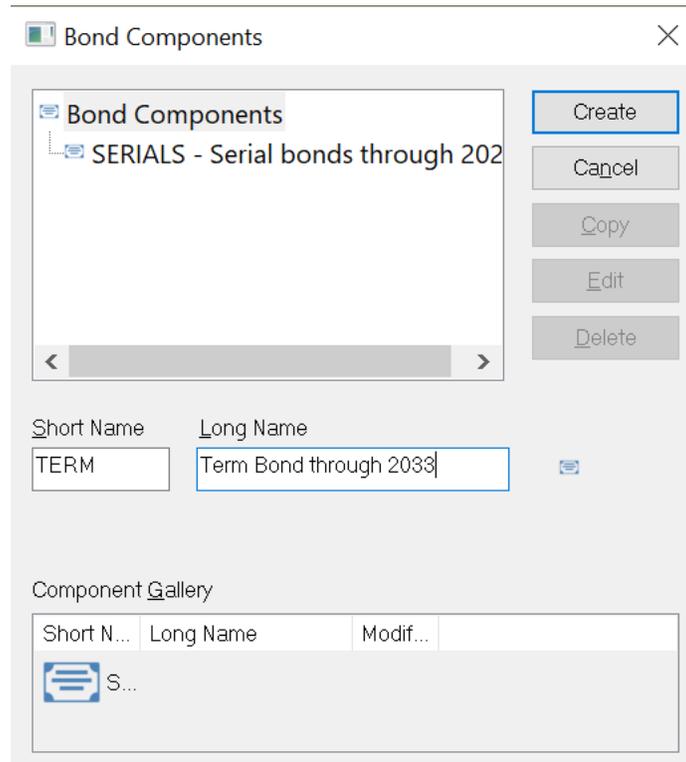
* **To model the current interest term bond, go to the short name field and input "TERM" (short), press ENTER, and "Term Bond due 2033" (long). Click CREATE.**

The program has certain industry standards entered as defaults. The dated, delivery, and first interest dates are defaulted from your entries in the **DEBT/SIZE ASSUMPTIONS** dialog.

*   **Change the SERIAL/TERM SELECTION to TERM BOND by clicking on the TERM BOND selection. Click on the right arrow or MATURITY STRUCTURE tab.**

🖐   **NOTE** - When modeling current interest bonds in the existing issues, the **SERIAL/TERM SELECTION** is used NOT for pricing but for reporting purposes. If you are modeling a term bond and do not change the **SERIAL/TERM SELECTION** to **TERM BOND** and subsequently run *Monitor* or *Refund*, the program will refer to the individual sinking funds as serial bonds NOT as part of one term bond.

Term Bond   The system requires the first and final sinking fund payment dates entered in the inset box.

*   **See pages 18 and 19 for 2033 Term bond maturity dates, mandatory sinking fund redemption amounts, and interest rate. Enter the first sinking fund date occurring after the delivery date of the refunding bonds (2029) and enter the final date of the sinking funds (2033). Click OK.**

	Maturity Date	Issue Amount	Interest Rate	Yield	Price	Takedown ($/bond)
					Bond Component-TERM	
1	01/01/2029	9,280.	6.000000000%	5.900000%	100.87500000	
2	01/01/2030	10,025.	6.000000000%	5.900000%	100.87500000	
3	01/01/2031	10,825.	6.000000000%	5.900000%	100.87500000	
4	01/01/2032	11,690.	6.000000000%	5.900000%	100.87500000	
5	01/01/2033	12,630.	6.000000000%	5.900000%	100.87500000	
		54,450.				

General Information Maturity Structure

* **Enter the sinking fund par amounts. Type the interest rate into the first cell of the INTEREST RATE column (do not press Enter), press F5 or right mouse click, then C for COPY DOWN, and just click OK. The interest rate will be copied all the way down. Click OK when the dates, par, and interest rates are all entered.**

❖ DATA MENU - BOND COMPONENTS - CABS

CABS must be modeled differently than current interest bonds because their interest payment structure is unique. CABs increase in value over time and this increase in value is, in effect, an imputed interest payment. CABs are optionally redeemed not at their original par value but at their accreted value.

* **Click on BOND COMPONENTS - DETAIL.**

* **To create the CAB term bond, input "CABTERM" (short), press ENTER, and "CAB Term Bond due 2038" (long). Click on CREATE.**

Capital
Appreciation
Bonds (CABs) CABs are the municipal bond market's equivalent to corporate-type zero coupon bonds or Treasury STRIPS. CABs are unique in that the issuance par amount is defined as the actual purchase price at delivery, unlike zero-coupons and STRIPs which are quoted at a discount to par. CAB interest is not paid over time but compounded semiannually until maturity. For example, a CAB issued at $3,905.99 will pay the bondholder $5,000 at maturity - there are no interest payments in between. The difference between the issuance par and the maturity value is the return to the investor (interest). The bond's value accretes (grows) at some yield until it reaches its final maturity amount, usually $5,000. CABs are dated and delivered the same day and have no accrued interest.

	Capital Appreciation Bond Yield = 5.00% Par Amount of $3,905.99			Current Interest Bond Current Coupon = 5.00% Par Amount of $5,000.00		
	Value of Bond	Accreted Interest	Payments to Bondholder	Value of Bond	Interest Paid	Payments to Bondholder
Closing Date	3,905.99			5,000.00		
6 months	4,003.64	97.65		5,000.00	125.00	125.00
12 months	4,103.73	100.09		5,000.00	125.00	125.00
18 months	4,206.33	102.59		5,000.00	125.00	125.00
24 months	4,311.48	105.16		5,000.00	125.00	125.00
30 months	4,419.27	107.79		5,000.00	125.00	125.00
36 months	4,529.75	110.48		5,000.00	125.00	125.00
42 months	4,643.00	113.24		5,000.00	125.00	125.00
48 months	4,759.07	116.08		5,000.00	125.00	125.00
54 months	4,878.05	118.98		5,000.00	125.00	125.00
60 months	5,000.00	121.95	5,000.00	5,000.00	125.00	5,125.00

Convertible
CABs Convertible CABs act like CABs until a specific date on which they reach their $5,000 value. On that date, they convert to current interest bonds and begin paying interest to bondholders on a regular basis.

The program has certain industry standards entered as defaults. The dated, delivery, and first interest dates are defaulted from your entries in the **DEBT/SIZE ASSUMPTIONS** dialog.

Bond Component-CABTERM

General Information | Maturity Structure

Dated Date	01/01/2013
Delivery Date	01/13/2013
First Interest Payment Date	

Interest Frequency	Semiannual
Interest Day Basis	30/360
Interest Payment Option	Compounded until Maturity Date
Final Compounding Date	
Future Maturity Denomination	5.
Existing CAB Input Tool	...

Serial/Term selection
- ○ Serial Bond (Price to Actual Maturity)
- ● Term Bond (Price to Final Maturity)

OK | Cancel | Advanced

* **For a CAB bond, enter the ORIGINAL DATED DATE (1/1/13) into the DATED DATE input and the ORIGINAL DELIVERY DATE (1/13/13) into the DELIVERY DATE input. Change the INTEREST PAYMENT OPTION to COMPOUNDED UNTIL MATURITY DATE, be sure the future denomination is "5" (for $5,000), and select TERM BOND pricing. Click on the right arrow or MATURITY STRUCTURE tab.**

✋ **NOTE -** When modeling CABs in the existing issues, the **SERIAL/TERM SELECTION** is used for reporting AND for pricing. If you are modeling a term bond and do not change the **SERIAL/TERM SELECTION** to "**TERM BOND**", each sinking fund will be treated as an actual maturity. **SERIAL/TERM SELECTION** This will affect the accreted value of each sinking fund payment and, consequently, the cost of the escrow and savings.

Term Bond The system requires the first and final sinking fund payment dates entered in the inset box. Also notice that the denomination in the Issuance Denomination column (shown on next page) is equal to the initial purchase denomination (the maturity value discounted at the interest rate in the Issue Amount column) and is equal for all the sinking fund payments. This confirms that the sinking fund payments are being priced to the final maturity date of the term bond.

Enter Dates

First date	01/01/2034
Final date	01/01/2038
Count	
Frequency	Annual
Day alignment	N/A
Alignment date	

OK   Cancel

*   **See pages 18 and 20 for 2013 CAB Term bond maturity dates, mandatory sinking fund redemption amounts, and interest rate. Enter the first and final sinking fund date. Click OK.**

CAB Discount
Rate   Usually a CAB with no premium or discount has a discount rate which is approximately equal to the yield. This is the most common type of CAB. In this case, the yield entered in the interest rate column is the rate at which the CAB's maturity value will be discounted to compute its issuance par amount. That issuance par implies a price of 100%.

CAB Yield
to Investor   This is the actual yield to the investor. If the CAB is priced at par, the accretion rate of the CAB (entered in the **INTEREST RATE** column) will approximately equal the yield to the investor. If the CAB is sold at a premium, the accretion rate (**INTEREST RATE** column) will be much higher than the yield to the investor (**YIELD** column). The CAB's maturity value will be discounted at the accretion rate, but the bond will be priced to the yield to the investor, thereby producing a premium.

	Maturity Date	Issue Amount	Interest Rate	Yield	Price	Takedov ($/bond
1	01/01/2034	2,606.593	6.050000000%	6.050000%	100.00000000	
2	01/01/2035	2,409.35615	6.050000000%	6.050000%	100.00000000	
3	01/01/2036	2,226.0583	6.050000000%	6.050000%	100.00000000	
4	01/01/2037	2,057.3966	6.050000000%	6.050000%	100.00000000	
5	01/01/2038	1,901.2796	6.050000000%	6.050000%	100.00000000	
		11,200.68365				

Bond Component-CABTERM — General Information | Maturity Structure

OK   Cancel   Advanced

*   **Enter the mandatory sinking fund redemption amounts in the ISSUE AMOUNT column. Enter the CAB yield in the INTEREST RATE column NOT in the YIELD column. To copy the rate down, click on the right mouse button or press F5, C for COPY DOWN, and OK.**

*   **Check the ISSUANCE DENOMINATION column to confirm that the term bond has been modeled properly - all amounts should be equal since all the sinking fund amounts are priced based on the final maturity of the term bond. They should match the value of the CAB term bond on delivery. Compare it to the issuance value on the Accreted Value Table in the O.S.**

✋ **NOTE -** CABs are usually sold as serial bonds NOT as term bonds. A CAB term bond was used for this analysis to illustrate how term vs. serial pricing affects the issuance denomination in a CAB.

Issuance

Denomination *DBC Finance* computes what the issuance par amount of a CAB bond is on the delivery date by discounting the future maturity denomination specified in the **BOND COMPONENT INFORMATION** dialog at the interest rate in the **INTEREST RATE** column back to the delivery date. The denomination should be the same for all the sinking fund payments of the CAB term bond.

✳ **Click OK when finished.**

Premium CAB

Yield Premium CABs can be modeled by entering the market yield in the **YIELD** column after entering the accretion rate in the **INTEREST RATE** column. CABs sold with a premium are used in cases where there are debt issuance limitations (i.e. refunding par cannot exceed refunded par). By issuing a CAB with a premium, for example, the issuer can decrease the par amount of CABs issued and generate the additional proceeds required from the premium on the bonds. When using premium CABs, the maturity amount (usually $5,000) is discounted at a rate higher than the yield to the investor. The example below shows two CABs with the same yield to the investor. Notice that the purchase price is equal in both cases although the par amounts are not.

Accretion Rate (discount)	Yield to Investor	Price	Issuance Par Amount	Purchase Price
7.00%	7.00%	100.000%	$1,266.20	$1,266.20
10.00%	7.00%	177.611%	$ 712.90	$1,266.20

When modeling a bond that was originally issued as a premium CAB, it is vital to remember that the intermediate values (as it accretes) and its final value are important. How much was originally paid for the bond is irrelevant. Using the example above, the investor is paying $1,266.20 for the bond **REGARDLESS** of whether that bond is a premium CAB or not. From the investor's point of view the premium CAB "functions" just like a regular CAB - it will accrete to a $5,000 value in the future at the stated yield. Yet, it serves the issuer's requirement to reduce the issuance par.

❖ DATA MENU - CALL PROVISIONS - CALL TABLES

The **CALLS** menu permits you to model the call provisions for each bond component you created. A premium table must be created for each set of provisions. In addition they permit you to model not only the first call date and premium but the entire call schedule as it appears in the official statement. For example, if an issue has three components and two of the components have different call provisions, you would create a premium table for each call provision schedule (two tables).

DBC Finance has the ability to combine this call schedule with additional information regarding whether the bonds are callable on any date or on an interest payment date only, and, finally, the number of days notice to compute the first allowable call date. This is especially useful for current refundings.

* **Click on DETAIL in the CALL PROVISIONS section of the DATA menu.**

* **Type "CURRENT" (short), press ENTER, type "Current Interest Bond Call Provisions" (long) then CREATE. See pages 19 and 20 for optional (call) redemption provisions.**

The call provisions for both the current interest serial bonds and the current interest term bonds are the same, therefore, we will model them in one premium table for convenience. The calls for the CAB bonds are a bit more complicated and will be modeled separately in the bond component.

🖐 **NOTE -** The following commands will save you time:

> **F5 - ENTER DATES** - use this to enter the begin date for each of the call date ranges (enter the first call and the date that the bonds are callable at par - this is not the last call date but the last time that the premium will change)

> **F5 - COPY** - use this to copy the first call premium and reduce it by .50%

In this dialog, the first and subsequent call dates and their respective prices are entered. *DBC Finance* is designed to be a "library" or datafile of an issuer's debt, therefore, historical information can be kept as part of a file. For example, you are structuring an analysis for a current refunding and the first call date is entered in the first row of the premium table. Interest rates suddenly shift and the refunding is no longer feasible. A few months pass by and the market "comes back" (rates drop again). The bonds are now callable at the second call. *DBC Finance* will recognize that the delivery date of the refunding is now past the second call date and automatically executes the call on the new date and at the correct price. It will ignore all events before the refunding issue's delivery date.

	Call Table-CURRENT

Call Table

Type of Call Table   Standard ▾

	Begin Date	Call Price
1	01/01/2023	100.00000000
2		100.00000000
3		100.00000000
4		100.00000000
5		100.00000000
6		100.00000000
7		100.00000000
8		100.00000000
9		100.00000000
10		100.00000000

Copy

Copy range	A1
Copy count	4
Copy operation	+12

OK   Cancel

OK   Cancel

*   **Type "1/1/23" as the first Begin Date and right mouse click to get the Copy Down command (you can also use F5-C). Be sure that the Copy Range is set to cell A1 as this refers to the location of the data to be copied. Set the Copy Count to 4 to repeat the operation 4 times. Type "+12" in the Copy Operation to add 12 months to the date. Click OK when done.**
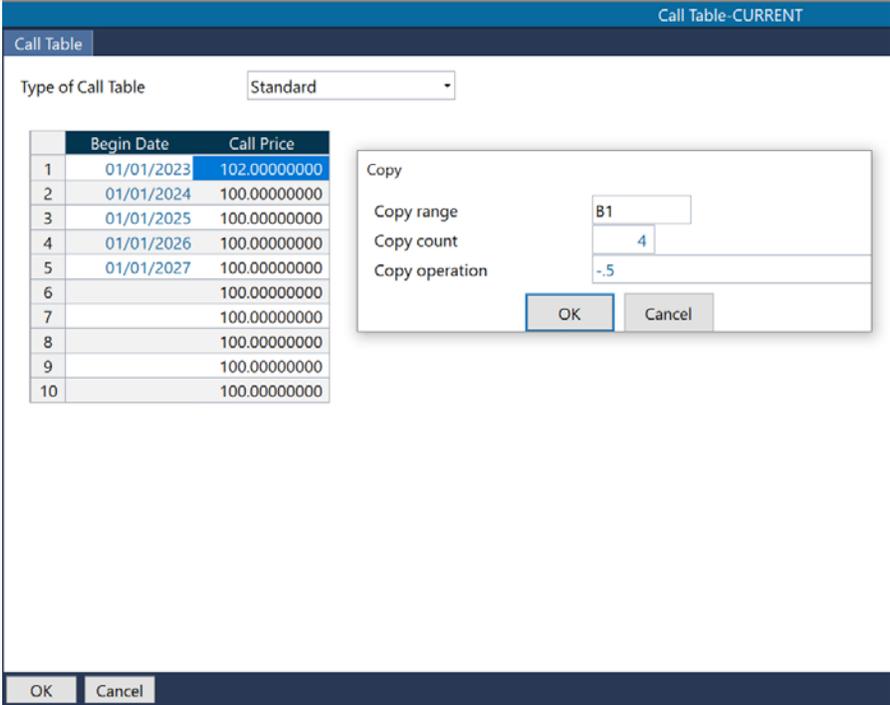
* **Type "102" in the first CALL PRICE cell. Using the COPY DOWN command as described for the previous dialog, set the COPY COUNT to 4 and the COPY OPERATION to "-.5". Click OK.**

It is not necessary to enter the entire call schedule, however, for this example enter all the call dates and prices for the current interest bonds as they appear in the official statement.
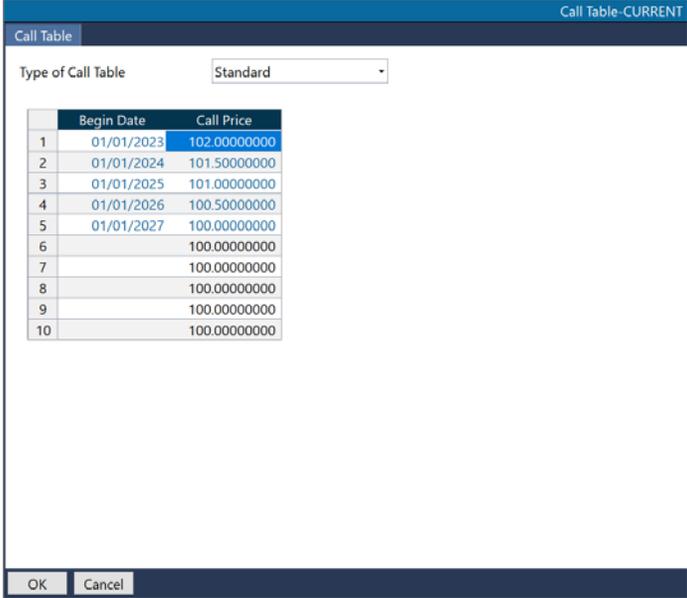
* **Click OK when finished.**

❖ DATA MENU - CALL PROVISIONS - REFUND PROVISIONS

The premium tables only describe one set of call provisions. The label "CURRENT" **is not** in any way interpreted by the program as being the call provisions for these particular components, they are simply labels. You must model the refund provisions including which premium table, if any, applies to each component, whether the bonds are callable on any date or only on an interest payment date, and any specified notice required before the bonds can be called (this is very important in current refundings).

∗   **Click on SETUP in the CALL PROVISIONS section of the DATA menu. (If you are using the drop down menus, go to REFUND PROVISIONS of CALL PROVISIONS.)**

	Bond Component	Call Table	Callable Dates	# Days Notice
1	Serial bonds through 2028	CURRENT	Interest Pmt Date	
2	Term Bond through 2033	CURRENT	Interest Pmt Date	
3	CAB Term bond due 2038		Any Date	

∗   **Double click on the CALL TABLE column and select CURRENT for all current interest bonds (the first two bond components). Go to the CALLABLE DATES column and select "Interest Pmt Date" for the first two bond components (or type the letter "I"). Click OK to exit the CALLS menu.**

∗   **Next, create a second Call Table title "CABCALL" with the call provisions shown on the OS. Then link to CAB bond component and select "Interest Pmt Date"**

	Call Table-CABCALL

Call Table

Type of Call Table   Standard ▾

	Begin Date	Call Price
1	01/01/2028	103.00000000
2	01/01/2029	102.00000000
3	01/01/2030	101.00000000
4	01/01/2031	100.00000000
5		100.00000000
6		100.00000000
7		100.00000000
8		100.00000000
9		100.00000000
10		100.00000000

	Call Provisions

Call Provisions

	Bond Component	Call Table	Callable Dates	# Days Notice
1	Serial Bonds through 2028	CURRENT	Interest Pmt Date	
2	Term Bond due 2033	CURRENT	Interest Pmt Date	
3	CAB Term Bond due 2038	CABCALL	Interest Pmt Date	

 # Days Notice This is the number of days notice an issuer must give to bondholders to exercise a redemption of bonds. In the case of current refundings, specifying the number of days notice will call the bonds on the first call date occurring after the delivery date plus the number of days notice, which is 30 days in the example below. **WARNING** This should only be entered if you assume the notice <u>will</u> be given on the delivery date. If the bonds are already callable on any date, the notice will affect your cash flows by pushing the call date out further.

Refunding Delivery Date	Next Debt Service Payment Due	If bonds are callable on: ANY DATE	INTEREST DATE
		Old bonds will be called on:	Old bonds will be called on:
12/15/19	1/1/20	1/15/20 (delivery plus 30 days)	7/1/20 (first interest after (del.+30 days)

❖ TOOLS MENU - DEBT SERVICE CALCULATOR

IN REAL-LIFE SITUATIONS, THIS IS OPTIONAL

IT IS NOT NECESSARY TO SOLVE DEBT SERVICE FOR THE OLD BOND ISSUE AS THIS IS AUTOMATICALLY DONE EVERY TIME YOU RUN *DBC REFUND*. DETAILED REPORTS OF ALL REFUNDED DEBT CAN BE GENERATED THROUGH *DBC REFUND*.

✋ **NOTE -** This is not required for a refunding. The *Refund* module automatically computes the debt service to maturity and the escrow requirements of the bonds.

The Debt Service Calculator computes the debt service for the selection of any combination of maturities, bond components, and series. In addition, there are several temporary options available for printing reports. These include date ranges through which to show the debt service, additional titles, and control over the frequency and alignment (or fiscal) date of the reports. We will use this as a simple way to compute the debt service for the 2013 series.

* **Click on the DEBT SERVICE CALCULATOR icon.**

* **Click on ABC's folder to open it then click on the white box next to 2013 until fully shaded. Click on the 2013 folder to show the underlying bond components. Click on CALCULATE.**

Bond Debt Service

	Date	Principal	Interest	Debt Service
1	01/01/2021	5,345,000.00	3,055,327.50	8,400,327.50
2	07/01/2021		2,932,392.50	2,932,392.50
3	01/01/2022	5,700,000.00	2,932,392.50	8,632,392.50
4	07/01/2022		2,797,017.50	2,797,017.50
5	01/01/2023	6,080,000.00	2,797,017.50	8,877,017.50
6	07/01/2023		2,649,577.50	2,649,577.50
7	01/01/2024	6,500,000.00	2,649,577.50	9,149,577.50
8	07/01/2024		2,483,827.50	2,483,827.50
9	01/01/2025	6,960,000.00	2,483,827.50	9,443,827.50
10	07/01/2025		2,301,127.50	2,301,127.50
11	01/01/2026	7,465,000.00	2,301,127.50	9,766,127.50
12	07/01/2026		2,099,572.50	2,099,572.50
13	01/01/2027	8,015,000.00	2,099,572.50	10,114,572.50
14	07/01/2027		1,877,156.25	1,877,156.25
15	01/01/2028	8,625,000.00	1,877,156.25	10,502,156.25
16	07/01/2028		1,633,500.00	1,633,500.00
17	01/01/2029	9,280,000.00	1,633,500.00	10,913,500.00
18	07/01/2029		1,355,100.00	1,355,100.00
19	01/01/2030	10,025,000.00	1,355,100.00	11,380,100.00
20	07/01/2030		1,054,350.00	1,054,350.00
21	01/01/2031	10,825,000.00	1,054,350.00	11,879,350.00
22	07/01/2031		729,600.00	729,600.00
23	01/01/2032	11,690,000.00	729,600.00	12,419,600.00
24	07/01/2032		378,900.00	378,900.00
25	01/01/2033	12,630,000.00	378,900.00	13,008,900.00
		120,340,683.65	80,212,195.15	200,552,878.80

Print Reports   View Reports   Close

* **Click on VIEW REPORTS to see the debt service, then click on Close twice.**

* **Press CTRL-S or click on** Save **to save the series.**

INPUTTING THE 2011 BONDS

The setup for the 2011 bonds are comparable to the entries made for the 2013 serial bonds and the term bond.

* **Enter the 2011 Bonds. The O.S. is on page 16.**

- **Create Series 2011 within Issuer ABC.**

- **Use the F5 COPY DOWN command as often as possible. Also use F5-ENTER DATES**

- **The Serials being refunded total $44,265,000.**

SETTING UP THE REFUNDING CASE

You will create three different types of cases:

1. Present Value analysis using the arbitrage yield as the discount rate for the escrow rate.
2. SLGS analysis using State and Local Government Series securities for the investment of bond proceeds in funding the escrow.
3. OMS analysis using open market securities for the investment of bond proceeds in funding the escrow.

❖ INPUTS REQUIRED - FOR A REFUNDING CASE

Setting up a case implies you wish to do a refunding analysis as a "case study". When you create a case, it is as if you were filling out a questionnaire of what you wish to accomplish in the financing. You are, in effect, writing a script for the program to follow. This script tells the program whose debt to refund, which series and which maturities, how the requirements should be computed (crossover, current, advance), which refunding series to use for sizing purposes, if there are funds to transfer and how to spend them in the escrow, which open market datafile to pick securities from for optimization, how should savings be computed and adjusted, and how the new debt should be structured.

As we hope you can see, all the assumptions that "make a refunding a refunding" and not an ordinary sizing are saved in a "case". The different entries belonging to Series and Case, respectively, are shown in the diagram below. A refunding analysis consists of all this information.

Refunding Analysis

Sizing - Series **Set up in Debt/Size**	**Refunding - Case** **Set up in Refund**
Refunded Bonds (for each series)	**Escrow Assumptions**
Principal Interest Rates Call Date and Price	Defeasance Requirements Cash Transfers to Escrow Savings Assumptions Solution Method for Sizing Escrow Candidates
Refunding Bonds	

Dated and Delivery Dates
Costs of Issuance and Spread
Maturity Dates and Scale
New Reserve Funds
Expenses
Other Sources of Funds
  (other than transfers related to
  refunding - these are in the
  refunding Case)
Other Uses of Funds
  (other than escrow - which is in
  refunding Case)	

The diagram below shows how you could solve 12 refunding analyses by using 4 cases and three scales:

REFUNDING ISSUES	New issue with base scale	New issue with scale + .05%	New issue with scale +.10%
CASES			
SLG refunding of all the bonds	1	5	9
SLG refunding of just callables	2	6	10
OMS refunding of all the bonds	3	7	11
OMS refunding of just callables	4	8	12

Batch runs will be covered in Advanced Analysis II.

REQUIRED ENTRIES

If rates change next week and you have to update the scale in the refunding series, all you have to do is make that one change in the refunding series, save it, and rerun the case. The "script" can stay the same even if the contents of the items that are referred to in the script change (as in a spreadsheet using cell references). You can create many different cases or scenarios. The program must have a script to follow for every single refunding analysis.

The order of entry for most refundings is as follows:

    Debt/Size
      Open or Create Datafile
      Open or Create Issuer
          Create Old Series
               Principal
               Interest Rates
               Call Provisions
               Existing Escrows (for transferred proceeds purposes - advanced application)
          Create New Series
               Dated and Delivery Dates
               Costs of Issuance and Spread
               Maturity Dates and Scale
               Reserve Funds
               Expenses
               Other Uses of Funds (other than escrow)

    Refund (datafile already defined)
      Create Case for same Issuer used in setting up series
          Refer to series with refunding issue assumptions
          Select security type used in most of escrow purchases

As mentioned in the *Debt/Size* tutorial, file names are given before a file is set up. The highest level of organization is the datafile. A datafile is designed to let you keep a "library" of all an issuer's debt. A way to think of a datafile is to think of it as a file cabinet. The issuers would be the drawers and the series are the file folders.

When actually setting up a series or a case, we enter the Datafile name first, then the issuer name, and finally the series or case as follows:

> Datafile - this is used to create the name for the file
> Issuer - name of the issuing entity
> Series - series of bonds described OR Case - refunding assumptions

Below is an example of a datafile with one datafile, three issuers, each with multiple series and cases.

One Datafile	Datafile								
Multiple Issuers	Issuer A			Issuer B			Issuer C		
Multiple Series per Issuer	2016	2018	Case OMS18	2015	2020	Case SLGALL	2017	Case PV17	Case OMS19

In *DBC Finance* when doing a refunding, we create and use cases. A case is, in effect, a script of sorts which groups all of the assumptions that make a refunding different from a sizing. These assumptions include which maturities to refund from individual series, how these bonds will be defeased, investment candidates, and savings assumptions. *Debt/Size* is used for modeling all aspects related to the structure of the bond issue **except** those features that are exclusive to refundings. For example, the debt service reserve of the new issue would be modeled in *Debt/Size* while the debt service reserve transfer of the refunded debt would be entered in the case (in *Refund*).

PV ANALYSIS

A present value analysis assumes that the cost of escrow will be computed by discounting the requirements at an interest rate (usually the arbitrage yield) to the delivery date of the refunding issue. This type of analysis implies that the securities available in the market will be able to earn the arbitrage yield. When doing present value analyses ALWAYS keep in mind that actual market rates may, in fact, be below the arbitrage yield limit and this would produce an escrow yield that is lower than the rate you are assuming in the PV Analysis. The use of PV escrow for a refunding par estimate is only reasonable when the assumption that market rates will yield sufficient return to meet the arbitrage yield is realistic.

Using the present value of the requirements when market rates are lower than the assumed rate will understate the true cost of the escrow securities. This will, in turn, understate your par amount because you will be borrowing less than you really will need to deposit into the escrow. Finally, it will overstate your savings because you are assuming the refinancing is less expensive than it really is.

ASSUMPTIONS

Refund all outstanding bonds of series 2011 and 2013 assuming that market rates **are** high enough to meet the arbitrage yield. You will use the arbitrage yield as your present value discount rate to compute the cost of the escrow.

NOTE - Only those inputs pertaining to the analysis being discussed will be reviewed. Please ignore other inputs as they will be reviewed in subsequent lessons.

❖ **FILE MENU**

There is a key difference in the type and location of data used for a sizing vs. that for a refunding. The Finance Document used to store data related to the bond issue structure including dates, par amounts, interest rates, and uses of funds is the Series. In DBC, we use the Refund Case as the Document for storing data related to the selection of bonds to be refunded, the escrow assumptions, investment security options, and savings structure.

* **Click on** [Open icon] **Open** or FILE OPEN.

* **Click on ABC County then press** NEW.

—

**Short/Long
  Name**   The case has both a short name and a long name. The short name is used for a quick reference while the long name is used to describe the distinguishing features of the case. This convention applies throughout *DBC Finance* for items such as reserve funds, expenses, and escrow requirements (some long names do appear on the reports). Errors in any short/long named entries can be corrected using the **EDIT** command.

* **Type "PVALL" (short), then ENTER, and "PV - Full Defeasance 2011 and 2013" (long name). Click OK.**

❖ DATA MENU

The **DATA** menu is where data is entered to describe information related to the escrow requirements, escrow investments, and adjustments to the calculation of savings. Notice the icon automatically generated for "Refunding Series". This is a New Money series with the Status set to "Proposed Refunding" so that the user does not need to create a separate refunding new money series.
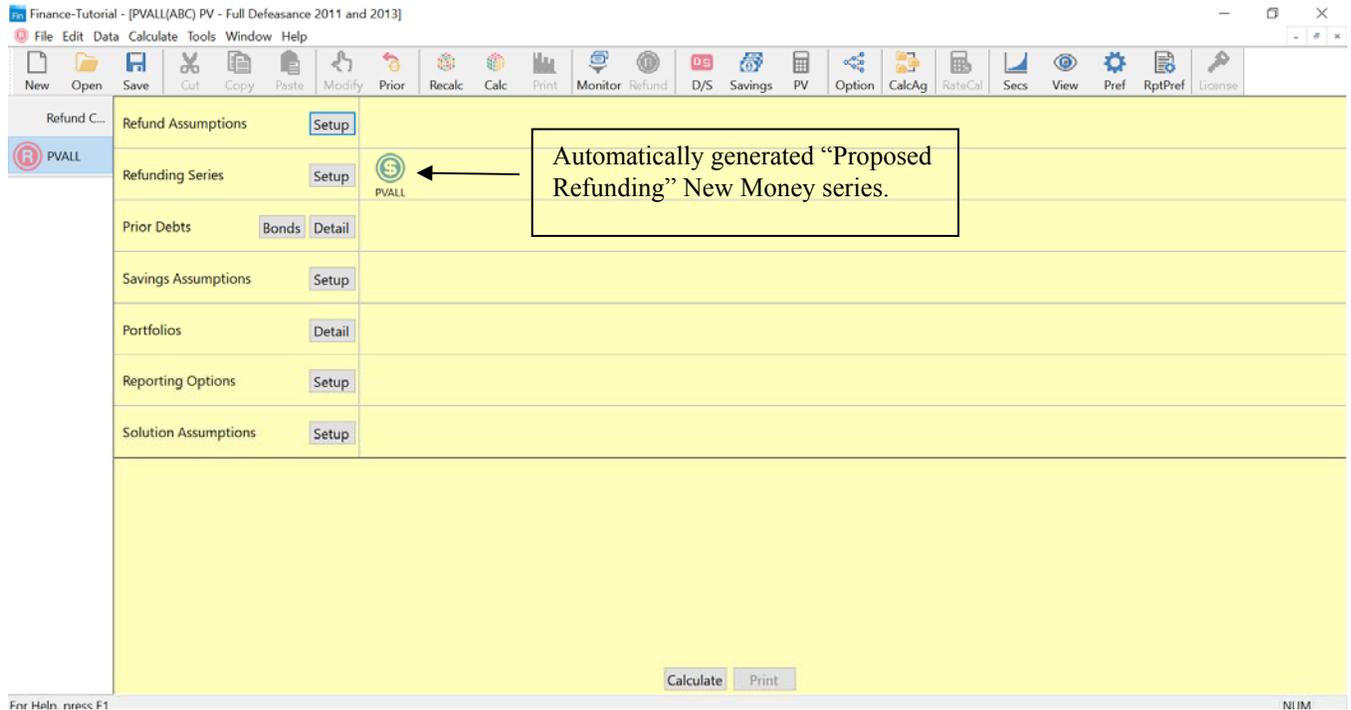
* **Go to REFUND ASSUMPTIONS and click on SETUP.**

❖ DATA MENU - REFUND ASSUMPTIONS - GENERAL

The Default for Available Securities offers a simple method for specifying which security type will be used for the escrow investments.

	Refund Assumptions

Escrow Solution Parameters	Global Proceeds Escrow	Notes

Default for 'Available Securities'   PV

Escrow purchase date   New delivery date

── SLGS solution parameters ──

SLGS rates file   Current

Allocate SLGS rates   Default

── OMS solution parameters ──

Available OMS   Security Universe   ...

  OMS file   Default

If prices and yields conflict

── PV solution parameters ──

Maximum PV rate

Funding option   Net funded

OK	Cancel	Advanced

* **Select "PV" as the DEFAULT FOR AVAILABLE SECURITIES. Click OK.**

<div style="border: 2px solid black; background-color: #e0e0e0; text-align: center; padding: 20px;">

SETTING UP THE REFUNDING SERIES

</div>

* **Enter the assumptions for the PVALL refunding series.**

See the **Debt/Size tutorial** for modeling new issues and their related expenses.

- **Open the PVALL refunding series from the PVALL refund case**

- **See pages 14 and 15 for assumptions.**

- **Notice the STATUS of the refunding issue is "Proposed Refunding" not "Actual"**

- **Be careful with the CABs in this issue.**

- **Be sure to specify that the insurance applies only for the term bond AND use the phrase "total adjusted debt service" to reflect that you are insuring the debt service net of accrued interest.**

- **Save the series after entering all the information in the DATA menu.**

❖ DATA MENU - REFUNDING SERIES

If you have already created a Debt/Size series with a "Proposed Refunding" status that you wish to use as your refunding series instead of the automatically generated refunding series, then you can use this dialog to select the refunding series being used for sizing the issue and will have the option to designate other series to be included in the arbitrage yield (via the **ADVANCED** button).

✋ **NOTE** – the instructions below are strictly for demonstration. You should not have nor do you need to create a 2020REF series. This process is only necessary if you wish to use a Proposed Refunding series separate from the series automatically generated when you create a new Refund Case.

＊ **Click on REFUNDING SERIES - SETUP.**

＊ **Double click on "2020REF".**

✋ **NOTE -** If 2020REF does not appear in the **REFUNDING BOND SERIES** list, one or both of the following could have happened:

1. You did not click on Issuer ABC when you created the case. This process links the case to the Issuer.
2. You did not save 2020REF with a **STATUS** of **PROPOSED REFUNDING**.

❖ **DATA MENU - PRIOR DEBTS**

Entries in **PRIOR DEBTS** let you model separate escrow requirements, when necessary. If, for example, you are refunding two issues that for some reason must have separate cash flows and you need to show separate investments purchased for each, you would set up two prior debt files, one for each issue you are refunding. When creating the Prior Debt files use names that describe which issues or bonds you are defeasing (i.e. 2013 and 2014, Callables only of 2015, etc.). Each **PRIOR DEBT** entry is modeled in two dialogs. In the first dialog you describe how the requirements are to be computed, what funds will be transferred to the new issue and the escrow, and which investments to use to defease the requirements. The second dialog will give you a menu of all the issuer's existing debt for you to select which series, bond components, and maturities and their dollar amounts to refund.

*   **Click on PRIOR DEBTS - DETAIL.**

*   **Type "FULLREF" (short), press ENTER, then type "Full Refunding of 2011 and 2013" and click CREATE.**

✍ **NOTE -** What you have just typed is a label which only appears on reports modified to show ALT-DETAIL (this will be discussed later). Use the label to make it easier to remember what series and maturities make up the requirements. If you had to keep two escrows (for issues A and B) completely separate for cash flow purposes, you would create an entry in **PRIOR DEBTS** for issue A and then a second one for B. In this manner, their respective requirements would be kept separate and can then be funded by separate escrows or just one combined escrow.

❖ DATA MENU - PRIOR DEBT - DEFEASANCE REQUIREMENT

In this dialog you will describe how the requirements are to be computed and which investments will be used to defease the requirements.

DEFEASANCE REQUIREMENT

The Source of prior bond debt service refers to where DBC should look for the bonds to defease. The default (Select bonds) allows you to pick and choose Series and maturities to defease from the bond issues currently in the datafile AND that were saved with a **STATUS** of **ACTUAL** or **ACTUAL REFUNDING**.

The defaults are those which apply in an advanced refunding escrow. *DBC Finance* assumes you would like to defease all amounts (principal and interest) of the prior bonds and that you would like to defease payments that start after the delivery date. Inputs in this dialog describe how the escrow requirements are going to be computed. For example, the escrow requirements for advance refunding a specific bond issue vs. a crossover refunding of the same debt would be very different. For the first you could use the default settings while the second would require you to specify that only principal is being defeased, that a percentage of the refunding interest is being defeased, and several other assumptions unique to crossovers.

* **Click on the DETAIL button** … **next to "Select Bonds"**

❖ DATA MENU - PRIOR DEBT - SERIES SELECTION

DBC Finance's datafile design makes setting up escrows extremely simple. This dialog displays all the series saved with a **STATUS** of **ACTUAL** or **ACTUAL REFUNDING** in *Debt/Size*. Setting up an escrow is as simple as selecting which series you wish to refund and whether you wish to refund some or all of the maturities. The default selection is "None", designated by an unshaded box, which forces the user to make all selections. This format is especially convenient when dealing with an issuer with many bond issues outstanding. The program saves all the selections of bonds to refund and eliminates the need to set up old series files for each combination of maturities to refund.

Clicking on the Series folder will drop down the bond components. Clicking on the bond component will drop down the maturities. Clicking on the box next to a maturity until it is half gray will cause a zero to print to the left of the date, indicating none of the maturity was selected for refunding. Entering an amount will allow the user to specify the refunding of a partial maturity. A fully grayed box indicates Fully Refunded; a half shaded box indicates Partially Refunded; an unshaded box indicates Not Refunded.

Prior bond debt service series selection

Series Selection	
ABC	ABC County
2011	2011 $100,000,000 Revenue Bonds
2013	2013 $150,000,683 Revenue Bonds
2016	Series 2016 Bonds

OK   Cancel   <   >
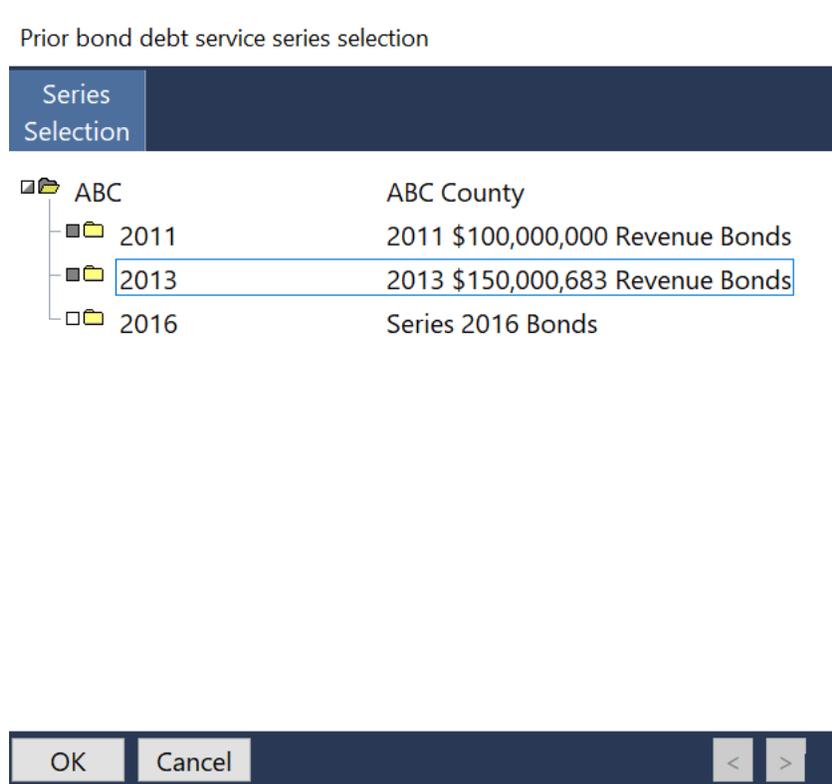
* **Click on both the boxes for the 2011 and 2013 series until they are completely shaded. Click OK.**

✋ **NOTE -** The 2016 series will appear ONLY if you have done the Debt/Size tutorial and did Advanced Analysis I.

In *DBC Finance*, a case can have one or many sets of escrow requirements. Issues can be fully or partially defeased. In the example below, series 2012, 2013, and 2017 are to be advance refunded and the maturities to refund have been saved in Prior Debt 1. Prior Debt 2 has the requirements for series 2014. For reasons that will not be discussed here, series 2014 must be refunded using a separate escrow. Notice that the selections made for some series indicate a partial refunding. *DBC Finance* can solve separate yield restricted escrows for each prior debt.

Case	Case XYZ										
Prior Debt	**Prior Debt 1**						**Prior Debt 2**				
Series	**2012**			**2013**	**2014**	**2017**	**2012**	**2013**	**2014**		**2017**
Selection	**Some**			**All**	**None**	**Some**	**None**	**None**	**Some**		**None**
Bond Component	**Serials**	**Term Bond**	**CAB Term**	No further information required.		**Serials**	No further information required.		**Serials**	**Term Bond**	
Selection	Some	All	All			Some			Some	None	
2020	500,000					250,000			200,000		
2021	500,000					250,000			200,000		
2022	500,000					250,000			200,000		
2023	500,000					250,000			200,000		
2024	500,000					250,000			200,000		
2025	500,000					350,000			200,000		
2026	500,000					350,000			200,000		
2027	500,000					350,000			200,000		
2028		750,000				350,000			200,000		
2029		750,000				350,000			200,000		
2030		750,000				450,000				500,000	
2031		750,000				450,000				500,000	
2032		750,000				450,000				500,000	
2033			900,000			450,000				500,000	
2034			900,000			550,000				500,000	
2035			900,000			550,000					
2036			900,000			550,000					
2037			900,000			550,000					
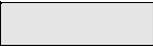
Shaded amounts indicate that this maturity is to be refunded.

❖ CALCULATE MENU - REFUND SOL'N ASSUMPS - BOND SOLUTION

Refunding solutions are executed from *Refund* NOT *Debt/Size*. In the **CALCULATE** menu, you must first enter **SOLUTION ASSUMPTIONS** (to size or not to size, how to amortize the new debt, etc.) then go to **CALCULATE.** This dialog controls what the program is solving for. In addition, the bond solution type is set here. Constraints for debt service structuring, par, and allocation of overlapping maturities are modeled here.

* **Go to the SOLUTION ASSUMPTIONS - SETUP.**

* **Change the TYPE OF BOND SOLUTION to "Uniform". Click on the SOLUTION ADJUSTMENTS tab.**

Solution
Method   DBC uses linear programming techniques to solve for an optimal debt service structure. Occasionally, users impose too many constraints for the linear optimization routine to run properly and the program will display an error message stating it cannot find a solution for the problem. Setting the **SOLUTION METHOD** to Basic will usually solve this problem.

❖ CALCULATE MENU - REFUND SOL'N ASSUMPS - SOL'N ADJUSTMENTS

Permits net debt service solutions and other adjustments to the solution constraints.

Solution Assumptions									
Bond Solution	Transfer Proceeds	Solution Adjustments	Add'l D/S for Wrapping	Bond Solution Revenues	Coverage Factors	Bond Component Targets	'Mixed' Solution Types	Overlap Maturity Allocations	Project Finance

Apply ongoing expenses to   N/A

Apply fund earnings/draws to   N/A

Reduce d/s by interest accrued   N/A

  Specified date

Adjust for short first period   ✔

Restrict periods before first maturity

Restrict periods without open maturities

Protect maturity dates from solution   ☐ ...

Import par amounts from formula   ☐ ...

Apply NYS '50 percent rule'   ☐

Spread principals in same solution period and same bond component ✔

[OK] [Cancel]

* **Set REDUCE D/S BY INTEREST ACCRUED to "N/A" (for tutorial purposes only). Click OK. Press CTRL-S or click on the SAVE icon to save the case before the solution is run. Click on CALCULATE to begin the refunding solution.**

SOLUTION TYPES

The ten different bond solutions that can be executed are shown on the next four pages displayed in the Bond Solution report format. To determine whether the each solution meets your requirements or not, you will focus on the different highlighted parts of each sample. These differ depending on the solution chosen. Keep in mind that the numbers below are for demonstration purposes and are not related to the Refund Case.

Level Debt service (p+i) is equal (+/- one bond denomination) every year. This solution completely ignores savings and focuses solely on the new debt service.

Period Ending	Proposed Principal	Proposed Debt Service	Total Debt Service
Jan 1, 2021	-	-	**-**
Jan 1, 2022	2,540,000	4,181,718	**4,181,718**
Jan 1, 2023	2,650,000	4,182,498	**4,182,498**
Jan 1, 2024	2,770,000	4,184,573	**4,184,573**
Jan 1, 2025	2,900,000	4,185,768	**4,185,768**
Jan 1, 2026	3,040,000	4,185,118	**4,185,118**
Jan 1, 2027	3,190,000	4,181,598	**4,181,598**
Jan 1, 2028	3,360,000	4,184,123	**4,184,123**
Jan 1, 2029	3,545,000	4,186,003	**4,186,003**
Jan 1, 2030	3,740,000	4,184,255	**4,184,255**
Jan 1, 2031	3,950,000	4,181,075	**4,181,075**
	31,685,000	41,836,725	41,836,725

Proportional Debt service is a proportional amount (level percentage) above or below the revenue constraint. This is used to generate a level coverage ratio (revenue/debt service). Savings will grow by a level percentage of the old debt service.

Period Ending	Proposed Principal	Proposed Debt Service	Total Debt Service	Revenue Constraints	Unused Revenues	Debt Service Coverage
Jan 1, 2021	-	-	-	-	-	-
Jan 1, 2022	2,205,000	3,860,130	3,860,130	5,000,000	1,139,870	**129.52932%**
Jan 1, 2023	2,380,000	3,940,315	3,940,315	5,100,000	1,159,685	**129.43128%**
Jan 1, 2024	2,565,000	4,019,405	4,019,405	5,202,000	1,182,595	**129.42214%**
Jan 1, 2025	2,765,000	4,100,133	4,100,133	5,306,040	1,205,908	**129.41143%**
Jan 1, 2026	2,980,000	4,181,030	4,181,030	5,412,161	1,231,131	**129.44563%**
Jan 1, 2027	3,215,000	4,265,540	4,265,540	5,520,404	1,254,864	**129.41864%**
Jan 1, 2028	3,465,000	4,346,753	4,346,753	5,630,812	1,284,060	**129.54067%**
Jan 1, 2029	3,740,000	4,432,910	4,432,910	5,743,428	1,310,518	**129.56339%**
Jan 1, 2030	4,040,000	4,525,340	4,525,340	5,858,297	1,332,957	**129.45540%**
Jan 1, 2031	4,360,000	4,615,060	4,615,060	5,975,463	1,360,403	**129.47747%**
	31,715,000	42,286,615	42,286,615	54,748,605	12,461,990	

Uniform   New debt service is a level amount above/below old debt and generates level savings.

Period Ending	Proposed Principal	Proposed Debt Service	Total Debt Service	Revenue Constraints	Unused Revenues	Debt Service Coverage
Jan 1, 2021	-	-	-	-	**-**	-
Jan 1, 2022	2,110,000	3,769,110	3,769,110	5,000,000	**1,230,890**	132.65731%
Jan 1, 2023	2,300,000	3,868,380	3,868,380	5,100,000	**1,231,620**	131.83813%
Jan 1, 2024	2,505,000	3,971,030	3,971,030	5,202,000	**1,230,970**	130.99876%
Jan 1, 2025	2,725,000	4,074,548	4,074,548	5,306,040	**1,231,493**	130.22403%
Jan 1, 2026	2,960,000	4,177,385	4,177,385	5,412,161	**1,234,776**	129.55858%
Jan 1, 2027	3,220,000	4,287,905	4,287,905	5,520,404	**1,232,499**	128.74362%
Jan 1, 2028	3,500,000	4,398,855	4,398,855	5,630,812	**1,231,957**	128.00631%
Jan 1, 2029	3,800,000	4,508,105	4,508,105	5,743,428	**1,235,323**	127.40228%
Jan 1, 2030	4,125,000	4,622,205	4,622,205	5,858,297	**1,236,092**	126.74247%
Jan 1, 2031	4,480,000	4,742,080	4,742,080	5,975,463	**1,233,383**	126.00932%
	31,725,000	42,419,603	42,419,603	54,748,605	12,329,002	

Accelerated   Principal is amortized as quickly as possible so that any positive savings occur in the later years. There are no savings in the earlier years. If the new debt service is greater than the old debt service (constraint), a fill solution will be done.

Period Ending	Proposed Principal	Proposed Debt Service	Total Debt Service	Revenue Constraints	Unused Revenues	Debt Service Coverage
Jan 1, 2021	-	-	**-**	**-**	**-**	-
Jan 1, 2022	3,435,000	4,995,203	**4,995,203**	**5,000,000**	**4,798**	100.09604%
Jan 1, 2023	3,685,000	5,097,498	**5,097,498**	**5,100,000**	**2,503**	100.04909%
Jan 1, 2024	3,950,000	5,198,515	**5,198,515**	**5,202,000**	**3,485**	100.06704%
Jan 1, 2025	4,240,000	5,304,840	**5,304,840**	**5,306,040**	**1,200**	100.02262%
Jan 1, 2026	4,550,000	5,409,200	**5,409,200**	**5,412,161**	**2,961**	100.05474%
Jan 1, 2027	4,890,000	5,519,425	**5,519,425**	**5,520,404**	**979**	100.01774%
Jan 1, 2028	5,255,000	5,627,700	**5,627,700**	**5,630,812**	**3,112**	100.05530%
Jan 1, 2029	1,555,000	1,641,303	**1,641,303**	**5,743,428**	**4,102,126**	349.93113%
Jan 1, 2030	-	-	**-**	**5,858,297**	**5,858,297**	-
Jan 1, 2031	-	-	**-**	**5,975,463**	**5,975,463**	-
	31,560,000	38,793,683	38,793,683	54,748,605	15,954,922	

Deferred   Principal is amortized as late as possible so that any positive savings occur in the early years. The later years will have zero savings. If the new debt service is greater than the old debt service (constraint), a fill solution will be done.

Period Ending	Proposed Principal	Proposed Debt Service	Total Debt Service	Revenue Constraints	Unused Revenues	Debt Service Coverage
Jan 1, 2021	-	-	-	-	-	-
Jan 1, 2022	-	1,734,363	**1,734,363**	**5,000,000**	**3,265,638**	288.29037%
Jan 1, 2023	-	1,734,363	**1,734,363**	**5,100,000**	**3,365,638**	294.05617%
Jan 1, 2024	140,000	1,874,363	**1,874,363**	**5,202,000**	**3,327,638**	277.53436%
Jan 1, 2025	3,575,000	5,302,853	**5,302,853**	**5,306,040**	**3,188**	100.06011%
Jan 1, 2026	3,855,000	5,409,465	**5,409,465**	**5,412,161**	**2,696**	100.04983%
Jan 1, 2027	4,160,000	5,519,788	**5,519,788**	**5,520,404**	**617**	100.01117%
Jan 1, 2028	4,485,000	5,626,388	**5,626,388**	**5,630,812**	**4,425**	100.07864%
Jan 1, 2029	4,845,000	5,741,955	**5,741,955**	**5,743,428**	**1,473**	100.02566%
Jan 1, 2030	5,225,000	5,853,058	**5,853,058**	**5,858,297**	**5,239**	100.08952%
Jan 1, 2031	5,645,000	5,975,233	**5,975,233**	**5,975,463**	**230**	100.00385%
	31,930,000	44,771,825	44,771,825	54,748,605	9,976,780	

Fill   Solves for bonding capacity (how much principal the prior debt can support or "afford" at specific interest rates). This generates zero savings in every maturity. The amount of par generated may be insufficient to pay for the refunding as this solution disregards the sources and uses of funds.

Period Ending	Proposed Principal	Proposed Debt Service	Total Debt Service	Revenue Constraints	Unused Revenues	Debt Service Coverage
Jan 1, 2021	-	-	-	-	-	
Jan 1, 2022	2,855,000	4,996,825	4,996,825	5,000,000	**3,175**	**100.06354%**
Jan 1, 2023	3,080,000	5,099,060	5,099,060	5,100,000	**940**	**100.01843%**
Jan 1, 2024	3,315,000	5,197,000	5,197,000	5,202,000	**5,000**	**100.09621%**
Jan 1, 2025	3,575,000	5,302,853	5,302,853	5,306,040	**3,188**	**100.06011%**
Jan 1, 2026	3,855,000	5,409,465	5,409,465	5,412,161	**2,696**	**100.04983%**
Jan 1, 2027	4,160,000	5,519,788	5,519,788	5,520,404	**617**	**100.01117%**
Jan 1, 2028	4,485,000	5,626,388	5,626,388	5,630,812	**4,425**	**100.07864%**
Jan 1, 2029	4,845,000	5,741,955	5,741,955	5,743,428	**1,473**	**100.02566%**
Jan 1, 2030	5,225,000	5,853,058	5,853,058	5,858,297	**5,239**	**100.08952%**
Jan 1, 2031	5,645,000	5,975,233	5,975,233	5,975,463	**230**	**100.00385%**
	41,040,000	54,721,623	54,721,623	54,748,605	26,982	

Equal   Par amount is level in every period without regard to the savings structure.

Period Ending	**Proposed Principal**	Proposed Debt Service	Total Debt Service	Revenue Constraints	Unused Revenues	Debt Service Coverage
Jan 1, 2021	**-**	-	-	-	-	-
Jan 1, 2022	**3,165,000**	4,780,925	4,780,925	5,000,000	219,075	104.58227%
Jan 1, 2023	**3,165,000**	4,644,830	4,644,830	5,100,000	455,170	109.79950%
Jan 1, 2024	**3,165,000**	4,503,988	4,503,988	5,202,000	698,013	115.49766%
Jan 1, 2025	**3,165,000**	4,356,815	4,356,815	5,306,040	949,225	121.78713%
Jan 1, 2026	**3,165,000**	4,203,313	4,203,313	5,412,161	1,208,848	128.75942%
Jan 1, 2027	**3,160,000**	4,038,480	4,038,480	5,520,404	1,481,924	136.69509%
Jan 1, 2028	**3,160,000**	3,872,580	3,872,580	5,630,812	1,758,232	145.40209%
Jan 1, 2029	**3,160,000**	3,700,360	3,700,360	5,743,428	2,043,068	155.21269%
Jan 1, 2030	**3,160,000**	3,524,980	3,524,980	5,858,297	2,333,317	166.19376%
Jan 1, 2031	**3,160,000**	3,344,860	3,344,860	5,975,463	2,630,603	178.64613%
	31,625,000	40,971,130	40,971,130	54,748,605	13,777,475	

Solution w/Carry   Maintains the solution type (accelerated/deferred/fill) but carries forward any unused revenues until it has sufficient to amortize another bond.

Mixed   This is used mainly for two common problems. Bond components have specific targets for either dollar amounts or percentage of par **OR** the solution constraints change over time (i.e. level for first 5 years, then fill solution).

❖ REFUND SOLUTION STATUS

Once the analysis is completed, the following dialog appears. It summarizes the results of the analysis. The total savings amount is the net present value savings.

```
New Bond Series:                        PVALL
Delivery Date:                   Jul 15, 2020
Arbitrage Yield:                    1.421944%
Escrow Yield:                       1.421944%
PV of prior ds:                295,369,115.90
Total Savings:                  59,131,667.73
Savings % of refunded bonds         28.126%


Bond Par Amount:    192,573,359.35      Cost of Projects:                    -
Bond Adjustments:    44,303,035.16      Cost of Escrow:         233,965,427.89
Other Sources:           75,000.00      Expenses:                 2,688,174.71
Equity Contribution:             -      Reserve Funds:              297,373.61
Funds on hand:                   -      Other Uses:                          -
                                        Additional funds:               418.30


                        Calculation Complete
                              OK
```

STOP RIGHT THERE

*   **Review the results. You can catch large errors on this dialog WITHOUT having to print all of your reports. Simply think about how each piece of the analysis fits into the whole and how reasonable it is in its context ($1,500,000 expense in a $20,000,000 issue is not realistic). Review the Sources and Uses checklist on the page 78. If your numbers do not match, use this information to determine where your error is. The following items include multiple amounts:**

Bond Adjustments	The sum of the accrued interest and the original issue discount and premium. If wrong, check the dated and delivery dates and also check yields and prices.
Expenses	Equals the sum of the underwriter's discount, the cost of issuance, and any upfront amounts entered in the Expenses section.
Reserve Funds	Equals the sum of all amounts modeled in the Reserve section including Debt Service Reserve Fund and Capitalized Interest Fund.

*   **Click on OK to continue when you are finished reviewing this dialog. Click on PRINT.**

❖ FILE MENU - PRINT DIALOG

PRINT offers the user the option to select individual reports or a sequence of reports and print them, put temporary titles on the reports, control pagination, and save user-defined sequences of reports for use in the future. These options are accessed via the various buttons on the dialog.

Print -- PVALL

Selected Reports	Available Reports
Modify — Sources and Uses of Funds	Accreted Value Table
Summary of Refunding Results	Aggregate Debt Service (con)
Select All — Summary of Bonds Refunded (sum)	Average Takedown
Savings (ann)	Bond Debt Service (con)
Save Rpt — Accreted Value Table	Bond Debt Service to Call (con)
Prior Debt Service (con,sum)	Bond Maturity Table
Bond Debt Service (con,sum)	Bond Pricing
Bond Statistics	Bond Solution
Bond Pricing	Bond Solution Chart
Bond Solution	Bond Statistics
Proof of Arbitrage Yield	Call Provisions
Escrow Descriptions (sum)	Capitalized Interest Fund (con)
Escrow Requirements (con,sum)	Cost of Issuance
Escrow Cost (sum)	Debt Service Reserve Fund (con)
Packets — Escrow Cash Flow (con,sum)	Escrow Cash Flow (con)
Load — Escrow Sufficiency (con,sum)	Escrow Cost
Escrow Statistics	Escrow Descriptions
Proof of Composite Escrow Yld	Escrow Requirements (con)
Save — Statement of Input Assumptions	Escrow Statistics
Escrow Sufficiency (con)	
Save As	Float Contract
Form 8038 Statistics	
Delete	Formula Verification
Net Debt Service (con)	

Print   View   Access   Cancel   Setup   Preferences

*   **Select the following reports in the order listed by double clicking on each one (use MODIFY to change frequency or level of detail). Note that only the Savings report is being changed. Click on PACKETS - SAVE to save the reports selected into a packet.**

Sources and Uses of Funds	**Proof of Arbitrage Yield**
Summary of Refunding Results	**Escrow Descriptions**
Summary of Bonds Refunded	**Escrow Requirements**
Savings (ann)	**Escrow Cost**
Accreted Value Table	**Escrow Cash Flow**
Prior Debt Service	**Escrow Sufficiency**
Bond Debt Service	**Escrow Statistics**
Bond Statistics	**Proof of Composite Escrow Yield**
Bond Pricing	**Statement of Input Assumptions**
Bond Solution	

✋ **NOTE -** If you want the Table of Contents report, click on **PREFERENCES** in the **PRINT DIALOG** and select **"YES"** for the **PRINT TABLE OF CONTENTS** prompt.

❖ FILE MENU - PRINT DIALOG - REPORT PACKETS

In all DBC applications, there is a **REPORT PACKETS** feature which lets you select individual reports and group them. This facilitates printing or viewing reports because instead of selecting each of the reports individually, you simply select the name of the report group or packet that you have defined and either **PRINT** it or **VIEW** it. This makes it very easy to print several different sets of cash flows for different audiences again and again i.e. one set for the client, a detailed set for yourself, another set for the verification consultants, etc. In addition, it is very simple to edit the report packet once it is created (simply **LOAD**, edit it, then **SAVE**).
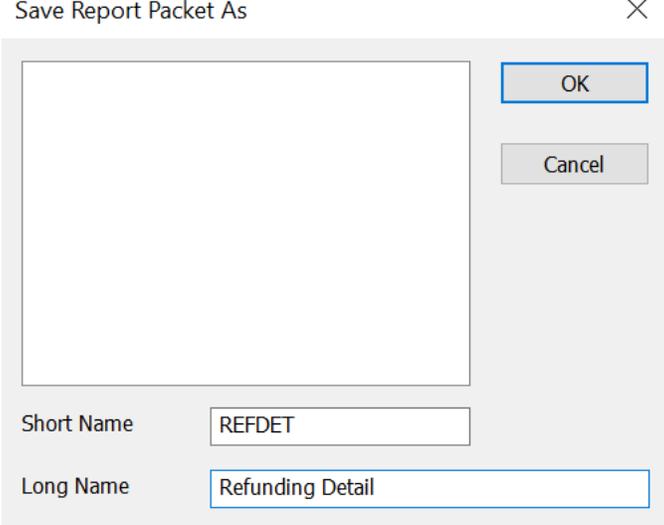
Save Report Packet As   ✕

OK

Cancel

Short Name   REFDET

Long Name   Refunding Detail

*   **Click on SAVE AS under PACKETS. Type "refdet" (short name), press ENTER, then type " Refunding Detail" (long name), click OK.**

❖ REFUNDING SOLUTION CHECKLIST

The following is a checklist of items to review when you do a refunding. Please bear in mind that in real life situations, there is no answer key and the only way to verify the accuracy of your cash flows is a combination of your calculator, common sense, and the hints listed below.   It is critical that you understand the underlying calculations involved in computing each of the entries on the reports you print. Changes to the level of detail on the reports can be made in **PRINT - MODIFY**.

Report	*Item*	*What to Look For*
Source and Uses	Par	Verify only if a target par amount was entered.
	Original Issue Discount/Premium	Based on prices entered in bond components. If amount is unusual, check Pricing Report.
	Accrued Interest	Only exists if dated date does NOT EQUAL delivery date.
		$\underline{\text{\# days from dated to delivery date}}$ x first interest payment
		# days from dated to first coupon
	Other Sources	In Debt/Size:
		1. Entries in Miscellaneous - Other Sources
		2. General Assumptions - F8 - Advanced Options
		a. If "Contingency is negative" is set to "Yes"
		b. If 2% limit..." is set to "generate equity contribution"
		In Refund:
		1. Prior Debt - amounts entered in Funds on Hand
	Debt Service Reserve	Check balance requirement by manually verifying each of the components of the formula specified.
	Cost of Issuance	Should never be more than about 1 or 2% of par; usually a mix of fixed amounts and a percentage of par.
	Underwriters Discount	Should never be more than about 1 or 2% of par; usually .7% to 1% of par. Check on your calculator and on the Data-General Bond Information Dialog.
	Bond Insurance	Should be between .5% and 2% of par; it is usually a % of total debt service of the insured bond. Check this on your calculator knowing the % and the total debt service of the insured bonds.
	Other Uses	In Debt/Size - Check Miscellaneous - Other Uses.
	Additional Proceeds	For most solutions, this should be between 0 and 5,000 (or the largest bond denomination). This should never be negative. It can be greater than 5,000 **only** if you are doing a "Fill", "Fill & Carry", or are entering a target par amount since these solutions disregard the amount of proceeds you need.
Summary of	Arb and Escrow Yield	Escrow Yield is usually ≤ Arbitrage Yield; **Refund** will generate a warning if this rule is violated.
Refunding Results	Bond Par Amount	Bond Par Amount is *usually* greater than Par Amount of

		Refunded Bonds.
	TIC	TIC should be 10 to 40 basis points greater than Arb Yield due to the inclusion of the spread and other recoverable costs.
Summary of Bonds Refunded	**EVERYTHING**	**This is where the most refunding mistakes are discovered.** You **MUST** check this data against the old Official Statements. Check Maturity Dates, Interest Rates, Outstanding Par Amounts, CALL DATES AND CALL PRICES. If these are wrong on a live deal, the consequences will be dire. **Remember: "Garbage In, Garbage Out"**
		Also, you must know if a bond can be refunded or not. Bonds that can't be refunded are:
		1. Bonds that were refunded in a previous refunding issue 2. Usually, bonds of a series that was a refunding of a refunding, unless the first refunding was before 2011.
	Call Dates/Prices	In general, the only bonds that won't have a call date or call price will be short-dated serial bonds that you are told to refund in addition to the callable bonds.
		Also, in certain "Low-to-High" refundings, the refunded bonds are not escrowed to call date, but are "escrowed to maturity". This is allowed only in rare circumstances, confirm with your lawyers or bankers if you are doing an escrow to maturity.
Savings Report	Prior Debt Service versus Refunding Debt Service	Usually, Prior D/S and Refunding D/S should end in the same fiscal year, unless you are doing a refunding to push D/S further into the future.
	Annual Savings	If you are doing a LEVEL SAVINGS [*Uniform* Bond Solution] scenario, each year should be about the same, except for the first year which may be prorated because it is a short fiscal period.
		If you are doing UP-FRONT SAVINGS [*Deferred* Bond Solution], all of your savings should be in the first fiscal years, and savings in the future should be between 0 and 5000.
Prior Bond D/S	Interest	Make sure that your first Interest payment is equal to or just slightly larger than the second. This insures that you are using the right First Interest Payment Date on the old bonds being refunded.
Bond Solution	Unused Revenues	This is roughly equal to your Savings. Make sure it looks like what you want.
Escrow Requirements	Principal	You should only have this if you are refunding bonds to their maturity date rather than the call date.
	Interest	Make sure that your first Interest payment is equal to or just slightly larger than the second. This insures that you are using the right First Interest Payment Date on the old bonds being

refunded.

	Principal Redeemed	These are your old bonds being called on their respective call dates. These dates are usually on Interest Payment Dates.
Escrow Cost	Cash Deposit	For SLGS escrows, the cash deposit should be between 0 and $100; for OMS escrows, it should be between 0 and $10,000. If it is bigger, see if your first escrow requirement date is within 30 days of your bond delivery date. If it is, then you're usually OK. The reason is that you can't buy SLGS that mature in less than 30 days. Also, there may not be a Treasury security that matures before the first requirement date. Current refundings frequently have large cash deposits if the redemption is on or shortly after the delivery date.

SOURCES AND USES OF FUNDS

ABC County
PV-Full Defeasance 2011 and 2013

Dated Date   07/01/2020
Delivery Date   07/15/2020

Sources:

Bond Proceeds:	
Par Amount	192,573,359.35
Accrued Interest	297,373.61
Premium	44,005,661.55
	236,876,394.51

Other Sources of Funds:	
Issuer Contribution	75,000.00
	236,951,394.51

Uses:

Refunding Escrow Deposits:	
PV cost of cashflows	233,965,427.89

Other Fund Deposits:	
Accrued Interest	297,373.61

Delivery Date Expenses:	
Cost of Issuance	250,000.00
Underwriter's Discount	2,022,020.28
Insurance for Term Bond	416,154.43
	2,688,174.71

Other Uses of Funds:	
Additional Proceeds	418.30
	236,951,394.51

This label can be changed in **Report Preferences**.

This should usually be between 0 and 5,000, except with a fill solution.

The Sources and Uses report should be verified manually by comparing the calculated numbers to the formulas you input. Remember that if your formulas are wrong, the issue will be properly sized but will be based on the wrong assumptions.

Expanded version shows proceeds by component. Simple version shows proceeds in aggregate.

SUMMARY OF REFUNDING RESULTS

ABC County
PV-Full Defeasance 2011 and 2013

Dated Date	07/01/2020
Delivery Date	07/15/2020
Arbitrage yield	1.421944%
Escrow yield	1.421944%
Value of Negative Arbitrage	-
Bond Par Amount	192,573,359.35
True Interest Cost	1.529103%
All-In TIC	1.542442%
Average Life	9.096
Weighted Average Maturity	9.482
Duration	8.062
Par amount of refunded bonds	203,920,683.65
Value of refunded bonds on 7/15/2020	210,239,793.88
Average coupon of refunded bonds	5.888691%
Average life of refunded bonds	8.830
Remaining weighted average maturity of refunded bonds	8.832
PV of prior debt to 07/15/2020 @ 1.421944%	295,369,115.90
Net PV Savings	59,131,667.73
Percentage savings of refunded bonds	28.125821%

*

> This is usually less than or equal to the arbitrage yield.

---

* Inclusion of this statistic is set in **Report Preferences**.

This report summarizes the three most important figures in a refunding: how much is the issue, how much do we save, and the savings percentage.

SUMMARY OF BONDS REFUNDED

Call information should always be cross-referenced with O.S.

ABC County
PV-Full Defeasance 2011 and 2013

Bond	Maturity Date	Interest Rate	Par Amount	Value on Jul 15, 2020	Value at Redemption	Call Date	Call Price
2011 $100,000,000 Revenue Bonds:							
Serial Bonds through 2031	01/01/2021	4.450%	2,560,000.00	2,560,000.00	-	-	-
	01/01/2022	4.600%	2,775,000.00	2,775,000.00	2,775,000.00	01/01/2021	102.000
	01/01/2023	4.700%	3,010,000.00	3,010,000.00	3,010,000.00	01/01/2021	102.000
	01/01/2024	4.950%	3,270,000.00	3,270,000.00	3,270,000.00	01/01/2021	102.000
	01/01/2025	5.100%	3,555,000.00	3,555,000.00	3,555,000.00	01/01/2021	102.000
	01/01/2026	5.250%	3,865,000.00	3,865,000.00	3,865,000.00	01/01/2021	102.000
	01/01/2027	5.400%	4,210,000.00	4,210,000.00	4,210,000.00	01/01/2021	102.000
	01/01/2028	5.500%	4,590,000.00	4,590,000.00	4,590,000.00	01/01/2021	102.000
	01/01/2029	5.650%	5,005,000.00	5,005,000.00	5,005,000.00	01/01/2021	102.000
	01/01/2030	5.800%	5,460,000.00	5,460,000.00	5,460,000.00	01/01/2021	102.000
	01/01/2031	6.000%	5,965,000.00	5,965,000.00	5,965,000.00	01/01/2021	102.000
Term Bond due 2036	01/01/2032	6.100%	6,525,000.00	6,525,000.00	6,525,000.00	01/01/2021	102.000
	01/01/2033	6.100%	7,135,000.00	7,135,000.00	7,135,000.00	01/01/2021	102.000
	01/01/2034	6.100%	7,805,000.00	7,805,000.00	7,805,000.00	01/01/2021	102.000
	01/01/2035	6.100%	8,530,000.00	8,530,000.00	8,530,000.00	01/01/2021	102.000
	01/01/2036	6.100%	9,320,000.00	9,320,000.00	9,320,000.00	01/01/2021	102.000
			83,580,000.00	83,580,000.00	81,020,000.00		
2013 $150,000,683 Revenue Bonds:							
Serial Bonds through 2028	01/01/2021	4.600%	5,345,000.00	5,345,000.00	-	-	-
	01/01/2022	4.750%	5,700,000.00	5,700,000.00	-	-	-
	01/01/2023	4.850%	6,080,000.00	6,080,000.00	-	-	-
	01/01/2024	5.100%	6,500,000.00	6,500,000.00	6,500,000.00	01/01/2023	102.000
	01/01/2025	5.250%	6,960,000.00	6,960,000.00	6,960,000.00	01/01/2023	102.000
	01/01/2026	5.400%	7,465,000.00	7,465,000.00	7,465,000.00	01/01/2023	102.000
	01/01/2027	5.550%	8,015,000.00	8,015,000.00	8,015,000.00	01/01/2023	102.000
	01/01/2028	5.650%	8,625,000.00	8,625,000.00	8,625,000.00	01/01/2023	102.000
Term Bond due 2033	01/01/2029	6.000%	9,280,000.00	9,280,000.00	9,280,000.00	01/01/2023	102.000
	01/01/2030	6.000%	10,025,000.00	10,025,000.00	10,025,000.00	01/01/2023	102.000
	01/01/2031	6.000%	10,825,000.00	10,825,000.00	10,825,000.00	01/01/2023	102.000
	01/01/2032	6.000%	11,690,000.00	11,690,000.00	11,690,000.00	01/01/2023	102.000
	01/01/2033	6.000%	12,630,000.00	12,630,000.00	12,630,000.00	01/01/2023	102.000
CAB Term Bond due 2038	01/01/2034	6.050%	2,606,593.00	4,077,159.35	6,360,525.58	01/01/2028	103.000
	01/01/2035	6.050%	2,409,356.15	3,768,647.03	5,879,234.48	01/01/2028	103.000
	01/01/2036	6.050%	2,226,058.30	3,481,937.69	5,431,956.88	01/01/2028	103.000
	01/01/2037	6.050%	2,057,396.60	3,218,121.81	5,020,393.94	01/01/2028	103.000
	01/01/2038	6.050%	1,901,279.60	2,973,928.00	4,639,442.19	01/01/2028	103.000
			120,340,683.65	126,659,793.88	119,346,553.07		
			203,920,683.65	210,239,793.88	200,366,553.07		

Term bonds can be displayed with each sinking fund itemized (set in **Report Preferences**).

The cash flow of the old bonds to the call date are the basis for the cost of the escrow. If your escrow requirements are wrong it is usually because you entered one of the following incorrectly: par refunded, maturity and call date, accreted value, or the call price. The most common error is leaving the "Call Provisions" dialog blank in the Actual series to be refunded in *Debt/Size*. This report summarizes all this information so there is no doubt as to which bonds were refunded in this analysis.

SAVINGS

Accrued Interest

ABC County
PV-Full Defeasance 2011 and 2013

Date	Prior Debt Service	Refunding Debt Service	Refunding Receipts	Refunding Net Cash Flow	Savings	Present Value to 07/15/2020 @ 1.4219438%
01/01/2021	13,342,572.50	11,433,375.00	297,373.61	11,136,001.39	2,206,571.11	2,194,137.95
01/01/2022	18,990,355.00	15,171,250.00	-	15,171,250.00	3,819,105.00	3,752,165.59
01/01/2023	19,206,955.00	15,386,000.00	-	15,386,000.00	3,820,955.00	3,701,151.34
01/01/2024	19,450,605.00	15,630,250.00	-	15,630,250.00	3,820,355.00	3,648,471.87
01/01/2025	19,702,240.00	15,881,000.00	-	15,881,000.00	3,821,240.00	3,597,857.66
01/01/2026	19,970,535.00	16,151,250.00	-	16,151,250.00	3,819,285.00	3,545,258.24
01/01/2027	20,259,512.50	16,443,250.00	-	16,443,250.00	3,816,262.50	3,492,384.27
01/01/2028	20,577,340.00	16,759,000.00	-	16,759,000.00	3,818,340.00	3,444,805.06
01/01/2029	20,907,577.50	17,090,250.00	-	17,090,250.00	3,817,327.50	3,395,059.65
01/01/2030	21,267,995.00	17,449,000.00	-	17,449,000.00	3,818,995.00	3,348,213.24
01/01/2031	21,654,815.00	17,836,500.00	-	17,836,500.00	3,818,315.00	3,299,905.06
01/01/2032	22,072,415.00	18,251,500.00	-	18,251,500.00	3,820,915.00	3,252,643.88
01/01/2033	22,522,990.00	18,706,500.00	-	18,706,500.00	3,816,490.00	3,199,897.20
01/01/2034	18,464,979.03	14,646,500.00	-	14,646,500.00	3,818,479.03	3,153,016.16
01/01/2035	18,542,004.00	14,723,250.00	-	14,723,250.00	3,818,754.00	3,109,276.92
01/01/2036	18,639,157.15	14,820,500.00	-	14,820,500.00	3,818,657.15	3,065,817.87
01/01/2037	8,584,300.53	4,765,500.00	-	4,765,500.00	3,818,800.53	3,023,125.68
01/01/2038	8,420,193.09	4,599,000.00	-	4,599,000.00	3,821,193.09	2,983,061.77
	332,576,541.30	265,743,875.00	297,373.61	265,446,501.39	67,130,039.91	59,206,249.43

Savings Summary

Dated Date	07/01/2020
Delivery Date	07/15/2020
PV of savings from cash flow	59,206,249.43
Less: Prior funds on hand	(75,000.00)
Plus: Refunding funds on hand	418.30
Net PV Savings	59,131,667.73

Includes other sources, other uses, reserve funds, and additional proceeds.

The Savings report is controlled by the inputs in the **Savings Assumptions** option in the **Data** menu. Here you can control what discount rate is used, what the discount date is, what adjustments are shown for both the prior debt and the refunding debt, as well as any cash adjustments on the closing date.

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BOND ACCRETED VALUE TABLE

ABC County
PV-Full Defeasance 2011 and 2013

Date	CAB through 2033 01/01/2031 1.54%	CAB through 2033 01/01/2032 1.61%	CAB through 2033 01/01/2033 1.67%
07/15/2020	4,258.65	4,160.55	4,064.10
01/01/2021	4,288.85	4,191.45	4,095.40
07/01/2021	4,321.90	4,225.15	4,129.60
01/01/2022	4,355.15	4,259.20	4,164.10
07/01/2022	4,388.70	4,293.45	4,198.85
01/01/2023	4,422.50	4,328.05	4,233.90
07/01/2023	4,456.55	4,362.85	4,269.25
01/01/2024	4,490.85	4,398.00	4,304.90
07/01/2024	4,525.45	4,433.40	4,340.85
01/01/2025	4,560.30	4,469.10	4,377.10
07/01/2025	4,595.40	4,505.05	4,413.65
01/01/2026	4,630.80	4,541.35	4,450.50
07/01/2026	4,666.45	4,577.90	4,487.65
01/01/2027	4,702.40	4,614.75	4,525.15
07/01/2027	4,738.60	4,651.90	4,562.90
01/01/2028	4,775.05	4,689.35	4,601.05
07/01/2028	4,811.85	4,727.10	4,639.45
01/01/2029	4,848.90	4,765.15	4,678.20
07/01/2029	4,886.25	4,803.50	4,717.25
01/01/2030	4,923.85	4,842.15	4,756.65
07/01/2030	4,961.75	4,881.15	4,796.35
01/01/2031	5,000.00	4,920.45	4,836.40
07/01/2031	-	4,960.05	4,876.80
01/01/2032	-	5,000.00	4,917.50
07/01/2032	-	-	4,958.55
01/01/2033	-	-	5,000.00

These double asterisks represent the multiple coupon rates of overlapping maturities.

PRIOR BOND DEBT SERVICE

ABC County
PV-Full Defeasance 2011 and 2013

Dated Date	07/01/2020
Delivery Date	07/15/2020

Inclusion of the dated and delivery dates are set in **Report Preferences**.

Period Ending	Principal	Coupon	Interest	Compounded Interest	Debt Service	Annual Debt Service	Bond Balance	Accreted Interest	Total Bond Value
07/15/2020	-	- -	-	-	-	-	203,920,683.65	6,319,110.23	210,239,793.88
01/01/2021	7,905,000.00	** %	5,437,572.50	-	13,342,572.50	13,342,572.50	196,015,683.65	6,807,217.97	202,822,901.62
07/01/2021	-	-	5,257,677.50	-	5,257,677.50	-	196,015,683.65	7,351,874.77	203,367,558.42
01/01/2022	8,475,000.00	** %	5,257,677.50	-	13,732,677.50	18,990,355.00	187,540,683.65	7,913,397.09	195,454,080.74
07/01/2022	-	-	5,058,477.50	-	5,058,477.50	-	187,540,683.65	8,491,288.87	196,031,972.52
01/01/2023	9,090,000.00	** %	5,058,477.50	-	14,148,477.50	19,206,955.00	178,450,683.65	9,087,038.25	187,537,721.90
07/01/2023	-	-	4,840,302.50	-	4,840,302.50	-	178,450,683.65	9,701,141.28	188,151,824.93
01/01/2024	9,770,000.00	** %	4,840,302.50	-	14,610,302.50	19,450,605.00	168,680,683.65	10,333,101.91	179,013,785.56
07/01/2024	-	-	4,593,620.00	-	4,593,620.00	-	168,680,683.65	10,984,408.27	179,665,091.92
01/01/2025	10,515,000.00	** %	4,593,620.00	-	15,108,620.00	19,702,240.00	158,165,683.65	11,655,556.41	169,821,240.06
07/01/2025	-	-	4,320,267.50	-	4,320,267.50	-	158,165,683.65	12,347,042.37	170,512,726.02
01/01/2026	11,330,000.00	** %	4,320,267.50	-	15,650,267.50	19,970,535.00	146,835,683.65	13,059,362.20	159,895,045.85
07/01/2026	-	-	4,017,256.25	-	4,017,256.25	-	146,835,683.65	13,793,507.98	160,629,191.63
01/01/2027	12,225,000.00	** %	4,017,256.25	-	16,242,256.25	20,259,512.50	134,610,683.65	14,549,479.72	149,160,163.37
07/01/2027	-	-	3,681,170.00	-	3,681,170.00	-	134,610,683.65	15,328,269.51	149,938,953.16
01/01/2028	13,215,000.00	** %	3,681,170.00	-	16,896,170.00	20,577,340.00	121,395,683.65	16,130,869.42	137,526,553.07
07/01/2028	-	-	3,311,288.75	-	3,311,288.75	-	121,395,683.65	16,957,775.52	138,353,459.17
01/01/2029	14,285,000.00	** %	3,311,288.75	-	17,596,288.75	20,907,577.50	107,110,683.65	17,809,483.84	124,920,167.49
07/01/2029	-	-	2,891,497.50	-	2,891,497.50	-	107,110,683.65	18,686,986.47	125,797,670.12
01/01/2030	15,485,000.00	** %	2,891,497.50	-	18,376,497.50	21,267,995.00	91,625,683.65	19,591,275.50	111,216,959.15
07/01/2030	-	-	2,432,407.50	-	2,432,407.50	-	91,625,683.65	20,522,350.93	112,148,034.58
01/01/2031	16,790,000.00	6.000%	2,432,407.50	-	19,222,407.50	21,654,815.00	74,835,683.65	21,482,196.94	96,317,880.59
07/01/2031	-	-	1,928,707.50	-	1,928,707.50	-	74,835,683.65	22,470,813.52	97,306,497.17
01/01/2032	18,215,000.00	** %	1,928,707.50	-	20,143,707.50	22,072,415.00	56,620,683.65	23,489,688.82	80,110,372.47
07/01/2032	-	-	1,378,995.00	-	1,378,995.00	-	56,620,683.65	24,538,822.83	81,159,506.48
01/01/2033	19,765,000.00	** %	1,378,995.00	-	21,143,995.00	22,522,990.00	36,855,683.65	25,620,199.73	62,475,883.38
07/01/2033	-	-	782,477.50	-	782,477.50	-	36,855,683.65	26,733,819.51	63,589,503.16
01/01/2034	10,411,593.00	** %	782,477.50	6,488,431.03	17,682,501.53	18,464,979.03	26,444,090.65	21,392,739.29	47,836,829.94
07/01/2034	-	-	544,425.00	-	544,425.00	-	26,444,090.65	22,300,104.75	48,744,195.40
01/01/2035	10,939,356.15	** %	544,425.00	6,513,797.85	17,997,579.00	18,542,004.00	15,504,734.50	16,720,695.41	32,225,429.91
07/01/2035	-	-	284,260.00	-	284,260.00	-	15,504,734.50	17,413,670.53	32,918,405.03
01/01/2036	11,546,058.30	** %	284,260.00	6,524,578.85	18,354,897.15	18,639,157.15	3,958,676.20	11,602,883.45	15,561,559.65
07/01/2036	-	-	-	-	-	-	3,958,676.20	12,073,611.77	16,032,287.97
01/01/2037	2,057,396.60	6.050%	-	6,526,903.93	8,584,300.53	8,584,300.53	1,901,279.60	6,031,636.92	7,932,916.52
07/01/2037	-	-	-	-	-	-	1,901,279.60	6,271,612.42	8,172,892.02
01/01/2038	1,901,279.60	6.050%	-	6,518,913.49	8,420,193.09	8,420,193.09	-	-	-
	203,920,683.65		96,083,232.50	32,572,625.15	332,576,541.30	332,576,541.30			

BOND DEBT SERVICE

ABC County
PV-Full Defeasance 2011 and 2013

Dated Date 07/01/2020
Delivery Date 07/15/2020

Period Ending	Principal	Coupon	Interest	Compounded Interest	Debt Service	Annual Debt Service	Bond Balance	Accreted Interest	Total Bond Value
07/15/2020	-	-	-	-	-	-	192,573,359.35	-	192,573,359.35
01/01/2021	7,610,000.00	5.000%	3,823,375	-	11,433,375	11,433,375	184,963,359.35	293,619.30	185,256,978.65
07/01/2021	-	-	3,633,125	-	3,633,125	-	184,963,359.35	614,403.65	185,577,763.00
01/01/2022	7,905,000.00	5.000%	3,633,125	-	11,538,125	15,171,250	177,058,359.35	937,896.60	177,996,255.95
07/01/2022	-	-	3,435,500	-	3,435,500	-	177,058,359.35	1,263,767.90	178,322,127.25
01/01/2023	8,515,000.00	5.000%	3,435,500	-	11,950,500	15,386,000	168,543,359.35	1,592,502.35	170,135,861.70
07/01/2023	-	-	3,222,625	-	3,222,625	-	168,543,359.35	1,923,623.85	170,466,983.20
01/01/2024	9,185,000.00	5.000%	3,222,625	-	12,407,625	15,630,250	159,358,359.35	2,257,608.50	161,615,967.85
07/01/2024	-	-	2,993,000	-	2,993,000	-	159,358,359.35	2,594,293.45	161,952,652.80
01/01/2025	9,895,000.00	5.000%	2,993,000	-	12,888,000	15,881,000	149,463,359.35	2,933,682.85	152,397,042.20
07/01/2025	-	-	2,745,625	-	2,745,625	-	149,463,359.35	3,275,618.00	152,738,977.35
01/01/2026	10,660,000.00	5.000%	2,745,625	-	13,405,625	16,151,250	138,803,359.35	3,620,570.85	142,423,930.20
07/01/2026	-	-	2,479,125	-	2,479,125	-	138,803,359.35	3,968,069.45	142,771,428.80
01/01/2027	11,485,000.00	5.000%	2,479,125	-	13,964,125	16,443,250	127,318,359.35	4,318,590.30	131,636,949.65
07/01/2027	-	-	2,192,000	-	2,192,000	-	127,318,359.35	4,671,652.35	131,990,011.70
01/01/2028	12,375,000.00	5.000%	2,192,000	-	14,567,000	16,759,000	114,943,359.35	5,027,745.35	119,971,104.70
07/01/2028	-	-	1,882,625	-	1,882,625	-	114,943,359.35	5,386,688.65	120,330,048.00
01/01/2029	13,325,000.00	5.000%	1,882,625	-	15,207,625	17,090,250	101,618,359.35	5,748,499.65	107,366,859.00
07/01/2029	-	-	1,549,500	-	1,549,500	-	101,618,359.35	6,113,169.65	107,731,529.00
01/01/2030	14,350,000.00	5.000%	1,549,500	-	15,899,500	17,449,000	87,268,359.35	6,480,707.35	93,749,066.70
07/01/2030	-	-	1,190,750	-	1,190,750	-	87,268,359.35	6,851,262.75	94,119,622.10
01/01/2031	13,163,487.15	1.540%	1,190,750	2,291,512.85	16,645,750	17,836,500	74,104,872.20	4,933,482.10	79,038,354.30
07/01/2031	-	-	1,190,750	-	1,190,750	-	74,104,872.20	5,191,078.50	79,295,950.70
01/01/2032	13,205,585.70	1.610%	1,190,750	2,664,414.30	17,060,750	18,251,500	60,899,286.50	2,786,351.00	63,685,637.50
07/01/2032	-	-	1,190,750	-	1,190,750	-	60,899,286.50	2,920,379.25	63,819,665.75
01/01/2033	13,269,286.50	1.670%	1,190,750	3,055,713.50	17,515,750	18,706,500	47,630,000.00	-	47,630,000.00
07/01/2033	-	-	1,190,750	-	1,190,750	-	47,630,000.00	-	47,630,000.00
01/01/2034	12,265,000.00	5.000%	1,190,750	-	13,455,750	14,646,500	35,365,000.00	-	35,365,000.00
07/01/2034	-	-	884,125	-	884,125	-	35,365,000.00	-	35,365,000.00
01/01/2035	12,955,000.00	5.000%	884,125	-	13,839,125	14,723,250	22,410,000.00	-	22,410,000.00
07/01/2035	-	-	560,250	-	560,250	-	22,410,000.00	-	22,410,000.00
01/01/2036	13,700,000.00	5.000%	560,250	-	14,260,250	14,820,500	8,710,000.00	-	8,710,000.00
07/01/2036	-	-	217,750	-	217,750	-	8,710,000.00	-	8,710,000.00
01/01/2037	4,330,000.00	5.000%	217,750	-	4,547,750	4,765,500	4,380,000.00	-	4,380,000.00
07/01/2037	-	-	109,500	-	109,500	-	4,380,000.00	-	4,380,000.00
01/01/2038	4,380,000.00	5.000%	109,500	-	4,489,500	4,599,000	-	-	-
	192,573,359.35		65,158,875	8,011,640.65	265,743,875	265,743,875			

BOND SUMMARY STATISTICS

ABC County
PV-Full Defeasance 2011 and 2013

Dated Date	07/01/2020
Delivery Date	07/15/2020
First Coupon	01/01/2021
Last Maturity	01/01/2038
Arbitrage Yield	1.421944%
True Interest Cost (TIC)	1.529103%
All-In TIC	1.542442%
Average Life (years)	9.096
Weighted Average Maturity (years)	9.482
Duration of Issue (years)	8.062
Par Amount	192,573,359.35
Bond Proceeds	236,876,394.51
Total Interest	65,158,875.00
Net Interest	23,175,233.73
Bond Years from Dated Date	1,759,124,431.88
Bond Years from Delivery Date	1,751,635,467.90
Total Debt Service	265,743,875.00
Maximum Annual Debt Service	18,706,500.00
Average Annual Debt Service	15,202,154.07
Underwriter's Fees (per $1000)	
Average Takedown	7.500000
Management Fee	0.500000
Other Fee	2.500000
Total Underwriter's Discount	10.500000
Bid Price	121.801376

The inclusion of these sections is set in **Report Preferences**.

Bond Component	Par Value	Price	Average Coupon	Average Life	Average Maturity Date	Duration	PV of 1 bp change
Serial Bonds through 2030	105,305,000.00	119.581	5.000%	5.557	02/03/2026	5.052	63,044.40
CAB through 2033	39,638,359.35	100.000	-	11.464	01/01/2032	11.469	45,156.45
Term Bond due 2038	47,630,000.00	149.098	5.000%	14.949	06/27/2035	11.562	91,449.60
	192,573,359.35			9.096			199,650.45

	TIC	All-In TIC	Arbitrage Yield
Par Value	192,573,359.35	192,573,359.35	192,573,359.35
+ Accrued Interest	297,373.61	297,373.61	297,373.61
+ Premium (Discount)	44,005,661.55	44,005,661.55	44,005,661.55
- Underwriter's Discount	(2,022,020.28)	(2,022,020.28)	
- Cost of Issuance Expense		(250,000.00)	
- Other Amounts	(416,154.43)	(416,154.43)	(416,154.43)
Target Value	234,438,219.80	234,188,219.80	236,460,240.08
Target Date	07/15/2020	07/15/2020	07/15/2020
Yield	1.529103%	1.542442%	1.421944%

Includes upfront expenses.

BOND PRICING

ABC County
PV-Full Defeasance 2011 and 2013

This column only appears in **Expanded** format (see **Report Preferences**).

Bond Component	Maturity Date	Amount	Rate	Yield	Price	Principal per $5,000 at Maturity	Offer Price per $5,000 at Maturity	CAB Value at Maturity	Premium (-Discount)	Principal Cost
Serial Bonds through 2030:										
	01/01/2021	7,610,000.00	5.000%	1.100%	101.788	-	-	-	136,066.80	7,746,066.80
	01/01/2022	7,905,000.00	5.000%	1.100%	105.636	-	-	-	445,525.80	8,350,525.80
	01/01/2023	8,515,000.00	5.000%	1.110%	109.417	-	-	-	801,857.55	9,316,857.55
	01/01/2024	9,185,000.00	5.000%	1.120%	113.135	-	-	-	1,206,449.75	10,391,449.75
	01/01/2025	9,895,000.00	5.000%	1.130%	116.789	-	-	-	1,661,271.55	11,556,271.55
	01/01/2026	10,660,000.00	5.000%	1.150%	120.321	-	-	-	2,166,218.60	12,826,218.60
	01/01/2027	11,485,000.00	5.000%	1.230%	123.346	-	-	-	2,681,288.10	14,166,288.10
	01/01/2028	12,375,000.00	5.000%	1.310%	126.146	-	-	-	3,235,567.50	15,610,567.50
	01/01/2029	13,325,000.00	5.000%	1.390%	128.722	-	-	-	3,827,206.50	17,152,206.50
	01/01/2030	14,350,000.00	5.000%	1.470%	131.072	-	-	-	4,458,832.00	18,808,832.00
		105,305,000.00						-	20,620,284.15	125,925,284.15
CAB through 2033:										
	01/01/2031	13,163,487.15	1.540%	1.540%	85.173	4,258.65	4,258.65	15,455,000	-	13,163,487.15
	01/01/2032	13,205,585.70	1.610%	1.610%	83.211	4,160.55	4,160.55	15,870,000	-	13,205,585.70
	01/01/2033	13,269,286.50	1.670%	1.670%	81.282	4,064.10	4,064.10	16,325,000	-	13,269,286.50
		39,638,359.35						47,650,000	-	39,638,359.35
Term Bond due 2038:										
	01/01/2034	12,265,000.00	5.000%	1.730%	149.098	-	-	-	6,021,869.70	18,286,869.70
	01/01/2035	12,955,000.00	5.000%	1.730%	149.098	-	-	-	6,360,645.90	19,315,645.90
	01/01/2036	13,700,000.00	5.000%	1.730%	149.098	-	-	-	6,726,426.00	20,426,426.00
	01/01/2037	4,330,000.00	5.000%	1.730%	149.098	-	-	-	2,125,943.40	6,455,943.40
	01/01/2038	4,380,000.00	5.000%	1.730%	149.098	-	-	-	2,150,492.40	6,530,492.40
		47,630,000.00						-	23,385,377.40	71,015,377.40
		192,573,359.35						47,650,000	44,005,661.55	236,579,020.90

Dated Date	07/01/2020	
Delivery Date	07/15/2020	
First Coupon	01/01/2021	
Par Amount	192,573,359.35	
Premium	44,005,661.55	
Production	236,579,020.90	122.851376%
Underwriter's Discount	(2,022,020.28)	(1.050000%)
Purchase Price	234,557,000.62	121.801376%
Accrued Interest	297,373.61	
Net Proceeds	234,854,374.23	

Term bonds can be shown with sinking funds. This is changed in **Report Preferences**.

The display of the accretion rate of CABs can be set in **Report Preferences**.

Prices can be based on maturity value vs. issuance value of CABs (set in **Report Preferences**).

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BOND SOLUTION

ABC County
PV-Full Defeasance 2011 and 2013

Period Ending	Proposed Principal	Proposed Debt Service	Total Adj Debt Service	Revenue Constraints	Unused Revenues	Debt Serv Coverage
01/01/2021	7,610,000	11,433,375	11,433,375	13,342,573	1,909,198	116.69846%
01/01/2022	7,905,000	15,171,250	15,171,250	18,990,355	3,819,105	125.17330%
01/01/2023	8,515,000	15,386,000	15,386,000	19,206,955	3,820,955	124.83397%
01/01/2024	9,185,000	15,630,250	15,630,250	19,450,605	3,820,355	124.44206%
01/01/2025	9,895,000	15,881,000	15,881,000	19,702,240	3,821,240	124.06171%
01/01/2026	10,660,000	16,151,250	16,151,250	19,970,535	3,819,285	123.64699%
01/01/2027	11,485,000	16,443,250	16,443,250	20,259,513	3,816,263	123.20869%
01/01/2028	12,375,000	16,759,000	16,759,000	20,577,340	3,818,340	122.78382%
01/01/2029	13,325,000	17,090,250	17,090,250	20,907,578	3,817,328	122.33629%
01/01/2030	14,350,000	17,449,000	17,449,000	21,267,995	3,818,995	121.88661%
01/01/2031	13,163,487	17,836,500	17,836,500	21,654,815	3,818,315	121.40731%
01/01/2032	13,205,586	18,251,500	18,251,500	22,072,415	3,820,915	120.93480%
01/01/2033	13,269,287	18,706,500	18,706,500	22,522,990	3,816,490	120.40195%
01/01/2034	12,265,000	14,646,500	14,646,500	18,464,979	3,818,479	126.07093%
01/01/2035	12,955,000	14,723,250	14,723,250	18,542,004	3,818,754	125.93690%
01/01/2036	13,700,000	14,820,500	14,820,500	18,639,157	3,818,657	125.76605%
01/01/2037	4,330,000	4,765,500	4,765,500	8,584,301	3,818,801	180.13431%
01/01/2038	4,380,000	4,599,000	4,599,000	8,420,193	3,821,193	183.08748%
	192,573,359	265,743,875	265,743,875	332,576,541	66,832,666	

Debt Service is generally solved on a fiscal basis unless otherwise specified in the **Solution Assumptions**.

This is the Prior Debt Service (generally).

This is the savings.

The Bond Solution report is the most important report to look at to verify the bond debt service structure. In this example, we see that the savings (in the **Unused Revenues** column) are level. The **Solution Assumptions** dialog controls what DBC uses as a constraint. If you need to brush up on the solution types, review the description starting on page 72.

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PROOF OF ARBITRAGE YIELD

ABC County
PV-Full Defeasance 2011 and 2013

Date	Debt Service	PV Factor	Present Value to 07/15/2020 @ 1.4219438489%
01/01/2021	11,433,375.00	0.993487755	11,358,918.06
07/01/2021	3,633,125.00	0.986474200	3,583,984.08
01/01/2022	11,538,125.00	0.979510158	11,301,710.64
07/01/2022	3,435,500.00	0.972595278	3,341,351.08
01/01/2023	11,950,500.00	0.965729215	11,540,946.98
07/01/2023	3,222,625.00	0.958911622	3,090,212.57
01/01/2024	12,407,625.00	0.952142159	11,813,822.85
07/01/2024	2,993,000.00	0.945420485	2,829,643.51
01/01/2025	12,888,000.00	0.938746262	12,098,561.83
07/01/2025	2,745,625.00	0.932119157	2,559,249.66
01/01/2026	13,405,625.00	0.925538836	12,407,426.55
07/01/2026	2,479,125.00	0.919004968	2,278,328.19
01/01/2027	13,964,125.00	0.912517227	12,742,504.62
07/01/2027	2,192,000.00	0.906075286	1,986,117.03
01/01/2028	14,567,000.00	0.899678822	13,105,621.40
07/01/2028	1,882,625.00	0.893327514	1,681,800.71
01/01/2029	15,207,625.00	0.887021044	13,489,483.40
07/01/2029	1,549,500.00	0.880759094	1,364,736.22
01/01/2030	15,899,500.00	0.874541350	13,904,770.20
07/01/2030	1,190,750.00	0.868367501	1,034,008.60
01/01/2031	16,645,750.00	0.862237237	14,352,585.48
07/01/2031	1,190,750.00	0.856150249	1,019,460.91
01/01/2032	17,060,750.00	0.850106232	14,503,449.90
07/01/2032	1,190,750.00	0.844104883	1,005,117.89
01/01/2033	17,515,750.00	0.838145901	14,680,754.07
07/01/2033	1,190,750.00	0.832228987	990,976.67
01/01/2034	13,455,750.00	0.826353843	11,119,210.72
07/01/2034	884,125.00	0.820520175	725,442.40
01/01/2035	13,839,125.00	0.814727690	11,275,118.34
07/01/2035	560,250.00	0.808976097	453,228.86
01/01/2036	14,260,250.00	0.803265108	11,454,761.25
07/01/2036	217,750.00	0.797594435	173,676.19
01/01/2037	4,547,750.00	0.791963795	3,601,653.35
07/01/2037	109,500.00	0.786372904	86,107.83
01/01/2038	4,489,500.00	0.780821483	3,505,498.05
	265,743,875.00		236,460,240.08

Proceeds Summary

Delivery date	07/15/2020	
Par Value	192,573,359.35	
Accrued interest	297,373.61	
Premium (Discount)	44,005,661.55	Includes upfront expenses included in the arbitrage yield.
Arbitrage expenses	(416,154.43)	
Target for yield calculation	236,460,240.08	

ESCROW DESCRIPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

Type of Security	Maturity Date	Par Amount	Rate	Total Cost
-:				
Cashflow	-	233,965,427.89	0.000%	233,965,427.89
		233,965,427.89		233,965,427.89

The Escrow Descriptions report is a standard part of ALL refunding analyses. However, in this analysis we arrived at the cost of the escrow by using present value, hence, there are no security types. In subsequent analyses, you will see each Treasury and SLGs security described in detail in this report.

ESCROW REQUIREMENTS

ABC County
PV-Full Defeasance 2011 and 2013

Dated Date   07/01/2020
Delivery Date   07/15/2020

Period Ending	Principal	Interest	Principal Redeemed	Compound Int Redeemed	Redemption Premium	Total
01/01/2021	7,905,000.00	5,437,572.50	81,020,000.00	-	1,620,400.00	95,982,972.50
07/01/2021	-	2,932,392.50	-	-	-	2,932,392.50
01/01/2022	5,700,000.00	2,932,392.50	-	-	-	8,632,392.50
07/01/2022	-	2,797,017.50	-	-	-	2,797,017.50
01/01/2023	6,080,000.00	2,797,017.50	92,015,000.00	-	1,840,300.00	102,732,317.50
01/01/2028	-	-	11,200,683.65	16,130,869.42	819,946.59	28,151,499.67
	19,685,000.00	16,896,392.50	184,235,683.65	16,130,869.42	4,280,646.59	241,228,592.17

Principal that is escrowed to maturity.

Principal called before maturity.

Premium is based on Principal Redeemed.

The escrow requirements are the basis for the cost of the escrow. It is a good habit to check this report to see that bonds are actually being called when you expect them to. This report will assist you in catching these errors. For example, if you had not called the CAB term bond, you would have seen escrow requirements through January 1, 2013. This would indicate that you either entered the call improperly or that the refund provisions were incorrect. Both errors would have to be fixed in Debt/Size. Review the Summary of Bonds Refunded very carefully to check the call information you entered.

ESCROW COST

ABC County
PV-Full Defeasance 2011 and 2013

Type of Security	Maturity Date	Par Amount	Rate	Total Cost
Cashflow	-	233,965,427.89	0.000%	233,965,427.89
		233,965,427.89		233,965,427.89

Purchase Date	Cost of Securities	Cash Deposit	Total Escrow Cost	Yield
07/15/2020	233,965,427.89	-	233,965,427.89	1.421944%
	233,965,427.89	0.00	233,965,427.89	

The escrow cost is the basis for the new refunding issue just as the project fund is the basis for the new money issue sizing. If you create multiple escrows in one Prior Debt, as is done when Bond Fund moneys and Debt Service Reserve moneys are transferred into the refunding issue, you should print your report in detail mode using the **F5 – Modify** command.

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ESCROW CASH FLOW

ABC County
PV-Full Defeasance 2011 and 2013

Date	Other Cash Flows	Net Escrow Receipts	PV Factor	Present Value to 07/15/2020 @ 1.4219438%
01/01/2021	95,982,972.50	95,982,972.50	0.993487755	95,357,907.82
07/01/2021	2,932,392.50	2,932,392.50	0.986474200	2,892,729.55
01/01/2022	8,632,392.50	8,632,392.50	0.979510158	8,455,516.14
07/01/2022	2,797,017.50	2,797,017.50	0.972595278	2,720,366.01
01/01/2023	102,732,317.50	102,732,317.50	0.965729215	99,211,600.31
01/01/2028	28,151,499.67	28,151,499.67	0.899678822	25,327,308.06
	241,228,592.17	241,228,592.17		233,965,427.89

Escrow Cost Summary

Purchase date	07/15/2020
Purchase cost of securities	233,965,427.89
Target for yield calculation	233,965,427.89

The escrow cash flow should *ideally* match your escrow requirements as closely as possible in terms of timing as well as in amounts. In other words, if you have a $1,000,000 requirement on January 15, 2020, the escrow cash flow should come due as close to January 15, 2020 as possible and the amount should not be significantly higher than $1,000,000. This is not always the case. You will learn more about escrow inefficiencies later in this Tutorial. You should compare this report to the escrow requirements in subsequent analyses. In a present value analysis, the escrow matches perfectly but is not realistic.

ESCROW SUFFICIENCY

ABC County
PV-Full Defeasance 2011 and 2013

Date	Escrow Requirement	Net Escrow Receipts	Excess Receipts	Excess Balance
01/01/2021	95,982,972.50	95,982,972.50	-	-
07/01/2021	2,932,392.50	2,932,392.50	-	-
01/01/2022	8,632,392.50	8,632,392.50	-	-
07/01/2022	2,797,017.50	2,797,017.50	-	-
01/01/2023	102,732,317.50	102,732,317.50	-	-
01/01/2028	28,151,499.67	28,151,499.67	-	-
	241,228,592.17	241,228,592.17	0.00	

The escrow sufficiency shows that the cash flows generated by the escrow are sufficient to pay for the escrow requirements. The Excess Balance column should never have a negative number in it.

ESCROW STATISTICS

ABC County
PV-Full Defeasance 2011 and 2013

Total Escrow Cost	Modified Duration (years)	PV of 1 bp change	Yield to Receipt Date	Yield to Disbursement Date	Perfect Escrow Cost	Value of Negative Arbitrage	Cost of Dead Time
Global Proceeds Escrow:							
233,965,427.89	2.112	49,395.43	1.421944%	1.421944%	233,965,427.89	-	-
233,965,427.89		49,395.43			233,965,427.89	0.00	0.00

Delivery date 07/15/2020
Arbitrage yield 1.421944%
Composite Modified Duration 2.112

This is the escrow yield. It equates the cash flow on the escrow investments to their

This is the Present Value of the escrow requirements at the escrow's yield limit.

These statistics represent the "losses" in the escrow portfolio.

The Escrow Statistics report is discussed in detail later in this Tutorial (in Analyzing your Results).

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PROOF OF COMPOSITE ESCROW YIELD

ABC County
PV-Full Defeasance 2011 and 2013

All restricted escrows funded by bond proceeds

Date	Security Receipts	PV Factor	Present Value to 07/15/2020 @ 1.4219438485%
01/01/2021	95,982,972.50	0.993487755	95,357,907.82
07/01/2021	2,932,392.50	0.986474200	2,892,729.55
01/01/2022	8,632,392.50	0.979510158	8,455,516.14
07/01/2022	2,797,017.50	0.972595278	2,720,366.01
01/01/2023	102,732,317.50	0.965729215	99,211,600.31
01/01/2028	28,151,499.67	0.899678822	25,327,308.06
	241,228,592.17		233,965,427.89

Escrow Cost Summary

Purchase date	07/15/2020
Purchase cost of securities	233,965,427.89
Target for yield calculation	233,965,427.89

This report is a proof that the cash flows of all escrows purchased with bond proceeds (unless specified otherwise) when discounted at the yield shown equal the purchase cost of the securities. This yield is important and usually cannot exceed the arbitrage yield.

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STATEMENT OF INPUT ASSUMPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

General Assumptions

```
Refunding bond series ....................  PVALL

Default for 'Available Securities' .......  PV
Escrow purchase date ....................  New delivery date

SLGS solution parameters:
  SLGS rates file .......................  Current
  Allocate SLGS rates ...................  Default
  Interest rate precision ...............  0.00100000%

OMS solution parameters:
  Available OMS .........................  Security Universe
  If prices and yields conflict .........  Display error
  Generate 0% SLGS rollovers ............  Only if needed
    Fix rollover date to ................      -
  Ignore available OMS maturing after ....      -

PV solution parameters:
  Maximum PV rate .......................      -

Generate global proceeds escrow? .........  Yes
  Escrow description ....................
  Yield limit ...........................  Arb Yield
  Available securities ..................  Default
  Existing portfolio ....................
  Additional cash .......................      -
  Required PV Cost ......................      -
  Float contract ........................  N/A
```

Advanced Options

```
Permit excess TP Penalty ................  Yes
Alternate yield to calculate neg arb .....      -

SLGS solution parameters:
  SLGS Regulations.......................  10/28/96 SLGS regulations
  Begin 0% SLGS rollovers on ............      -
  Stop 0% SLGS rollovers on .............      -
  Use long first interest period.........  No

Use pre-computed Prior D/S ..............  No

OMS and SLG Yield adjustment (+/-) .......      -
```

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STATEMENT OF INPUT ASSUMPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

<u>Savings Assumptions</u>

```
PV of savings is based upon .................  Default
Target date for PV of savings ...............  New delivery date
Exclude from savings the cash flows through ..       -
Value refunded CABs at ......................  Accreted value
Add'l savings adjustments ...................        -

Prior expenditures
   Source of debt service ....................  Prior debt
   Source of cash flow adjustments ...........  N/A

Refunding expenditures
   Source of debt service ....................  Refunding bonds
   Source of cash flow adjustments ...........  N/A
   Apply reserve funds .......................  Up front at par value
   Apply accrued interest retained ...........  As cash flow at delivery
   Apply other sources and other uses ........  As up front adjustment
   Apply future expenses .....................  Yes
```

STATEMENT OF INPUT ASSUMPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

Full Refunding of 2011 and 2013

```
                    Defeasance Requirement
                    ----------------------

Select prior debt service from existing b Select Bonds
Enter prior debt service ..............  No
Portion of prior bonds to defease ......  All amounts
Portion of prior interest to include:
  Starting ............................  After new delivery date
  Ending ..............................  On maturity date
Pct of refunding interest to defease ...      -
Days in advance for escrow receipts ....      -

                         Funds on Hand
                         -------------

                                                   Spend       Spend
                                          % of    first in    remaining
                                          Accr    Res Fund    in Escrow
Fund Description            Amount         Int      (name)      (name)
------------------------------------------------------------------------
                              -             -
                              -             -
                              -             -
                              -             -
                              -             -

                            Escrows
                            -------

Escrow      Yield        Solution      Available   Existing
Name        limit        option        Securities  Portfolio
------------------------------------------------------------------
            Arb Yield    Fill w/B.P.   Default
            Arb Yield    Fill w/B.P.   Default
            Arb Yield    Fill w/B.P.   Default
            Arb Yield    Fill w/B.P.   Default
            Arb Yield    Fill w/B.P.   Default

                       Transferred Proceeds
                       --------------------

Source of transfer factors ............  Calculated
Percent of proceeds to apply to cap ....  100.000000%
Additional escrow yield adjustment .....       -

                          Miscellaneous
                          -------------

Include d/s of unrefunded bonds
  as 'Other D/S' .......................  Yes
Include unrefunded interest from
  refunded bonds as 'Other D/S' ........  Yes
```

Advanced Options

```
    Options for Select First escrow:
      Allocate cash .........................  to Select First escrow

    Transferred proceeds options:
      Force calculation of factors ..........  No

    Prior ongoing expenses:
      Apply to savings & bond solution .......  No

    Other options:
      Exclude accr int from requirement ....  No
      Exclude accr int for savings .........  No
      Escrow all bonds to maturity ..........  No
      Exclude Unrefundable (Adv) Amount ......  No
      Exclude all refundable bonds ..........  No
      Exclude all non-callable bonds ........  No
      Exclude bonds maturing on delivery date ......  Yes
```

STATEMENT OF INPUT ASSUMPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

General Bond Information

```
Series Date Information
  Dated date ................................. Jul  1, 2020
  Delivery date ............................. Jul 15, 2020
  First interest payment date ............... Jan  1, 2021
  Interest frequency ........................ Semiannual
  Interest day basis ........................ 30/360
  First bond year ending (fiscal) date ........ -
Apply Treasury regulations of ................ Default
Application of accrued interest .............. Retain in general fund
```

	$/1000	%	000
Cost of Issuance	1.298207	0.1298207%	250,000.00
Underwriters Discount	10.500000	1.0500000%	2,022,020.28
Average Takedown	7.500000	0.7500000%	1,444,300.20
Management Fee	0.500000	0.0500000%	96,286.68
Underwriting Fee	-	-	-
Expenses	2.500000	0.2500000%	481,433.40
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-

Advanced Options

```
  Fiscal date specifies first fiscal period .... No
  First fiscal period begins after .............     -

  Apply 2% limitation on issuance costs ........ No

  Share revenues in excess of net d/s
    with external series ....................... No

  If contingency is negative .................. N/A
  Name of Equity Contribution .................

  Arbitrage Yield Calculation Method .......... Fixed Yield Issue
  Arbitrage Expense Allocation Method ......... By expense formula

  Name of DDL File ...................

  Expected Parameters for statistics calculations
    Day basis ................................ 30/360
    Compounding frequency .................... Semiannual

  Bond rounding option ........................ Default

  Cost of issuance and UD applies to .......... Par amount
```

STATEMENT OF INPUT ASSUMPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

Bond Component Information - Serial Bonds through 2030

```
Dated Date ....................... Jul  1, 2020
Delivery Date .................... Jul 15, 2020
First Interest Payment Date ...... Jan  1, 2021
Interest Frequency ............... Semiannual
Interest Day Basis ............... 30/360
Interest Payment Option .......... Paid until Maturity Date
Serial/Term selection ............ Serial Bond (Price to Actual Maturity)
```

Bond Component Maturity Data

Maturity Date	Issue Amount	Interest Rate	Yield	Price	Issuance Denomination
01/01/2021	7,610,000.00	5.000%	1.100%	101.788	5,000.00
01/01/2022	7,905,000.00	5.000%	1.100%	105.636	5,000.00
01/01/2023	8,515,000.00	5.000%	1.110%	109.417	5,000.00
01/01/2024	9,185,000.00	5.000%	1.120%	113.135	5,000.00
01/01/2025	9,895,000.00	5.000%	1.130%	116.789	5,000.00
01/01/2026	10,660,000.00	5.000%	1.150%	120.321	5,000.00
01/01/2027	11,485,000.00	5.000%	1.230%	123.346	5,000.00
01/01/2028	12,375,000.00	5.000%	1.310%	126.146	5,000.00
01/01/2029	13,325,000.00	5.000%	1.390%	128.722	5,000.00
01/01/2030	14,350,000.00	5.000%	1.470%	131.072	5,000.00

105,305,000.00

Advanced Options

```
Actual Day Basis Interest Options:
  Observe full period rule ............... No
  Determine interest year ................ Backward from payment date

Pricing and Valuation Options:
  Security class ......................... Municipal (truncate to 3)
  Amortize OID (or premium) .............. No
  Accreted value/call price precision .... Default
  Premium CAB price precision ............ Default
  Force CAB denom to fit issue amount .... No

Variable rate bond options:
  Use Series Variable Rate Table ......... No

Arbitrage Yield:
  Include in Arbitrage Yield ............. Yes
  Arb Yield override for term bond ....... -
  Arb expense override for term bond .....        -

Other options:
  Auto EOM alignment for pmt dates ....... Yes
  Apply takedowns to ..................... Par Amount
```

STATEMENT OF INPUT ASSUMPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

Bond Component Information - CAB through 2033

```
Dated Date ........................ Jul  1, 2020
Delivery Date ..................... Jul 15, 2020
Interest Frequency ...............  Semiannual
Interest Day Basis ...............  30/360
Interest Payment Option ..........  Compounded until Maturity Date
  Future Maturity Denomination ....    5,000.00
Serial/Term selection ............  Serial Bond (Price to Actual Maturity)
```

Bond Component Maturity Data

Maturity Date	Issue Amount	Interest Rate	Yield	Price	Issuance Denomination
01/01/2031	13,163,487.15	1.540%	1.540%	100.000	4,258.65
01/01/2032	13,205,585.70	1.610%	1.610%	100.000	4,160.55
01/01/2033	13,269,286.50	1.670%	1.670%	100.000	4,064.10
	39,638,359.35				

Advanced Options

```
Actual Day Basis Interest Options:
   Observe full period rule ...............  No
   Determine interest year ...............   Backward from payment date

Pricing and Valuation Options:
   Security class .........................  Municipal (truncate to 3)
   Amortize OID (or premium) .............   No
   Accreted value/call price precision ....  Default
   Premium CAB price precision ...........   Default
   Force CAB denom to fit issue amount ....  No

Variable rate bond options:
   Use Series Variable Rate Table ........   No

Arbitrage Yield:
   Include in Arbitrage Yield ............   Yes
   Arb Yield override for term bond .......         -
   Arb expense override for term bond .....         -

Other options:
   Auto EOM alignment for pmt dates .......  Yes
   Apply takedowns to ....................   Par Amount
```

STATEMENT OF INPUT ASSUMPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

Bond Component Information - Term Bond due 2038

```
Dated Date ....................... Jul  1, 2020
Delivery Date .................... Jul 15, 2020
First Interest Payment Date ...... Jan  1, 2021
Interest Frequency ............... Semiannual
Interest Day Basis ............... 30/360
Interest Payment Option .......... Paid until Maturity Date
Serial/Term selection ............ Term Bond (Price to Final Maturity)
```

Bond Component Maturity Data

Maturity Date	Issue Amount	Interest Rate	Yield	Price	Issuance Denomination
01/01/2034	12,265,000.00	5.000%	1.730%	149.098	5,000.00
01/01/2035	12,955,000.00	5.000%	1.730%	149.098	5,000.00
01/01/2036	13,700,000.00	5.000%	1.730%	149.098	5,000.00
01/01/2037	4,330,000.00	5.000%	1.730%	149.098	5,000.00
01/01/2038	4,380,000.00	5.000%	1.730%	149.098	5,000.00
	47,630,000.00				

Advanced Options

```
Actual Day Basis Interest Options:
  Observe full period rule ............... No
  Determine interest year ............... Backward from payment date

Pricing and Valuation Options:
  Security class ........................ Municipal (truncate to 3)
  Amortize OID (or premium) ............. No
  Accreted value/call price precision .... Default
  Premium CAB price precision ........... Default
  Force CAB denom to fit issue amount .... No

Variable rate bond options:
  Use Series Variable Rate Table ........ No

Arbitrage Yield:
  Include in Arbitrage Yield ............ Yes
  Arb Yield override for term bond .......       -
  Arb expense override for term bond .....       -

Other options:
  Auto EOM alignment for pmt dates ....... Yes
  Apply takedowns to .................... Par Amount
```

STATEMENT OF INPUT ASSUMPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

Expense Information - Insurance for Term Bond

```
Type of Expense ..........................  Other
  Include in Arbitrage Yield ..............  Yes
  Include in TIC ........................  Yes
  Include in All-In TIC .................  Yes
  Include in 2% limit (if applicable) .....  No
  Include in bond optimization ...........  No

Expense formula:
  >.5% of total adjusted Debt Service of TERM
  >
  >
  >
  >
```

STATEMENT OF INPUT ASSUMPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

Other Sources

Description	Amount
Issuer Contribution	75,000.00
	75,000.00

STATEMENT OF INPUT ASSUMPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

Escrow Description - Global Escrow

```
Type of Escrow .........................   Actual escrow
Creation status ........................   Calculated
Subject to future transfer .............   Yes

Escrow yield ...........................   1.421944%
Cost of escrow .........................   233,965,427.89
```

Schedule of Escrow Receipts

Date	Amount
01/01/2021	95,982,972.50
07/01/2021	2,932,392.50
01/01/2022	8,632,392.50
07/01/2022	2,797,017.50
01/01/2023	102,732,317.50
01/01/2028	28,151,499.67
	241,228,592.17

The Global Escrow is automatically generated by DBC Finance. You can control the assumptions for this escrow in the **Refund Assumptions** – **Global Proceeds** dialog.

STATEMENT OF INPUT ASSUMPTIONS

ABC County
PV-Full Defeasance 2011 and 2013

Reporting Options

```
Report alignment date......................      -
Name of general fund......................

Report Titles
  Print issuer name ......................  Yes
  Print series name ......................  Yes
  Additional titles:
   >
   >
   >
   >
   >
```

SLGS ANALYSIS

SLGS or State and Local Government Series are Treasury securities offered by the US government to state and local governments specifically for use in investing advance refunding proceeds at a restricted yield. Their maturity date is defined by the subscriber and the interest rate is also set but is subject to overall limits based on current market rates. Using SLGS to structure an escrow provides a more realistic approach than using PV because SLGS reflect true market rates and provide a real cash flow. A PV escrow is completely optimal in size but doesn't reflect the problems of interest rate availability and date matching.

The main advantages to using SLGS over open market Treasury securities are that the purchaser can match the SLG maturity dates to the escrow disbursement date and set the rates (up to the maximum rate available at time of subscription).

❖ FILE MENU - SLGS DATAFILE

Below is the partial listing of State and Local Government security rates for August 21, 2019. They are the maximum rates available for deposits within the specified maturity ranges. The chart is a bit confusing to read and explanations are provided below (example assumes a 7/15/19 purchase date). SLGS are sold in three formats: Certificates which mature up to one year, Notes from one year and one day through ten years, and Bonds which mature from ten years one day through thirty years. For example, a deposit made July 15, 2020 to mature on August 16, 2022 can earn up to a maximum rate of 1.51% (see 02-01 below).

SAMPLE SLGS SHEET
Department of the Treasury
Bureau of the Public Debt

SLGS TABLE FOR USE ON August 21, 2019

DEMAND DEPOSIT RATE

ANNUALIZED EFFECTIVE RATE	DAILY FACTOR
1.48%	0.000040142

TIME DEPOSIT RATES

FROM	THROUGH	
YR - MO	YR - MO	RATE
-------	-------	-----
00-01	ONLY	2.03%
00-02	ONLY	1.96%
00-03	ONLY	1.95%
00-04	ONLY	1.93%
00-05	ONLY	1.91%
00-06	ONLY	1.89%
00-07	ONLY	1.86%
00-08	ONLY	1.84%
00-09	ONLY	1.81%
00-10	ONLY	1.78%
00-11	ONLY	1.76%
01-00	ONLY	1.73%
01-01	ONLY	1.71%
01-02	ONLY	1.69%
01-03	ONLY	1.67%
01-04	ONLY	1.64%
01-05	ONLY	1.62%
01-06	ONLY	1.60%
01-07	ONLY	1.59%
01-08	ONLY	1.57%
01-09	ONLY	1.56%
01-10	ONLY	1.54%
01-11	ONLY	1.53%
02-00	ONLY	1.52%
02-01	ONLY	1.51%
02-02	ONLY	1.50%
02-03	ONLY	1.49%
02-04	ONLY	1.49%

The following is a detailed explanation of how SLGS rates are applied to escrow requirements. Based on the requirement date, one has to pick the rate appropriate for the amount of time from the purchase of the SLGS to the requirement date. SLGS are not available for maturities less than 30 days. The chart below is an outline of how the maximum rates are allocated to requirements in an escrow. The date ranges have been compressed for this outline. The methodology for allocating SLGS rates changes as you go from less than one-year maturities to 1 to 10 year maturities to 10 to 30 year maturities. You will note, in the MATURITY DATES column of the chart, that as you read the FROM and THRU dates the dates are continuous (there are no gaps).

As a practical matter, you will not have to manually enter these rates as you will download the SLGS table from within the program.

From the schedule below, we can determine that the rate for a SLG purchased on 7/15/20 for a requirement on 7/15/30 can have a maximum rate of 6.08%.

FROM YR-MO	THRU YR-MO	MAX RATE	FORMULAS (DATE RANGES) FROM	THROUGH	MATURITY DATES FROM	THRU
0-1	ONLY	2.03%	30 days	2 mos less 1 day	7/15/20	8/14/20
0-2 THRU	ONLY	1.96%	2 months	3 mos less 1 day	8/15/20	9/14/20
0-10	ONLY	1.78%	x months	x+1 less 1 day	x/15/20	x+1/14/20
0-11	ONLY	1.76%	11 months	12 months	6/15/21	7/15/21
1-0 THRU	ONLY	1.73%	1 yr plus 1 day	1 yr 3 mos less 1 day	7/16/22	10/14/22
9-6	ONLY	1.56%	x yr y mos	x yr y+3 mos less 1 day	x/15/22	x+3/14/22
9-9	ONLY	1.57%	9 yr 9 mos	10 years	4/15/30	7/15/30
10-0 THRU	ONLY	1.57%	10 yr plus 1 day	11 years less 1 day	7/16/30	7/14/31
29-0	ONLY	2.05%	x yrs	x+1 years less 1 day	7/15/x+1	7/14/x+1
30- 6	ONLY	2.05%	29 years	30 years	7/15/49	7/15/50

❖ **Tools-Security Universe**

To download SLGS within the program, click the SECS icon on the Toolbar Secs or go to Tools-Security Universe.
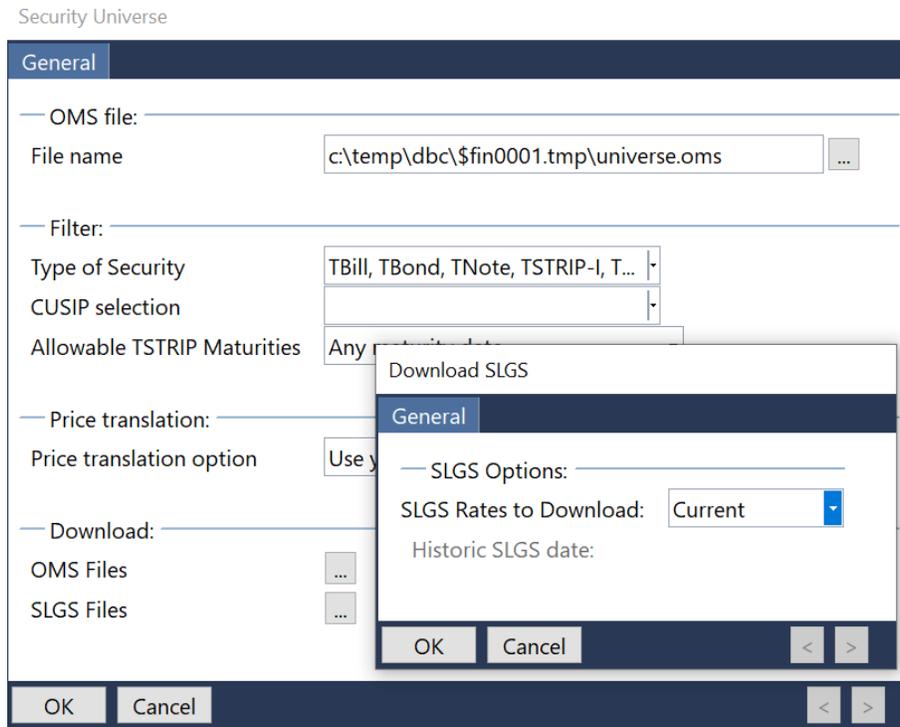
Select the Detail button ⟨ ... ⟩ for SLGS Files. From here you have the option to download either the Current file, which will be the file as of the date of download, or a Historic File which can be any previous business day.

✋ **NOTE –** The Bureau of Public Debt typically releases SLGS files around 10:00 am ET. Attempting to download a Current file prior to that time may result in an error due to the SLGS file not yet being availabe.

❖ OPEN - COPY

OPEN - COPY is a general command used to name and save all types of DBC Finance documents. It is used to take an existing Finance document (Series, Cases, and Financings) and make an exact copy within the same issuer and save it is a new document with a unique name.

🖐 **NOTE -** You will use the Present Value analysis as the base case for this analysis and the next one. You will make copies each time of the PV case and rename it as instructed.

✻ **Go to the OPEN menu, highlight the PVALL Refund Case, and hit Copy.**

Open - Tutorial	✕

🗄 **DBC** Issuers (Tutorial.df2)	OK
🏛 ABC - ABC County	Cancel
Ⓢ 2011 (Act) - 2011 $100,000,000 Revenue Bonds	New...
Ⓢ 2013 (Act) - 2013 $150,000,683 Revenue Bonds	Copy
Ⓢ 2016 (Act) - Series 2016 Bonds	Edit
Ⓢ 2020 (Prp) - 2020 Street and Road Repair Revenue	Delete
Ⓢ 202020ML (Prp) - 2020 New Money- $20,000,000 Total Par	Detail List
Ⓢ 2020FILL (Prp) - 2020 New Money-Bonding Capacity	Datafile
Ⓢ 2020TARG (Prp) - 2020 New Money-Serials at $25,000,000	CalcAgent
Ⓢ 2020WRAP (Prp) - 2020 New Money Wraparound Analysis	EZAgent
Ⓢ PVALL (PrpRef) - PV - Full Defeasance 2011 and 2013	
Ⓡ PVALL - PV - Full Defeasance 2011 and 2013	

Sort by:
Short name (A to Z)

Group by:
Document type

Document Filter:
View All

✻ **Type "SLGSALL" (short), then ENTER, and "SLGS - Full Defeasance 2011 and 2013" (long name. Click OK when finished.**

❖ Download Historic SLGS File

For this analysis, we are going to use the SLGS file from the July 24ˢᵗ, 2019.

❖ DATA MENU - REFUND ASSUMPTIONS – ESCROW SOL'N PARAMETERS

Escrow solution parameters determines the data source used for the default escrow solution method for the current Case. For this analysis, we define which SLGS file to use and how to allocate the SLGS rates.

✳ **Select REFUND ASSUMPTIONS- SETUP from the DATA menu**

		Refund Assumptions
Escrow Solution Parameters	Global Proceeds Escrow	Notes

Default for 'Available Securities' SLGS only
Escrow purchase date New delivery date

— SLGS solution parameters —
SLGS rates file 24JUL19
Allocate SLGS rates Default

— OMS solution parameters —
Available OMS Datafile selections ...
  OMS file
If prices and yields conflict Display error

— PV solution parameters —
Maximum PV rate

Funding option Net funded

OK   Cancel   Advanced

✳ **Select "SLGS only" as the DEFAULT FOR AVAILABLE SECURITIES.**

✳ **Use Shift-? and select "24JUL19" as the SLGS rates file. Click OK. Save the case and click on CALCULATE. Click on OK if any of the previously discussed WARNINGS appear.**

🖐 **NOTE –** The default SLGS rates file setting is Current, this means the program will use the most up to date SLGS file that you have downloaded. If the 7/24/2019 SLGS file is the only file downloaded, then leaving the option set to Current will work. However, if you have downloaded SLGS files after 7/24/2019 then you must manually select the correct file using the instructions above.

❖ **REFUND SOLUTION STATUS**

Once the analysis is completed, the following dialog appears. It summarizes the results of the analysis. The total savings amount is the net present value savings.

New Bond Series:	SLGSALL
Delivery Date:	Jul 15, 2020
Arbitrage Yield:	1.421944%
Escrow Yield:	1.421939%
PV of prior ds:	295,369,115.90
Total Savings:	59,131,641.50
Savings % of refunded bonds:	28.126%

Bond Par Amount:	192,573,359.35	Cost of Projects:	-
Bond Adjustments:	44,303,035.16	Cost of Escrow:	233,965,454.12
Other Sources:	75,000.00	Expenses:	2,688,174.71
Equity Contribution:	-	Reserve Funds:	297,373.61
Funds on hand:	-	Other Uses:	-
		Additional funds:	392.07

Calculation Complete

OK

* **Click OK when finished. Go to PRINT and select PACKETS - LOAD. Select the packet called "REFDET" and click on PRINT. Go back to page 78 and review your results using the checklist. The reports below are only a portion of the report packet.**

🖐 **NOTE -** The **TOTAL SAVINGS** number has changed from the savings in the PV Analysis. Look at the Escrow reports and try to determine why this difference exists. Think about the escrow yield and how efficient (or inefficient) the escrow is. Do securities mature right when you need them **or** do they mature much earlier only to have their cash flow uninvested until an escrow payment is made?

SOURCES AND USES OF FUNDS

ABC County
SLGS-Full Defeasance 2011 and 2013

Dated Date	07/01/2020
Delivery Date	07/15/2020

Sources:

Bond Proceeds:	
Par Amount	192,573,359.35
Accrued Interest	297,373.61
Premium	44,005,661.55
	236,876,394.51
Other Sources of Funds:	
Issuer Contribution	75,000.00
	236,951,394.51

Uses:

Refunding Escrow Deposits:	
Cash Deposit	1.12
SLGS Purchases	233,965,453.00
	233,965,454.12
Other Fund Deposits:	
Accrued Interest	297,373.61
Delivery Date Expenses:	
Cost of Issuance	250,000.00
Underwriter's Discount	2,022,020.28
Insurance for Term Bond	416,154.43
	2,688,174.71
Other Uses of Funds:	
Additional Proceeds	392.07
	236,951,394.51

SUMMARY OF REFUNDING RESULTS

ABC County
SLGS-Full Defeasance 2011 and 2013

Dated Date	07/01/2020
Delivery Date	07/15/2020
Arbitrage yield	1.421944%
Escrow yield	1.421939%
Value of Negative Arbitrage	26.17
Bond Par Amount	192,573,359.35
True Interest Cost	1.529103%
All-In TIC	1.542442%
Average Life	9.096
Weighted Average Maturity	9.482
Duration	8.062
Par amount of refunded bonds	203,920,683.65
Value of refunded bonds on 7/15/2020	210,239,793.88
Average coupon of refunded bonds	5.888691%
Average life of refunded bonds	8.830
Remaining weighted average maturity of refunded bonds	8.832
PV of prior debt to 07/15/2020 @ 1.421944%	295,369,115.90
Net PV Savings	59,131,641.50
Percentage savings of refunded bonds	28.125808%

SAVINGS

ABC County
SLGS-Full Defeasance 2011 and 2013

Date	Prior Debt Service	Refunding Debt Service	Refunding Receipts	Refunding Net Cash Flow	Savings	Present Value to 07/15/2020 @ 1.4219438%
01/01/2021	13,342,572.50	11,433,375.00	297,373.61	11,136,001.39	2,206,571.11	2,194,137.95
01/01/2022	18,990,355.00	15,171,250.00	-	15,171,250.00	3,819,105.00	3,752,165.59
01/01/2023	19,206,955.00	15,386,000.00	-	15,386,000.00	3,820,955.00	3,701,151.34
01/01/2024	19,450,605.00	15,630,250.00	-	15,630,250.00	3,820,355.00	3,648,471.87
01/01/2025	19,702,240.00	15,881,000.00	-	15,881,000.00	3,821,240.00	3,597,857.66
01/01/2026	19,970,535.00	16,151,250.00	-	16,151,250.00	3,819,285.00	3,545,258.24
01/01/2027	20,259,512.50	16,443,250.00	-	16,443,250.00	3,816,262.50	3,492,384.27
01/01/2028	20,577,340.00	16,759,000.00	-	16,759,000.00	3,818,340.00	3,444,805.06
01/01/2029	20,907,577.50	17,090,250.00	-	17,090,250.00	3,817,327.50	3,395,059.65
01/01/2030	21,267,995.00	17,449,000.00	-	17,449,000.00	3,818,995.00	3,348,213.24
01/01/2031	21,654,815.00	17,836,500.00	-	17,836,500.00	3,818,315.00	3,299,905.06
01/01/2032	22,072,415.00	18,251,500.00	-	18,251,500.00	3,820,915.00	3,252,643.88
01/01/2033	22,522,990.00	18,706,500.00	-	18,706,500.00	3,816,490.00	3,199,897.20
01/01/2034	18,464,979.03	14,646,500.00	-	14,646,500.00	3,818,479.03	3,153,016.16
01/01/2035	18,542,004.00	14,723,250.00	-	14,723,250.00	3,818,754.00	3,109,276.92
01/01/2036	18,639,157.15	14,820,500.00	-	14,820,500.00	3,818,657.15	3,065,817.87
01/01/2037	8,584,300.53	4,765,500.00	-	4,765,500.00	3,818,800.53	3,023,125.68
01/01/2038	8,420,193.09	4,599,000.00	-	4,599,000.00	3,821,193.09	2,983,061.77
	332,576,541.30	265,743,875.00	297,373.61	265,446,501.39	67,130,039.91	59,206,249.43

Savings Summary

Dated Date	07/01/2020
Delivery Date	07/15/2020
PV of savings from cash flow	59,206,249.43
Less: Prior funds on hand	(75,000.00)
Plus: Refunding funds on hand	392.07
Net PV Savings	59,131,641.50

ESCROW DESCRIPTIONS

ABC County
SLGS-Full Defeasance 2011 and 2013

Type of Security	Type of SLGS	Maturity Date	First Int Pmt Date	Par Amount	Rate	Max Rate	Total Cost
Jul 15, 2020:							
SLGS	Certificate	01/01/2021	01/01/2021	93,933,515	2.070%	2.070%	93,933,515.00
SLGS	Certificate	07/01/2021	07/01/2021	1,663,014	1.960%	1.960%	1,663,014.00
SLGS	Note	01/01/2022	01/01/2021	7,394,359	1.870%	1.870%	7,394,359.00
SLGS	Note	07/01/2022	01/01/2021	1,628,121	1.810%	1.810%	1,628,121.00
SLGS	Note	01/01/2023	01/01/2021	125,375,344	1.780%	1.780%	125,375,344.00
SLGS	Note	01/01/2028	01/01/2021	3,971,100	1.930%	1.930%	3,971,100.00
				233,965,453			233,965,453.00
Jan 1, 2023:							
SLGS	Rollover Note	01/01/2028	-	23,797,188	0.000%	0.000%	23,797,188.00
Jul 1, 2023:							
SLGS	Rollover Note	01/01/2028	-	38,321	0.000%	0.000%	38,321.00
Jan 1, 2024:							
SLGS	Rollover Note	01/01/2028	-	38,321	0.000%	0.000%	38,321.00
Jul 1, 2024:							
SLGS	Rollover Note	01/01/2028	-	38,321	0.000%	0.000%	38,321.00
Jan 1, 2025:							
SLGS	Rollover Note	01/01/2028	-	38,321	0.000%	0.000%	38,321.00
Jul 1, 2025:							
SLGS	Rollover Note	01/01/2028	-	38,322	0.000%	0.000%	38,322.00
Jan 1, 2026:							
SLGS	Rollover Note	01/01/2028	-	38,321	0.000%	0.000%	38,321.00
Jul 1, 2026:							
SLGS	Rollover Note	01/01/2028	-	38,321	0.000%	0.000%	38,321.00
Jan 1, 2027:							
SLGS	Rollover Cert	01/01/2028	-	38,321	0.000%	0.000%	38,321.00
Jul 1, 2027:							
SLGS	Rollover Cert	01/01/2028	-	38,321	0.000%	0.000%	38,321.00
				258,107,531			258,107,531.00

SLGS Summary

SLGS Rates File	24JUL19
Total Certificates of Indebtedness	95,596,529.00
Total Notes	138,368,924.00
Total original SLGS	233,965,453.00
Total Rollover SLGS	24,142,078.00

These SLG rollovers occur because there are unspent interest earnings in the cash flow. Remember that there are no escrow requirements from Jan. 1, 2023 until Jan. 1, 2028. The Jan. 1, 2028 maturity generates SLG interest from Jan. 1, 12023 through 2028. When these moneys go unspent they are rolled (reinvested) in zero coupon SLGs. All SLGs have a minimum purchase amount of $1,000, are sold in multiples of $1, and have a minimum maturity of 15 days.

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ESCROW REQUIREMENTS

ABC County
SLGS-Full Defeasance 2011 and 2013

Dated Date   07/01/2020
Delivery Date   07/15/2020

Period Ending	Principal	Interest	Principal Redeemed	Compound Int Redeemed	Redemption Premium	Total
01/01/2021	7,905,000.00	5,437,572.50	81,020,000.00	-	1,620,400.00	95,982,972.50
07/01/2021	-	2,932,392.50	-	-	-	2,932,392.50
01/01/2022	5,700,000.00	2,932,392.50	-	-	-	8,632,392.50
07/01/2022	-	2,797,017.50	-	-	-	2,797,017.50
01/01/2023	6,080,000.00	2,797,017.50	92,015,000.00	-	1,840,300.00	102,732,317.50
01/01/2028	-	-	11,200,683.65	16,130,869.42	819,946.59	28,151,499.67
	19,685,000.00	16,896,392.50	184,235,683.65	16,130,869.42	4,280,646.59	241,228,592.17

ESCROW COST

ABC County
SLGS-Full Defeasance 2011 and 2013

Type of Security	Maturity Date	Par Amount	Rate	Total Cost
SLGS	01/01/2021	93,933,515	2.070%	93,933,515.00
SLGS	07/01/2021	1,663,014	1.960%	1,663,014.00
SLGS	01/01/2022	7,394,359	1.870%	7,394,359.00
SLGS	07/01/2022	1,628,121	1.810%	1,628,121.00
SLGS	01/01/2023	125,375,344	1.780%	125,375,344.00
SLGS	01/01/2028	3,971,100	1.930%	3,971,100.00
		233,965,453		233,965,453.00

Purchase Date	Cost of Securities	Cash Deposit	Total Escrow Cost	Yield
07/15/2020	233,965,453	1.12	233,965,454.12	1.421939%
	233,965,453	1.12	233,965,454.12	

This amount should always be below $100 in SLGs portfolios. All moneys invested in the portfolio should be "working" earning interest. Any cash amounts over $100 means that the first escrow requirement is within 15 days of the refunding delivery date. SLGs have a minimum of 15 days.

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ESCROW CASH FLOW

ABC County
SLGS-Full Defeasance 2011 and 2013

Date	Principal	Interest	Rollovers	Net Escrow Receipts	PV Factor	Present Value to 07/15/2020 @ 1.4219386%
01/01/2021	93,933,515.00	2,049,457.26	-	95,982,972.26	0.993487779	95,357,909.89
07/01/2021	1,663,014.00	1,269,378.29	-	2,932,392.29	0.986474250	2,892,729.48
01/01/2022	7,394,359.00	1,238,033.44	-	8,632,392.44	0.979510233	8,455,516.73
07/01/2022	1,628,121.00	1,168,896.18	-	2,797,017.18	0.972595379	2,720,365.98
01/01/2023	125,375,344.00	1,154,161.68	(23,797,188.00)	102,732,317.68	0.965729340	99,211,613.32
07/01/2023	-	38,321.12	(38,321.00)	0.12	0.958911772	0.12
01/01/2024	-	38,321.12	(38,321.00)	0.12	0.952142332	0.11
07/01/2024	-	38,321.12	(38,321.00)	0.12	0.945420682	0.11
01/01/2025	-	38,321.12	(38,321.00)	0.12	0.938746483	0.11
07/01/2025	-	38,321.12	(38,322.00)	(0.88)	0.932119400	(0.82)
01/01/2026	-	38,321.12	(38,321.00)	0.12	0.925539101	0.11
07/01/2026	-	38,321.12	(38,321.00)	0.12	0.919005256	0.11
01/01/2027	-	38,321.12	(38,321.00)	0.12	0.912517537	0.11
07/01/2027	-	38,321.12	(38,321.00)	0.12	0.906075618	0.11
01/01/2028	3,971,100.00	38,321.12	24,142,078.00	28,151,499.12	0.899679175	25,327,317.51
	233,965,453.00	7,263,138.05	0.00	241,228,591.05		233,965,453.00

Escrow Cost Summary

Purchase date	07/15/2020
Purchase cost of securities	233,965,453.00
Target for yield calculation	233,965,453.00

These are the rollovers mentioned on page 121. Note that all amounts over $1 dollar were reinvested. In one period, $0.88 was subtracted from the excess cash balances (sort of slush fund) to round up the reinvestment to a multiple of $1. Look at the sufficiency report for a clearer look at how the cash flow is structured to meet the requirements efficiently. This rollover decreases the escrow yield by pushing out further in time the cash flow generated by the SLG investments.

ESCROW SUFFICIENCY

ABC County
SLGS-Full Defeasance 2011 and 2013

> This is the sum of security principal, interest, and zero SLG rollovers.

Date	Escrow Requirement	Net Escrow Receipts	Excess Receipts	Excess Balance
07/15/2020	-	1.12	1.12	1.12
01/01/2021	95,982,972.50	95,982,972.26	(0.24)	0.88
07/01/2021	2,932,392.50	2,932,392.29	(0.21)	0.67
01/01/2022	8,632,392.50	8,632,392.44	(0.06)	0.61
07/01/2022	2,797,017.50	2,797,017.18	(0.32)	0.29
01/01/2023	102,732,317.50	102,732,317.68	0.18	0.47
07/01/2023	-	0.12	0.12	0.59
01/01/2024	-	0.12	0.12	0.71
07/01/2024	-	0.12	0.12	0.83
01/01/2025	-	0.12	0.12	0.95
07/01/2025	-	(0.88)	(0.88)	0.07
01/01/2026	-	0.12	0.12	0.19
07/01/2026	-	0.12	0.12	0.31
01/01/2027	-	0.12	0.12	0.43
07/01/2027	-	0.12	0.12	0.55
01/01/2028	28,151,499.67	28,151,499.12	(0.55)	0.00
	241,228,592.17	241,228,592.17	0.00	

> An optimally sized SLGs escrow will always have an ending balance in all periods of less than $2 unless the requirements are more frequent than semiannual. Sometimes, additional cash will be put into the escrow as "padding" just in case there are small unforeseen insufficiencies in the escrow. The excess balance should never be zero except in the last period nor can it be negative.

ESCROW STATISTICS

ABC County
SLGS-Full Defeasance 2011 and 2013

Total Escrow Cost	Modified Duration (years)	PV of 1 bp change	Yield to Receipt Date	Yield to Disbursement Date	Perfect Escrow Cost	Value of Negative Arbitrage	Cost of Dead Time
Global Proceeds Escrow:							
233,965,454.12	2.112	49,395.44	1.421939%	1.421939%	233,965,427.89	26.17	0.06
233,965,454.12		49,395.44			233,965,427.89	26.17	0.06

Delivery date	07/15/2020
Arbitrage yield	1.421944%
Composite Modified Duration	2.112

This is the difference in the net present values of the escrow receipts discounted at the arbitrage yield and the escrow yield to receipt date. Negative arbitrage occurs when the available market rates are below the arbitrage yield. This inability to earn sufficiently high rates results in higher escrow costs as the escrow must generate sufficient receipts to fund the requirements whether they are from principal or from interest. Consequently, the escrow will buy more securities (more principal) at the lower earning rates.

This is the loss due to uninvested cash balances in the escrows. This is the net present value of all lost earnings (at the arbitrage yield) for all uninvested cash balances. The dead time here is negligible but reflects the differences in timing between the receipt date of the escrow and the requirement dates. SLG escrows tend to have less dead time because the maturity dates are user-defined, the minimum denomination of $1 (after the first $1,000 for each maturity) is very low and can be set to match the requirement dates exactly.

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PROOF OF COMPOSITE ESCROW YIELD

ABC County
SLGS-Full Defeasance 2011 and 2013

All restricted escrows funded by bond proceeds

Date	Security Receipts	Rollovers	Net Escrow Receipts	PV Factor	Present Value to 07/15/2020 @ 1.4219385518%
01/01/2021	95,982,972.26	-	95,982,972.26	0.993487779	95,357,909.89
07/01/2021	2,932,392.29	-	2,932,392.29	0.986474250	2,892,729.48
01/01/2022	8,632,392.44	-	8,632,392.44	0.979510233	8,455,516.73
07/01/2022	2,797,017.18	-	2,797,017.18	0.972595379	2,720,365.98
01/01/2023	126,529,505.68	(23,797,188.00)	102,732,317.68	0.965729340	99,211,613.32
07/01/2023	38,321.12	(38,321.00)	0.12	0.958911772	0.12
01/01/2024	38,321.12	(38,321.00)	0.12	0.952142332	0.11
07/01/2024	38,321.12	(38,321.00)	0.12	0.945420682	0.11
01/01/2025	38,321.12	(38,321.00)	0.12	0.938746483	0.11
07/01/2025	38,321.12	(38,322.00)	(0.88)	0.932119400	(0.82)
01/01/2026	38,321.12	(38,321.00)	0.12	0.925539101	0.11
07/01/2026	38,321.12	(38,321.00)	0.12	0.919005256	0.11
01/01/2027	38,321.12	(38,321.00)	0.12	0.912517537	0.11
07/01/2027	38,321.12	(38,321.00)	0.12	0.906075618	0.11
01/01/2028	4,009,421.12	24,142,078.00	28,151,499.12	0.899679175	25,327,317.51
	241,228,591.05	0.00	241,228,591.05		233,965,453.00

Escrow Cost Summary

Purchase date	07/15/2020
Purchase cost of securities	233,965,453.00
Target for yield calculation	233,965,453.00

The escrow yield discounts the net receipts to the purchase cost of securities.

OMS ANALYSIS

OMS or Open Market Securities are US Treasury and US Agency securities currently for sale in the secondary market. The yields on the US Treasury securities (bills, bonds, notes, and STRIPs) are 1/8th of a percent (.125%) higher than SLGS (which are also backed by the US Treasury) as the rate on SLGS is pegged to that on Treasuries. There are situations when the yields available on securities used for escrows are lower than the yield on the bonds sold to fund the escrow. This is known as negative arbitrage because you are earning less than your allowable yield, consequently, you are investing at a loss.

Open market securities are usually used when the yield on a SLGS escrow is lower than the arbitrage yield even when investing each SLG at the maximum rate. OMS offer a small boost (increase) in yield which, if the cash flows match the requirements well, could reduce the cost of the escrow making it cheaper than a SLGS escrow.

The primary disadvantage of using OMS is that the buyer has no control over the interest rates or the maturity dates. This often creates inefficiencies. However, if there is sufficient negative arbitrage, a portfolio with OMS could still be less expensive than one with SLGS.

❖ FILE MENU - OMS DATAFILE

Below is a partial list of US Treasury securities sold on the open market published by Street Software Technologies. These are priced on July 24, 2019 for delivery on July 25, 2019.

SAMPLE - US Treasury Notes and Bonds

Type of Security	CUSIP or other ID	Maturity Date	Interest Rate	Purchase Yield	Purchase Price	Interest Class
TNote	912828TH3	7/31/2019	0.00875	0	100.0156	Periodic
TNote	912828WW6	7/31/2019	0.01625	0.00864	100.0156	Periodic
TNote	9128282K5	7/31/2019	0.01375	0.00874	100.0156	Periodic
TNote	912828LJ7	8/15/2019	0.03625	0.01803	100.1094	Periodic
TBond	912810ED6	8/15/2019	0.08125	0.03181	100.2813	Periodic
TNote	9128282B5	8/15/2019	0.0075	0.01789	99.9375	Periodic
TNote	912828TN0	8/31/2019	0.01	0.02012	99.89063	Periodic
TNote	912828D80	8/31/2019	0.01625	0.02075	99.95313	Periodic
TNote	9128282T6	8/31/2019	0.0125	0.02073	99.92188	Periodic
TNote	9128282G4	9/15/2019	0.00875	0.02066	99.82813	Periodic
TNote	912828TR1	9/30/2019	0.01	0.02022	99.8125	Periodic
TNote	912828F39	9/30/2019	0.0175	0.02092	99.9375	Periodic
TNote	9128282X7	9/30/2019	0.01375	0.02041	99.875	Periodic
TNote	912828T59	10/15/2019	0.01	0.0193	99.79688	Periodic

SAMPLE - US Treasury STRIPs

Type of Security	CUSIP or other ID	Maturity Date	Interest Rate	Purchase Yield	Purchase Price	Interest Class
TSTRIP-I	912834LQ9	7/31/2019	0	0.02279	99.962	Zero Coupon
TSTRIP-P	912820RS8	7/31/2019	0	0.00708	99.988	Zero Coupon
TSTRIP-P	912820P50	7/31/2019	0	0.01515	99.975	Zero Coupon
TSTRIP-P	9128207Q4	7/31/2019	0	0.01668	99.972	Zero Coupon
TSTRIP-I	912833KW9	8/15/2019	0	0.0225	99.87	Zero Coupon
TSTRIP-P	912803AR4	8/15/2019	0	0.0224	99.87	Zero Coupon
TSTRIP-P	912820UD7	8/15/2019	0	0.02033	99.882	Zero Coupon
TSTRIP-P	9128203F2	8/15/2019	0	0.01439	99.917	Zero Coupon

❖ Downloading OMS Files

DBC Finance uses Street Software Technologies to provide end of day pricing for OMS files. Downloading these files requires a username and password which must be entered in the Tools-Preferences-Internet Settings window.

If you do not know your firms OMS login information you can reach out to DBC Support who will provide you with the necessary information.

With your login information entered, go to Tools-Security Universe or hit the Secs [icon] icon on the tool bar. In the OMS Files window, use to dropdown to download the July 24, 2019 file.

❖ OPEN MENU - COPY

✱ **Press CTRL-O for O**PEN** or go to the F**ILE** menu and select O**PEN**.**

✋ **NOTE -** You will use the Present Value analysis as the base case for this analysis. You will make copies each time of the PV case and rename them as instructed. Remember you can also use the **S**AVE **A**S command to save the (already saved and currently loaded) PV case as a different case.
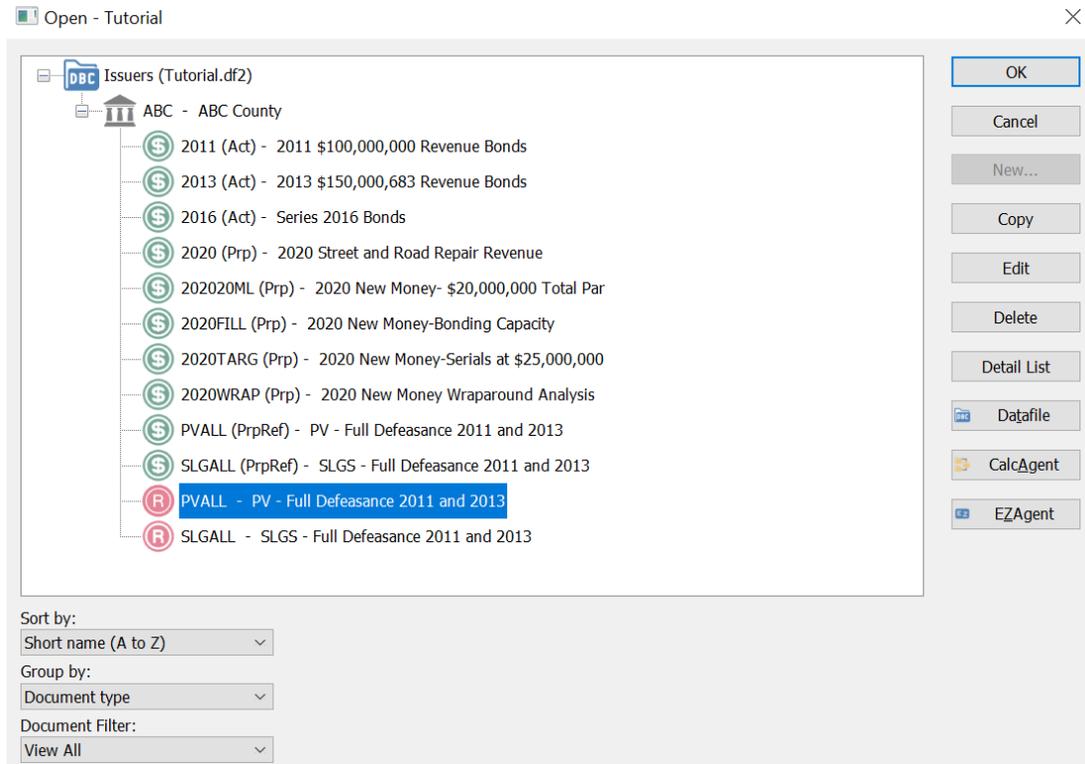
✱ **Place the cursor on the present value case (PVALL). Click on C**OPY**.**
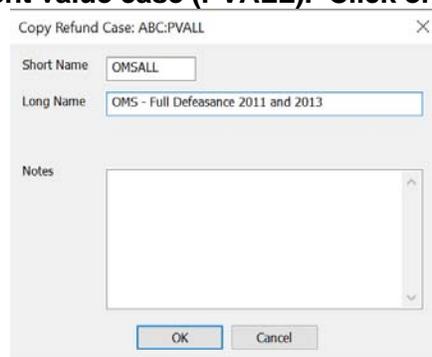
✱ **Type "OMSALL" (short), then ENTER, and "OMS - Full Defeasance 2011 and 2013" (long name). Click OK then double click on OMSALL in the list to open it.**

❖ DATA MENU - REFUND ASSUMPTIONS – ESCROW SOL'N PARAMETERS

Escrow solution parameters determines the data source used for the default escrow solution method for the current Case. For this analysis, we define where to get the OMS data to use, how to adjust price and yield, and when to generate zero coupon SLGS.

✱ **Select REFUND ASSUMPTIONS SETUP from the DATA menu**

		Refund Assumptions

Escrow Solution Parameters | Global Proceeds Escrow | Notes

Default for 'Available Securities' `OMS only ▾`
Escrow purchase date `New delivery date ▾`

SLGS solution parameters
SLGS rates file `Current ▾`
Allocate SLGS rates `Default ▾`

OMS solution parameters
Available OMS `Datafile selections ▾` `...`
OMS file
If prices and yields conflict `Use yield to calculate price ▾`

PV solution parameters
Maximum PV rate `_____`

Funding option `Net funded ▾`

`OK` `Cancel` `Advanced`

✱ **Select "OMS only" as the Default for Available Securities.**

✱ **Under OMS Solution Parameters, set "Available OMS" to "Datafile Selections" and hit the detail button. Select the "20190724" file from the "OMS Selections" window.**

✱ **Go to "If prices and yields conflict" and select "Use yield to calculate price".**

❖ **DATA MENU - REFUND ASSUMPTIONS - OMS SELECTION**

Select the Detail button ⋯ for the Available OMS section. In this dialog you select which datafile files to use as sources for structuring open market investments.

```
OMS Selections
┌──────────────────────────────────────────────┐
│ OMS Selections │ OMS Filter                   │
├──────────────────────────────────────────────┤
│ ■▢ 20190724            SST US Govt Securitie  │
│ ▢▢ ABC                 OPEN MARKETS FOR       │
│ ▢▢ UNIVERSE            SST US Govt Securitie   │
│                                                │
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│ ‹                                          ›   │
├──────────────────────────────────────────────┤
│  OK    Cancel                        ‹   ›     │
└──────────────────────────────────────────────┘
```
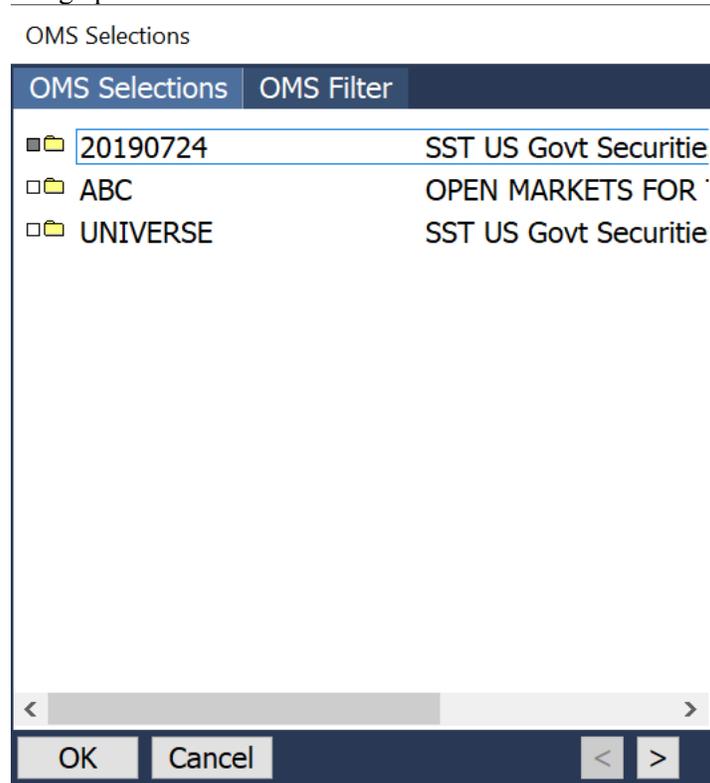
* **Click on the selection box of "20190724" until it is grey (select all). Click on OK. Save the case. Click on CALCULATE button. Click OK on any previously discussed warnings.**

❖ REFUND SOLUTION STATUS

Once the analysis is completed, the following dialog appears. It summarizes the results of the analysis. The total savings amount is the net present value savings.

New Bond Series:	OMSALL
Delivery Date:	Jul 15, 2020
Arbitrage Yield:	1.421944%
Escrow Yield:	1.421930%
PV of prior ds:	295,369,115.90
Total Savings:	59,131,419.24
Savings % of refunded bonds:	28.126%

Bond Par Amount:	192,573,359.35	Cost of Projects:	-
Bond Adjustments:	44,303,035.16	Cost of Escrow:	233,965,676.38
Other Sources:	75,000.00	Expenses:	2,688,174.71
Equity Contribution:	-	Reserve Funds:	297,373.61
Funds on hand:	-	Other Uses:	-
		Additional funds:	169.81

Calculation Complete

OK

* **Click OK. Click on PRINT and then PACKETS - LOAD. Select the packet called "REFDET" and print or view it. Click on OK if any of the previously discussed WARNINGS appear. The reports below are only a portion of the report packet.**

SOURCES AND USES OF FUNDS

ABC County
OMS-Full Defeasance 2011 and 2013

Dated Date	07/01/2020
Delivery Date	07/15/2020

Sources:

Bond Proceeds:
Par Amount	192,573,359.35
Accrued Interest	297,373.61
Premium	44,005,661.55
	236,876,394.51

Other Sources of Funds:
Issuer Contribution	75,000.00
	236,951,394.51

Uses:

Refunding Escrow Deposits:
Cash Deposit	730.89
Open Market Purchases	233,964,945.49
	233,965,676.38

Other Fund Deposits:
Accrued Interest	297,373.61

Delivery Date Expenses:
Cost of Issuance	250,000.00
Underwriter's Discount	2,022,020.28
Insurance for Term Bond	416,154.43
	2,688,174.71

Other Uses of Funds:
Additional Proceeds	169.81
	236,951,394.51

SUMMARY OF REFUNDING RESULTS

ABC County
OMS-Full Defeasance 2011 and 2013

Dated Date	07/01/2020
Delivery Date	07/15/2020
Arbitrage yield	1.421944%
Escrow yield	1.421930%
Value of Negative Arbitrage	70.57
Bond Par Amount	192,573,359.35
True Interest Cost	1.529103%
All-In TIC	1.542442%
Average Life	9.096
Weighted Average Maturity	9.482
Duration	8.062
Par amount of refunded bonds	203,920,683.65
Value of refunded bonds on 7/15/2020	210,239,793.88
Average coupon of refunded bonds	5.888691%
Average life of refunded bonds	8.830
Remaining weighted average maturity of refunded bonds	8.832
PV of prior debt to 07/15/2020 @ 1.421944%	295,369,115.90
Net PV Savings	59,131,419.24
Percentage savings of refunded bonds	28.125703%

SAVINGS

ABC County
OMS-Full Defeasance 2011 and 2013

Date	Prior Debt Service	Refunding Debt Service	Refunding Receipts	Refunding Net Cash Flow	Savings	Present Value to 07/15/2020 @ 1.4219438%
01/01/2021	13,342,572.50	11,433,375.00	297,373.61	11,136,001.39	2,206,571.11	2,194,137.95
01/01/2022	18,990,355.00	15,171,250.00	-	15,171,250.00	3,819,105.00	3,752,165.59
01/01/2023	19,206,955.00	15,386,000.00	-	15,386,000.00	3,820,955.00	3,701,151.34
01/01/2024	19,450,605.00	15,630,250.00	-	15,630,250.00	3,820,355.00	3,648,471.87
01/01/2025	19,702,240.00	15,881,000.00	-	15,881,000.00	3,821,240.00	3,597,857.66
01/01/2026	19,970,535.00	16,151,250.00	-	16,151,250.00	3,819,285.00	3,545,258.24
01/01/2027	20,259,512.50	16,443,250.00	-	16,443,250.00	3,816,262.50	3,492,384.27
01/01/2028	20,577,340.00	16,759,000.00	-	16,759,000.00	3,818,340.00	3,444,805.06
01/01/2029	20,907,577.50	17,090,250.00	-	17,090,250.00	3,817,327.50	3,395,059.65
01/01/2030	21,267,995.00	17,449,000.00	-	17,449,000.00	3,818,995.00	3,348,213.24
01/01/2031	21,654,815.00	17,836,500.00	-	17,836,500.00	3,818,315.00	3,299,905.06
01/01/2032	22,072,415.00	18,251,500.00	-	18,251,500.00	3,820,915.00	3,252,643.88
01/01/2033	22,522,990.00	18,706,500.00	-	18,706,500.00	3,816,490.00	3,199,897.20
01/01/2034	18,464,979.03	14,646,500.00	-	14,646,500.00	3,818,479.03	3,153,016.16
01/01/2035	18,542,004.00	14,723,250.00	-	14,723,250.00	3,818,754.00	3,109,276.92
01/01/2036	18,639,157.15	14,820,500.00	-	14,820,500.00	3,818,657.15	3,065,817.87
01/01/2037	8,584,300.53	4,765,500.00	-	4,765,500.00	3,818,800.53	3,023,125.68
01/01/2038	8,420,193.09	4,599,000.00	-	4,599,000.00	3,821,193.09	2,983,061.77
	332,576,541.30	265,743,875.00	297,373.61	265,446,501.39	67,130,039.91	59,206,249.43

Savings Summary

Dated Date	07/01/2020
Delivery Date	07/15/2020
PV of savings from cash flow	59,206,249.43
Less: Prior funds on hand	(75,000.00)
Plus: Refunding funds on hand	169.81
Net PV Savings	59,131,419.24

ESCROW DESCRIPTIONS

ABC County
OMS-Full Defeasance 2011 and 2013

Type of Security	CUSIP or ID	Type of SLGS	Maturity Date	First Int Pmt Date	Par Amount	Rate	Yield	Price	Dated Date	Cost	Accrued Interest	Total Cost
Jul 15, 2020:												
TSTRIP-I	912834NC8		12/31/2020	-	94,607,000	0.000%	2.055%	99.065000	-	93,722,424.55	-	93,722,424.55
Agency	3130AGDA0		04/30/2021	10/30/2019	1,555,000	2.625%	2.624%	99.998700	04/29/2019	1,554,979.79	8,503.91	1,563,483.70
TSTRIP-I	912834PE2		12/31/2021	-	7,276,000	0.000%	1.854%	97.343000	-	7,082,676.68	-	7,082,676.68
TNote	912828XG0		06/30/2022	-	1,441,000	2.125%	1.783%	100.655271	-	1,450,442.46	1,248.15	1,451,690.61
TNote	912828N30		12/31/2022	-	126,208,000	2.125%	1.792%	100.797299	-	127,214,255.12	109,317.39	127,323,572.51
RSTRIP-I	76116EHJ2		10/15/2027	-	3,334,000	0.000%	2.317%	84.616000	-	2,821,097.44	-	2,821,097.44
					234,421,000					233,845,876.04	119,069.45	233,964,945.49
Oct 30, 2020:												
SLGS		Rollover Cert	01/01/2021	-	21,140	0.000%	-	-	-	-	-	21,140.00
Dec 31, 2020:												
SLGS		Rollover Cert	07/01/2021	-	1,438	0.000%	-	-	-	-	-	1,438.00
Apr 30, 2021:												
SLGS		Rollover Cert	07/01/2021	-	1,575,409	0.000%	-	-	-	-	-	1,575,409.00
Dec 31, 2022:												
SLGS		Rollover Note	01/01/2028	-	24,817,499	0.000%	-	-	-	-	-	24,817,499.00
Oct 15, 2027:												
SLGS		Rollover Cert	01/01/2028	-	3,334,000	0.000%	-	-	-	-	-	3,334,000.00
					264,170,486					233,845,876.04	119,069.45	263,714,431.49

SLGS Summary

Total Rollover SLGS   29,749,486.00

Zero coupon SLGs are purchased to blend down the yield.

Note that the securities are all multiples of $1,000. This is set in Denomination column in the OMS Datafile. You would change this if you wanted to only buy securities in multiples of $5,000, for example.

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ESCROW COST

ABC County
OMS-Full Defeasance 2011 and 2013

Type of Security	Maturity Date	Par Amount	Rate	Yield	Price	Cost	Accrued Interest	Total Cost
TSTRIP-I	12/31/2020	94,607,000	0.000%	2.055%	99.065000	93,722,424.55	-	93,722,424.55
Agency	04/30/2021	1,555,000	2.625%	2.624%	99.998700	1,554,979.79	8,503.91	1,563,483.70
TSTRIP-I	12/31/2021	7,276,000	0.000%	1.854%	97.343000	7,082,676.68	-	7,082,676.68
TNote	06/30/2022	1,441,000	2.125%	1.783%	100.655271	1,450,442.46	1,248.15	1,451,690.61
TNote	12/31/2022	126,208,000	2.125%	1.792%	100.797299	127,214,255.12	109,317.39	127,323,572.51
RSTRIP-I	10/15/2027	3,334,000	0.000%	2.317%	84.616000	2,821,097.44	-	2,821,097.44
		234,421,000				233,845,876.04	119,069.45	233,964,945.49

Purchase Date	Cost of Securities	Cash Deposit	Total Escrow Cost	Yield
07/15/2020	233,964,945.49	730.89	233,965,676.38	1.421930%
	233,964,945.49	730.89	233,965,676.38	

Cash deposits are usually less than $1,000 unless the first escrow requirement is before the first available Treasury maturity date. Also, this could be up to $10,000 if the first requirement is less than the smallest Treasury minimum amount for purchase.

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ESCROW CASH FLOW

ABC County
OMS-Full Defeasance 2011 and 2013

Date	Principal	Interest	Rollovers	Net Escrow Receipts	PV Factor	Present Value to 07/15/2020 @ 1.4219296%
10/30/2020	-	20,409.38	(21,140.00)	(730.62)	0.995875906	(727.61)
12/31/2020	94,607,000.00	1,356,270.63	(1,438.00)	95,961,832.63	0.993487819	95,336,911.85
01/01/2021	-	-	21,140.00	21,140.00	0.993487819	21,002.33
04/30/2021	1,555,000.00	20,409.38	(1,575,409.00)	0.38	0.988845563	0.38
06/30/2021	-	1,356,270.63	-	1,356,270.63	0.986513161	1,337,978.83
07/01/2021	-	-	1,576,847.00	1,576,847.00	0.986474334	1,555,519.09
12/31/2021	7,276,000.00	1,356,270.63	-	8,632,270.63	0.979510361	8,455,398.52
06/30/2022	1,441,000.00	1,356,270.63	-	2,797,270.63	0.972633829	2,720,720.04
12/31/2022	126,208,000.00	1,340,960.00	(24,817,499.00)	102,731,461.00	0.965729552	99,210,807.79
10/15/2027	3,334,000.00	-	(3,334,000.00)	-	-	-
01/01/2028	-	-	28,151,499.00	28,151,499.00	0.899679774	25,327,334.26
	234,421,000.00	6,806,861.28	0.00	241,227,861.28		233,964,945.49

Escrow Cost Summary

Purchase date	07/15/2020
Purchase cost of securities	233,964,945.49
Target for yield calculation	233,964,945.49

ESCROW SUFFICIENCY

ABC County
OMS-Full Defeasance 2011 and 2013

Date	Escrow Requirement	Net Escrow Receipts	Excess Receipts	Excess Balance
07/15/2020	-	730.89	730.89	730.89
10/30/2020	-	(730.62)	(730.62)	0.27
12/31/2020	-	95,961,832.63	95,961,832.63	95,961,832.90
01/01/2021	95,982,972.50	21,140.00	(95,961,832.50)	0.40
04/30/2021	-	0.38	0.38	0.78
06/30/2021	-	1,356,270.63	1,356,270.63	1,356,271.41
07/01/2021	2,932,392.50	1,576,847.00	(1,355,545.50)	725.91
12/31/2021	-	8,632,270.63	8,632,270.63	8,632,996.54
01/01/2022	8,632,392.50	-	(8,632,392.50)	604.04
06/30/2022	-	2,797,270.63	2,797,270.63	2,797,874.67
07/01/2022	2,797,017.50	-	(2,797,017.50)	857.17
12/31/2022	-	102,731,461.00	102,731,461.00	102,732,318.17
01/01/2023	102,732,317.50	-	(102,732,317.50)	0.67
01/01/2028	28,151,499.67	28,151,499.00	(0.67)	0.00
	241,228,592.17	241,228,592.17	0.00	

Large short-term balances are common with OMS escrows. These should usually last between 1 and 60 days. A balance of $1,000 or more should not sit uninvested for more than 6 months.

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ESCROW STATISTICS

ABC County
OMS-Full Defeasance 2011 and 2013

Total Escrow Cost	Modified Duration (years)	PV of 1 bp change	Yield to Receipt Date	Yield to Disbursement Date	Perfect Escrow Cost	Value of Negative Arbitrage	Cost of Dead Time
Global Proceeds Escrow:							
233,965,676.38	2.112	49,394.24	1.421930%	1.421895%	233,965,427.89	70.57	177.92
233,965,676.38		49,394.24			233,965,427.89	70.57	177.92

Delivery date	07/15/2020
Arbitrage yield	1.421944%
Composite Modified Duration	2.112

This is the loss due to the large uninvested cash balances in the escrow.

PROOF OF COMPOSITE ESCROW YIELD

ABC County
OMS-Full Defeasance 2011 and 2013

All restricted escrows funded by bond proceeds

Date	Security Receipts	Rollovers	Net Escrow Receipts	PV Factor	Present Value to 07/15/2020 @ 1.4219295657%
10/30/2020	20,409.38	(21,140.00)	(730.62)	0.995875906	(727.61)
12/31/2020	95,963,270.63	(1,438.00)	95,961,832.63	0.993487819	95,336,911.85
01/01/2021	-	21,140.00	21,140.00	0.993487819	21,002.33
04/30/2021	1,575,409.38	(1,575,409.00)	0.38	0.988845563	0.38
06/30/2021	1,356,270.63	-	1,356,270.63	0.986513161	1,337,978.83
07/01/2021	-	1,576,847.00	1,576,847.00	0.986474334	1,555,519.09
12/31/2021	8,632,270.63	-	8,632,270.63	0.979510361	8,455,398.52
06/30/2022	2,797,270.63	-	2,797,270.63	0.972633829	2,720,720.04
12/31/2022	127,548,960.00	(24,817,499.00)	102,731,461.00	0.965729552	99,210,807.79
10/15/2027	3,334,000.00	(3,334,000.00)	-	-	-
01/01/2028	-	28,151,499.00	28,151,499.00	0.899679774	25,327,334.26
	241,227,861.28	0.00	241,227,861.28		233,964,945.49

Escrow Cost Summary

Purchase date	07/15/2020
Purchase cost of securities	233,964,945.49
Target for yield calculation	233,964,945.49

❖ ANALYZING YOUR RESULTS

You have now run the same refunding analysis using three different assumptions for the escrow investments. The next step is to analyze your results. There are several questions you should be able to answer about the analyses:

1.   Which solution gave you the best "deal"? - (which one cost the issuer the least and therefore, created the highest amount of savings)

2.   Which escrow is most efficient? - (which one's maturity dates best matches the timing of your cash flow requirements)

3.   Which escrow has the highest yield?

4.   Does the escrow with the highest yield have the lowest cost? When would this not be the case?

5.   Do the escrows earn as much as the arbitrage yield using SLGs or open markets? What would account for this?

Summary of Refunding Analysis Results

Type of Analysis	Par Amount	Arbitrage Yield	Escrow Yield	Cost of Escrow	Savings
Present Value	$189,038,288.10	1.420943%	1.420943%	$229,520,448.05	$63,637,881.49
SLGS	$189,038,288.10	1.420943%	1.420937%	$229,520,473.16	$63,637,856.38
OMS	$189,038,288.10	1.420943%	1.420934%	$229,520,664.24	$63,637,665.30

1.   The par amount across all three scenarios is the same, so we cannot judge which deal is best based on cost to the issuer. Remember, the par amount is not an even $5,000 denomination because of the CAB bond component.

2.   The SLGS match the escrow requirements the best but are inefficient because there are interest receipts from the SLGS every six months from 7/1/21 through 7/1/27 that don't match any requirements because there are none in those periods. These receipts are uninvested at zero. This loss of income is inefficient.

3.   The OMS escrow has a lower yield than the SLGS escrow.
4.   In this example, the escrow with the higher yield also happens to be the one with the lower cost. This is not, however, always the case. To understand how an escrow with a high yield can be <u>more</u> expensive than one with a lower yield, please read the topic "Inefficiency in the timing of escrow" on page 146.

5.   The SLGS & OMS escrows earns almost as much as the arbitrage yield but it is not exact. It doesn't match because when you purchase actual securities, they have to be purchased in multiples of $1 for SLGS and $1,000 or more for Treasury's. This creates cash flows which never exactly match the requirements to the penny. They are always a bit larger. If the securities were available in denominations of a penny (meaning you can buy $1,365.23 of a T-Bond) you'd be able to match the requirements more closely and the yield (if rates are high enough) could be even closer to the arbitrage yield.

There are several factors that can make a deal that would seem to, at quick glance, have savings not have them. These are:

High redemption premiums - the redemption premium is an additional cost of refinancing and is paid on the call date. It is, in effect, a prepayment penalty. The higher the premium is, the more money needs to be set aside today from bond proceeds (thereby increasing the refunding par amount). For example, if **TODAY** you were refunding 8% 1-year debt with 6% 1-year debt, it would seem that you have approximately 2% savings in interest. However, if the redemption premium of the 8% bonds is 2%, it will now cost you 6% to refinance plus 2% for the redemption premium. The perceived 2% interest savings is now diminished by the cost of the redemption premium. Keep in mind, however, that for longer term financings the cumulative effect of saving 2% annually in interest costs over an extended period of time could easily exceed the one-time cost of the redemption premium.

High costs of issuance on the refinancing - the impact of high issuance costs is the same as that of high redemption premiums except that it usually is paid in addition to the premiums and thereby diminishes the savings even further. If **TODAY**, for example, you were refunding 8% 1-year debt with 6% 1-year debt and had no redemption premium, it would seem that you have 2% savings. If your costs of issuance are 2.5% you would have a .5% cost (instead of savings). If in addition, you had a 2% redemption premium, you would now have 2.5% **dissavings** (or cost).

Savings	2.0%
Costs of Issuance	+(2.5%)

Net Savings/(Cost)	(.5%)
Plus	
Redemption Premium	(2.0%)

Total Net Savings/(Cost)	(2.5%)

NOTE - This is an overly simplistic view of this issue but should help you understand the problem in general terms. This example doesn't account for the impact of saving 2% in interest every year for many years as the cumulative effect of this greatly offsets the upfront costs incurred in doing a refunding.

Long period before the call date - economic refundings are based on the premise that higher interest rate debt can be replaced by lower interest rate debt, thereby, effecting savings. This only happens the instant that the higher interest cash flow can be stopped (or the meter stops ticking, so to speak) and the new lower rate can take effect. When a home owner refinances their mortgage, they generate savings because they can usually prepay (or a call) their mortgage right away. With respect to municipal bonds, that moment comes when a bond is optionally redeemed. The longer the gap between the refinancing and the actual moment of redemption, the later it will be before the refinancing generates any benefit in the form of d/s savings.

Negative arbitrage (market reinvestment rates lower than your allowable reinvestment rate) this has a tremendous impact on your refinancing because it means that no matter how high your arbitrage yield could be, there would be no way for you to buy securities that yield as much as the limit for your escrow. In effect, you would be funding your escrow at a loss (loss = what you could have earned less what you actually earn). This affects your cost of escrow by increasing it. The less the securities earn, the more principal you need to have to make up for the lost interest. In the example below, a purchase date of 1/1/20 is assumed and the costs of escrow are computed using the present value of the requirement at the respective yields and assuming 30/360-day basis and annual compounding.

	Requirement	Cost of Escrow using OMS @ 4.00%	Cost of Escrow using Arb Yld. @ 6.00%	Difference
1/1/20	$1,000,000	$961,538.46	$943,396.23	$18,142.23

In the above example, we are comparing the cost of funding a requirement due in one year of $1,000,000 using the open market rate of 4.00% vs. assuming we could earn the arbitrage yield of 6.00%. Notice that if we could earn the 6.00%, we would save $18,142.23 on the cost of the escrow. In a negative arbitrage environment, market rates are below the allowable investment yield (arbitrage yield).

Inefficiency in the timing of escrow - this occurs when investments purchased for the escrow mature several days or more before the disbursement date (date money is actually spent) of the escrow which means that this cash received on the receipt date (date money is received from investment) is reinvested at a rate of 0% until the disbursement date. This has a very subtle but very costly effect on the escrow. SLGs are an excellent way to avoid timing inefficiencies because they are the only investment vehicle for which the buyer can set the maturity date to match the disbursement date. In the example below, we compare two securities with the same interest rate and yield. Their maturity dates, however, are different. We are assuming a $1,000,000 requirement is due in 1/1/21 and we are buying a zero coupon security on 1/1/20. Try this exercise with your calculator. Discount the cash flow at maturity for each security back to 1/1/20 at 6.00%. Assume 30/360 day count basis and semiannual compounding.

	Zero-coupon with a yield of 6.00% Security matures 12/1/20		Zero-coupon with a yield of 6.00% Security matures 1/1/21	
Dates	**Cash flow**	**Cost**	**Cash flow**	**Cost**
1/1/20		$947,251		$942,596
12/1/20	$1,000,000			
1/1/21			$1,000,000	

Yield to Receipt	6.000%	6.000%
Yield to Disbursement	5.493%	6.000%

The main problem in the example above is that although both securities have the same rate of return, the security that matures on 12/1/20 earns 6% for 11 months instead of 12 months. The 12/1/20 security matures one month before the escrow payment of $1,000,000 must be made.   In effect, the money received from the maturing 12/1/20 security sits idle and uninvested until the money is drawn out of the account. This inefficiency raises the cost of the escrow another $4,655. The security maturing 1/1/21 is cheaper and preferable.   Any security maturing 1/1/21 could have any rate between 5.493% (yield to disbursement on the 12/1/20 security) and 6.000% and still be cheaper than the one maturing 12/1/20.

Now that you understand these concepts, let's review the results of the three analyses. Following are the ESCROW STATISTICS reports from the three runs. This report is critical because it displays the dollar amounts of your escrow's inefficiency. The statistics in this report will enable you to see where your escrow could use improvement. The formulas for the most important statistics are as follows:

Total Escrow Cost - cost of escrow securities (including premiums or discounts), accrued interest on the securities, and the cash deposit.

Perfect Escrow Cost - requirements discounted at arbitrage yield. Is called "perfect" because it is the absolute lowest cost for an escrow whose yield does not violate the arbitrage yield (because it's equal to it).

Value of Negative Arbitrage - total escrow cost less the PV of escrow receipts at the arbitrage yield.

Cost of Dead Time - total escrow cost less perfect escrow cost less negative arbitrage.

Present Value Analysis

Total Escrow Cost	Modified Duration (years)	Yield to Receipt Date	Yield to Disbursement Date	Perfect Escrow Cost	Negative	Value of Arbitrage	Cost of Dead Time
Global Proceeds Escrow:							
229,520,448.05	2.009	1.420973%	1. 420973%	229,520,448.05			
229,520,448.05				229,520,448.05			

Arbitrage yield   1.420973%

The present value run has no inefficiencies because the escrow cost is simply the present value of the requirement at the maximum allowable rate (the arbitrage yield). Notice that the escrow cost is equal to the perfect escrow cost.

SLGS Analysis

Total Escrow Cost	Modified Duration (years)	Yield to Receipt Date	Yield to Disbursement Date	Perfect Escrow Cost		Value of Negative Arbitrage	Cost of Dead Time
Global Proceeds Escrow:							
229,520,473.16	2.009	1.420937%	1.420937%	229,520,448.05		25.04	0.07
229,520,473.16				229,520,448.05	25.04	0.07	

Arbitrage yield   1.420973%

The SLGS run has a small amount of negative arbitrage and very little dead time. This tells us that the maximum rates available for SLGS were close the arbitrage yield AND that there was no timing inefficiency (negligible). The only way to improve this escrow is to find slightly higher yielding securities that can be used in the escrow with the same maturity dates as the SLGS.

Open Market Securities Analysis

Total Escrow Cost	Modified Duration (years)	Yield to Receipt Date	Yield to Disbursement Date	Perfect Escrow Cost		Value of Negative Arbitrage	Cost of Dead Time
Global Proceeds Escrow:							
229,520,664.24	2.009	1.420934%	1. 420934%	229,520,448.05		42.21	174.98
229,520,664.24				229,520,448.05	42.21	174.98	

Arbitrage yield   1.420973%

The OMS run has also fairly little negative arbitrage and cost of dead time, however, both are higher when compared to the SLGS run, especially the Cost of Dead Time. This run had better yielding securities but the escrow could have been improved if there were securities available that not only had higher rates but that also matured closer to the disbursement dates.

******* ADVANCED ANALYSIS I *******

❖ PARTIAL REFUNDING - NEW DEBT WRAPS AROUND UNREFUNDED

It is very common to refund only portions of the outstanding bond issues instead of refunding whole issues. This is usually done to increase savings economic benefit or for debt restructuring purposes as there would not be a legal defeasance of the bond issue unless ALL the maturities were defeased. DBC makes partial refundings extremely simple because you can select only those maturities that you wish to refund yet the program will still keep track of the unrefunded bonds. The goal of this analysis is to amortize the new debt in such a way that the sum of the new debt and the unrefunded debt service is level. This wraparound is comparable to the one you did in the *Debt/Size* Tutorial - Advanced Analysis I.

ASSUMPTIONS

Using open markets, refund only the callable bonds for the 2011 and 2013 bond issues as follows:

1. Run the analysis only for level savings without regard for the resulting aggregate debt service.
2. Wrap the new bonds around the unrefunded bonds to achieve total level debt service

The optional redemption provisions in the O.S. contain all information relevant to callable bonds. For this analysis, the callable bonds are listed below. Please read the O.S.'s on pages 16-21 and verify this.

Bond	Maturity Date	Interest Rate	Par Amount	Value on 7/15/2020	Call Date	Call Price
		2011 $100,000,000 Revenue Bonds:				
SERIALS	1/01/2022	4.600%	2,775,000.00	2,775,000.00	1/01/2021	102.000
SERIALS	1/01/2023	4.700%	3,010,000.00	3,010,000.00	1/01/2021	102.000
SERIALS	1/01/2024	4.950%	3,270,000.00	3,270,000.00	1/01/2021	102.000
SERIALS	1/01/2025	5.100%	3,555,000.00	3,555,000.00	1/01/2021	102.000
SERIALS	1/01/2026	5.250%	3,865,000.00	3,865,000.00	1/01/2021	102.000
SERIALS	1/01/2027	5.400%	4,210,000.00	4,210,000.00	1/01/2021	102.000
SERIALS	1/01/2028	5.500%	4,590,000.00	4,590,000.00	1/01/2021	102.000
SERIALS	1/01/2029	5.650%	5,005,000.00	5,005,000.00	1/01/2021	102.000
SERIALS	1/01/2030	5.800%	5,460,000.00	5,460,000.00	1/01/2021	102.000
SERIALS	1/01/2031	6.000%	5,965,000.00	5,965,000.00	1/01/2021	102.000
TERM	1/01/2035	6.100%	39,315,000.00	39,315,000.00	1/01/2021	102.000
			81,020,000.00	81,020,000.00		
		2013 $150,000,683.65 Revenue Bonds:				
SERIALS	1/01/2024	5.100%	6,500,000.00	6,500,000.00	1/01/2023	102.000
SERIALS	1/01/2025	5.250%	6,960,000.00	6,960,000.00	1/01/2023	102.000
SERIALS	1/01/2026	5.400%	7,465,000.00	7,465,000.00	1/01/2023	102.000
SERIALS	1/01/2027	5.550%	8,015,000.00	8,015,000.00	1/01/2023	102.000
SERIALS	1/01/2028	5.650%	8,625,000.00	8,625,000.00	1/01/2023	102.000
TERM	1/01/2033	6.000%	54,450,000.00	54,450,000.00	1/01/2023	102.000
CABTERM	1/01/2038	6.050%	11,200,683.65	20,254,281.66	1/01/2028	103.000
			103,215,683.65	112,269,281.66		
			184,235,683.65	193,289,281.66		

*   **Go to FILE OPEN and highlight OMSALL then click on COPY. Enter "OMSCALL" (short name) and "OMS – Partial Defeasance 2011 and 2013 Callable Bonds" to save your new analysis as a separate case. Select OMSCALL.**

❖ PRIOR DEBT

The key difference between this analysis and the first OMS refunding is simply the escrow requirements. The requirements are modeled in the **DATA** menu in **PRIOR DEBT**. You will edit the prior debt description currently entered to reflect that this is a partial refunding. There are two methods described below.

*   **Go to PRIOR DEBTS.**
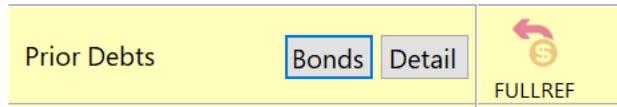
*   **Highlight FULLREF then RIGHT MOUSE CLICK and select EDIT ENTRY.**
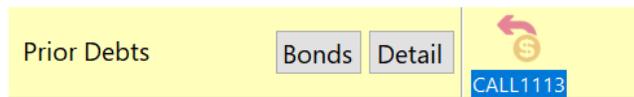
*   **Type in the new name as follows "CALL1113" (short name) and "2011 and 2013 Callable Bonds" (long name). Click OK. Double click on CALL1113 to open it.**

🖐 **NOTE -** The alternate method for editing the name is to click on **DETAILS**, select FULLALL and then press the **EDIT** dialog button.

❖ PRIOR DEBT - DEFEASANCE REQUIREMENT

The critical part of the analysis is that the debt service of the unrefunded bonds be included in the solution.

*   **Make sure INCLUDE D/S OF UNREFUNDED BONDS AS 'OTHER D/S' is checked. Select the Detail button ⋯ for From Existing Bonds.**

✋   **NOTE -** This prompt computes the debt service of all the maturities NOT selected in bond issues which are partially selected (set to SOME). For example, if you select the 2013 bonds to be partially refunded and only select the term bond, all the other maturities remain unrefunded. The unrefunded debt service is then added to any amounts in the **OTHER D/S** section in *Debt/Size* and can be optionally used for solution purposes and will always appear in the aggregate debt service report.

❖ PRIOR DEBT - SERIES SELECTION

This analysis differs from the original three in that the entire 2011 and 2013 issues are not being refunded. In addition, the unrefunded debt service will be used in the solution. This will be run in three phases to illustrate the role each prompt plays in the final results.

＊ **Click on the PRIOR DEBT - SERIES SELECTION dialog.**

Click on the series file folder to see the bond components.

Click on the box until it is half shaded. This implies that you want to select SOME bonds.

A fully shaded box implies that ALL parts are to be chosen.

Click on the bond component file folder to see the maturities.

If a maturity is set to SOME (half shaded) you can enter a specific dollar amount to refund from that maturity. This option only appears when you have ~~selected SOME~~

Prior bond debt service series selection

Series Selection

🗁 ABC	ABC County				
🗁 2011	2011 $100,000,000 Revenue Bonds				
🗁 SERIALS	Serial Bonds				
☐	01/01/2012	1,410.		3.250%	100.000
☐	01/01/2013	1,490.		3.300%	100.000
☐	01/01/2014	1,565.		3.350%	100.000
☐	01/01/2015	1,650.		3.500%	100.000
☐	01/01/2016	1,740.		3.700%	100.000
☐	01/01/2017	1,840.		3.850%	100.000
☐	01/01/2018	2,045.		4.000%	100.000
☐	01/01/2019	2,270.		4.150%	100.000
☐	01/01/2020	2,410.		4.300%	100.000
☐	01/01/2021	2,560.		4.450%	100.000
◪	01/01/2022	2,775.		4.600%	100.000
◪	01/01/2023	3,010.		4.700%	100.000
◪	01/01/2024	3,270.		4.950%	100.000
◪	01/01/2025	3,555.		5.100%	100.000
◪	01/01/2026	3,865.		5.250%	100.000
◪	01/01/2027	4,210.		5.400%	100.000
◪	01/01/2028	4,590.		5.500%	100.000
◪	01/01/2029	5,005.		5.650%	100.000
◪	01/01/2030	5,460.		5.800%	100.000
◪	01/01/2031	5,965.		6.000%	100.000
🗁 TERM	Term Bond through 2018				
🗁 2013	2013 $150,000,683 Revenue Bonds				
🗁 SERIALS	Serial bonds through 2028				
🗁 TERM	Term Bond through 2033				

OK	Cancel		<	>

＊ **You must change the bonds selected for the refunding since the original assumptions were for a full defeasance. Review pages 65-68 before starting, as well as the descriptions of the above dialog. Select the bonds to be refunded as per the refunding assumptions (all callable maturities).**

❖ REFUND SOLUTION STATUS

Once the analysis is completed, the following dialog appears. It summarizes the results of the analysis. The total savings amount is the net present value savings.

New Bond Series:	OMSCALL
Delivery Date:	Jul 15, 2020
Arbitrage Yield:	1.426508%
Escrow Yield:	1.426492%
PV of prior ds:	274,650,624.24
Total Savings:	59,251,071.21
Savings % of refunded bonds:	31.094%

Bond Par Amount:	172,860,103.40	Cost of Projects:	-
Bond Adjustments:	43,139,082.16	Cost of Escrow:	213,334,521.94
Other Sources:	75,000.00	Expenses:	2,480,031.78
Equity Contribution:	-	Reserve Funds:	259,155.56
Funds on hand:	-	Other Uses:	-
		Additional funds:	476.28

Calculation Complete

OK

* **Click OK. Go to the PRINT menu and only select the Savings, Aggregate Debt Service and Bond Solution to print. Use MODIFY to change the first two reports so they are shown annual. PRINT or VIEW these reports.**

🖐 **NOTE -** Notice on our Savings report that the savings are level BUT notice on the Aggregate Debt Service report and on the Bond Solution report that the aggregate debt service and the total adjusted debt service are not level. Remember our goal is level aggregate (overall) debt service NOT to have uniform savings. In the next phase, you will change the solution type to level and see if it improves your solution.

SAVINGS

ABC County
OMS-Partial Defeasance 2011 and 2013

Date	Prior Debt Service	Refunding Debt Service	Refunding Receipts	Refunding Net Cash Flow	Savings	Present Value to 07/15/2020 @ 1.4265081%
01/01/2021	4,974,862.50	3,332,000.00	259,155.56	3,072,844.44	1,902,018.06	1,891,285.22
01/01/2022	12,724,725.00	8,874,000.00	-	8,874,000.00	3,850,725.00	3,783,051.43
01/01/2023	12,832,075.00	8,983,500.00	-	8,983,500.00	3,848,575.00	3,727,522.67
01/01/2024	19,450,605.00	15,602,000.00	-	15,602,000.00	3,848,605.00	3,674,873.55
01/01/2025	19,702,240.00	15,853,500.00	-	15,853,500.00	3,848,740.00	3,623,016.75
01/01/2026	19,970,535.00	16,119,500.00	-	16,119,500.00	3,851,035.00	3,573,831.52
01/01/2027	20,259,512.50	16,412,500.00	-	16,412,500.00	3,847,012.50	3,519,480.47
01/01/2028	20,577,340.00	16,729,250.00	-	16,729,250.00	3,848,090.00	3,470,458.66
01/01/2029	20,907,577.50	17,056,500.00	-	17,056,500.00	3,851,077.50	3,423,740.09
01/01/2030	21,267,995.00	17,421,500.00	-	17,421,500.00	3,846,495.00	3,370,867.64
01/01/2031	21,654,815.00	17,805,000.00	-	17,805,000.00	3,849,815.00	3,325,532.95
01/01/2032	22,072,415.00	18,225,000.00	-	18,225,000.00	3,847,415.00	3,273,504.96
01/01/2033	22,522,990.00	18,675,000.00	-	18,675,000.00	3,847,990.00	3,224,500.31
01/01/2034	18,464,979.03	14,615,000.00	-	14,615,000.00	3,849,979.03	3,177,118.94
01/01/2035	18,542,004.00	14,693,000.00	-	14,693,000.00	3,849,004.00	3,131,878.13
01/01/2036	18,639,157.15	14,791,500.00	-	14,791,500.00	3,847,657.15	3,086,955.17
01/01/2037	8,584,300.53	4,732,750.00	-	4,732,750.00	3,851,550.53	3,046,792.51
01/01/2038	8,420,193.09	4,572,750.00	-	4,572,750.00	3,847,443.09	3,001,183.97
	311,568,321.30	244,494,250.00	259,155.56	244,235,094.44	67,333,226.86	59,325,594.93

Savings Summary

Dated Date	07/01/2020
Delivery Date	07/15/2020
PV of savings from cash flow	59,325,594.93
Less: Prior funds on hand	(75,000.00)
Plus: Refunding funds on hand	476.28
Net PV Savings	59,251,071.21

AGGREGATE DEBT SERVICE

ABC County
OMS-Partial Defeasance 2011 and 201

This amount is the "Other D/S" that was set to be included in the Prior Debt dialog.

Period Ending	OMS-Partial Defeasance 2011 and 2013	Unrefunded Bonds	Aggregate Debt Service
01/01/2021	3,332,000	8,367,710	11,699,710
01/01/2022	8,874,000	6,265,630	15,139,630
01/01/2023	8,983,500	6,374,880	15,358,380
01/01/2024	15,602,000	-	15,602,000
01/01/2025	15,853,500	-	15,853,500
01/01/2026	16,119,500	-	16,119,500
01/01/2027	16,412,500	-	16,412,500
01/01/2028	16,729,250	-	16,729,250
01/01/2029	17,056,500	-	17,056,500
01/01/2030	17,421,500	-	17,421,500
01/01/2031	17,805,000	-	17,805,000
01/01/2032	18,225,000	-	18,225,000
01/01/2033	18,675,000	-	18,675,000
01/01/2034	14,615,000	-	14,615,000
01/01/2035	14,693,000	-	14,693,000
01/01/2036	14,791,500	-	14,791,500
01/01/2037	4,732,750	-	4,732,750
01/01/2038	4,572,750	-	4,572,750
	244,494,250	21,008,220	265,502,470

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Notice that the unrefunded bonds are not taken into account in this solution.

BOND SOLUTION

ABC County
OMS-Partial Defeasance 2011 and 2013

Period Ending	Proposed Principal	Proposed Debt Service	Total Adj Debt Service	Revenue Constraints	Unused Revenues	Debt Serv Coverage
01/01/2021	-	3,332,000	3,332,000	4,974,863	1,642,863	149.30560%
01/01/2022	2,210,000	8,874,000	8,874,000	12,724,725	3,850,725	143.39334%
01/01/2023	2,430,000	8,983,500	8,983,500	12,832,075	3,848,575	142.84049%
01/01/2024	9,170,000	15,602,000	15,602,000	19,450,605	3,848,605	124.66738%
01/01/2025	9,880,000	15,853,500	15,853,500	19,702,240	3,848,740	124.27691%
01/01/2026	10,640,000	16,119,500	16,119,500	19,970,535	3,851,035	123.89054%
01/01/2027	11,465,000	16,412,500	16,412,500	20,259,513	3,847,013	123.43953%
01/01/2028	12,355,000	16,729,250	16,729,250	20,577,340	3,848,090	123.00217%
01/01/2029	13,300,000	17,056,500	17,056,500	20,907,578	3,851,078	122.57836%
01/01/2030	14,330,000	17,421,500	17,421,500	21,267,995	3,846,495	122.07901%
01/01/2031	13,142,194	17,805,000	17,805,000	21,654,815	3,849,815	121.62210%
01/01/2032	13,188,944	18,225,000	18,225,000	22,072,415	3,847,415	121.11064%
01/01/2033	13,248,966	18,675,000	18,675,000	22,522,990	3,847,990	120.60503%
01/01/2034	12,240,000	14,615,000	14,615,000	18,464,979	3,849,979	126.34266%
01/01/2035	12,930,000	14,693,000	14,693,000	18,542,004	3,849,004	126.19618%
01/01/2036	13,675,000	14,791,500	14,791,500	18,639,157	3,847,657	126.01262%
01/01/2037	4,300,000	4,732,750	4,732,750	8,584,301	3,851,551	181.38082%
01/01/2038	4,355,000	4,572,750	4,572,750	8,420,193	3,847,443	184.13850%
	172,860,103	244,494,250	244,494,250	311,568,321	67,074,071	

The constraints are equal to the refunded bonds' debt service to maturity.

These amounts are, in effect, the savings on the refunding.

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❖ **REFUND SOLUTION ASSUMPTIONS - BOND SOLUTION**

The bond solution will affect how the bonds are amortized and, consequently, will impact the savings.

✳ **Go to SOLUTION ASSUMPTIONS.**

Solution Assumptions									
Bond Solution	Transfer Proceeds	Solution Adjustments	Add'l D/S for Wrapping	Bond Solution Revenues	Coverage Factors	Bond Component Targets	'Mixed' Solution Types	Overlap Maturity Allocations	Project Finance

Compute bond solution? ✔
Size for Par Amount ✔
  Target amount
    Target specifies
  Total protected bond amounts

Type of bond solution   Level Debt Service ▾
Solution method   Linear optimization ▾

Bond solution is based on   Fiscal period ▾
  Fiscal date   [   ]
  Fiscal period   Annual ▾

[OK] [Cancel]

✳ **Go to the BOND SOLUTION tab and set the Type of Bond Solution to "Level". Click OK then CALCULATE.**

❖ REFUND SOLUTION STATUS

Once the analysis is completed, the following dialog appears. It summarizes the results of the analysis. The total savings amount is the net present value savings.

New Bond Series:	OMSCALL
Delivery Date:	Jul 15, 2020
Arbitrage Yield:	1.470215%
Escrow Yield:	1.470198%
PV of prior ds:	273,613,238.57
Total Savings:	58,449,656.56
Savings % of refunded bonds:	30.673%

Bond Par Amount:	169,780,776.70	Cost of Projects:	-
Bond Adjustments:	46,125,654.08	Cost of Escrow:	213,130,883.85
Other Sources:	75,000.00	Expenses:	2,572,653.88
Equity Contribution:	-	Reserve Funds:	276,752.78
Funds on hand:	-	Other Uses:	-
		Additional funds:	1,140.27

Calculation Complete

OK

---

* **Click OK, then go to PRINT. PRINT or VIEW the three reports already selected.**

🖐 **NOTE -** Notice that the savings are no longer level. The debt service of the new refunding issue is although the aggregate debt service is not.

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SAVINGS

ABC County
OMS-Partial Defeasance 2011 and 2013

Date	Prior Debt Service	Refunding Debt Service	Refunding Receipts	Refunding Net Cash Flow	Savings	Present Value to 07/15/2020 @ 1.4702145%
01/01/2021	4,974,862.50	7,013,250.00	276,752.78	6,736,497.22	(1,761,634.72)	(1,747,912.78)
01/01/2022	12,724,725.00	14,028,750.00	-	14,028,750.00	(1,304,025.00)	(1,265,597.03)
01/01/2023	12,832,075.00	14,029,500.00	-	14,029,500.00	(1,197,425.00)	(1,143,564.45)
01/01/2024	19,450,605.00	14,027,500.00	-	14,027,500.00	5,423,105.00	5,167,108.66
01/01/2025	19,702,240.00	14,032,000.00	-	14,032,000.00	5,670,240.00	5,323,118.03
01/01/2026	19,970,535.00	14,031,750.00	-	14,031,750.00	5,938,785.00	5,493,147.55
01/01/2027	20,259,512.50	14,031,000.00	-	14,031,000.00	6,228,512.50	5,676,246.28
01/01/2028	20,577,340.00	14,028,750.00	-	14,028,750.00	6,548,590.00	5,879,919.02
01/01/2029	20,907,577.50	14,029,000.00	-	14,029,000.00	6,878,577.50	6,085,076.41
01/01/2030	21,267,995.00	14,030,500.00	-	14,030,500.00	7,237,495.00	6,307,966.41
01/01/2031	21,654,815.00	14,032,000.00	-	14,032,000.00	7,622,815.00	6,545,569.68
01/01/2032	22,072,415.00	14,032,000.00	-	14,032,000.00	8,040,415.00	6,800,315.92
01/01/2033	22,522,990.00	14,032,000.00	-	14,032,000.00	8,490,990.00	7,073,460.69
01/01/2034	18,464,979.03	14,032,000.00	-	14,032,000.00	4,432,979.03	3,635,211.23
01/01/2035	18,542,004.00	14,027,250.00	-	14,027,250.00	4,514,754.00	3,648,732.64
01/01/2036	18,639,157.15	14,030,250.00	-	14,030,250.00	4,608,907.15	3,670,911.91
01/01/2037	8,584,300.53	14,029,250.00	-	14,029,250.00	(5,444,949.47)	(4,282,085.07)
01/01/2038	8,420,193.09	14,028,000.00	-	14,028,000.00	(5,607,806.91)	(4,344,108.82)
	311,568,321.30	245,524,750.00	276,752.78	245,247,997.22	66,320,324.08	58,523,516.29

Notice this is level.

This is not level.

Savings Summary

Dated Date	07/01/2020
Delivery Date	07/15/2020
PV of savings from cash flow	58,523,516.29
Less: Prior funds on hand	(75,000.00)
Plus: Refunding funds on hand	1,140.27
Net PV Savings	58,449,656.56

AGGREGATE DEBT SERVICE

ABC County
OMS-Partial Defeasance 2011 and 2013

Period Ending	OMS-Partial Defeasance 2011 and 2013	Unrefunded Bonds	Aggregate Debt Service
01/01/2021	7,013,250	8,367,710	15,380,960
01/01/2022	14,028,750	6,265,630	20,294,380
01/01/2023	14,029,500	6,374,880	20,404,380
01/01/2024	14,027,500	-	14,027,500
01/01/2025	14,032,000	-	14,032,000
01/01/2026	14,031,750	-	14,031,750
01/01/2027	14,031,000	-	14,031,000
01/01/2028	14,028,750	-	14,028,750
01/01/2029	14,029,000	-	14,029,000
01/01/2030	14,030,500	-	14,030,500
01/01/2031	14,032,000	-	14,032,000
01/01/2032	14,032,000	-	14,032,000
01/01/2033	14,032,000	-	14,032,000
01/01/2034	14,032,000	-	14,032,000
01/01/2035	14,027,250	-	14,027,250
01/01/2036	14,030,250	-	14,030,250
01/01/2037	14,029,250	-	14,029,250
01/01/2038	14,028,000	-	14,028,000
	245,524,750	21,008,220	266,532,970

This is not level because the solution is structuring the new bonds to be level without taking in to account the unrefunded debt.

BOND SOLUTION

ABC County
OMS-Partial Defeasance 2011 and 2013

Period Ending	Proposed Principal	Proposed Debt Service	Total Adj Debt Service	Revenue Constraints	Unused Revenues	Debt Serv Coverage
01/01/2021	3,455,000	7,013,250	7,013,250	4,974,863	(2,038,388)	70.93519%
01/01/2022	7,085,000	14,028,750	14,028,750	12,724,725	(1,304,025)	90.70462%
01/01/2023	7,440,000	14,029,500	14,029,500	12,832,075	(1,197,425)	91.46495%
01/01/2024	7,810,000	14,027,500	14,027,500	19,450,605	5,423,105	138.66052%
01/01/2025	8,205,000	14,032,000	14,032,000	19,702,240	5,670,240	140.40935%
01/01/2026	8,615,000	14,031,750	14,031,750	19,970,535	5,938,785	142.32391%
01/01/2027	9,045,000	14,031,000	14,031,000	20,259,513	6,228,513	144.39108%
01/01/2028	9,495,000	14,028,750	14,028,750	20,577,340	6,548,590	146.67978%
01/01/2029	9,970,000	14,029,000	14,029,000	20,907,578	6,878,578	149.03113%
01/01/2030	10,470,000	14,030,500	14,030,500	21,267,995	7,237,495	151.58401%
01/01/2031	9,364,771	14,032,000	14,032,000	21,654,815	7,622,815	154.32451%
01/01/2032	9,149,049	14,032,000	14,032,000	22,072,415	8,040,415	157.30056%
01/01/2033	8,936,956	14,032,000	14,032,000	22,522,990	8,490,990	160.51162%
01/01/2034	10,995,000	14,032,000	14,032,000	18,464,979	4,432,979	131.59193%
01/01/2035	11,540,000	14,027,250	14,027,250	18,542,004	4,514,754	132.18560%
01/01/2036	12,120,000	14,030,250	14,030,250	18,639,157	4,608,907	132.84979%
01/01/2037	12,725,000	14,029,250	14,029,250	8,584,301	(5,444,949)	61.18859%
01/01/2038	13,360,000	14,028,000	14,028,000	8,420,193	(5,607,807)	60.02419%
	169,780,777	245,524,750	245,524,750	311,568,321	66,043,571	

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❖ REFUND SOLUTION ASSUMPTIONS - ADD'L D/S FOR WRAPPING

In a wraparound solution, the program must be told to recognize any **OTHER D/S** as part of the solution otherwise it will assume that only the debt service of the issue currently being sized has to be level. This prompts the program to recognize the unrefunded debt when structuring the new issue so the total of the new and the unrefunded is level.

Solution Assumptions									
Bond Solution	Transfer Proceeds	Solution Adjustments	Add'l D/S for Wrapping	Bond Solution Revenues	Coverage Factors	Bond Component Targets	'Mixed' Solution Types	Overlap Maturity Allocations	Project Finance

Wrap around 'Other D/S'   ☑
D/S from Other Formula   [▾]
Additional source of d/s [N/A   ▾]

OK   Cancel

*   Go to ADD'L D/S FOR WRAPPING in the SOLUTION ASSUMPTIONS menu.   Set WRAP AROUND OTHER D/S" TO "YES". Click OK then CALCULATE.

❖ REFUND SOLUTION STATUS

Once the analysis is completed, the following dialog appears. It summarizes the results of the analysis. The total savings amount is the net present value savings.

New Bond Series:	OMSCALL
Delivery Date:	Jul 15, 2020
Arbitrage Yield:	1.474919%
Escrow Yield:	1.474903%
PV of prior ds:	273,501,892.62
Total Savings:	58,386,880.78
Savings % of refunded bonds:	30.640%

Bond Par Amount:	167,240,487.80	Cost of Projects:	-
Bond Adjustments:	48,649,996.22	Cost of Escrow:	213,108,986.72
Other Sources:	75,000.00	Expenses:	2,587,097.75
Equity Contribution:	-	Reserve Funds:	267,759.72
Funds on hand:	-	Other Uses:	-
		Additional funds:	1,639.83

Calculation Complete

OK

✱   **Click OK then go to the PRINT menu, and PRINT or VIEW the three reports already selected.**

✋   **NOTE -** Notice that the savings are no longer level NOR is the debt service of the new refunding issue BUT the aggregate debt service is level after the first period. The goal has been reached. Notice that the Existing Debt Service appears in the Bond Solution report. Its presence in this report is essential for DBC to properly structure a wraparound.

SAVINGS

ABC County
OMS-Partial Defeasance 2011 and 2013

Date	Prior Debt Service	Refunding Debt Service	Refunding Receipts	Refunding Net Cash Flow	Savings	Present Value to 07/15/2020 @ 1.4749187%
01/01/2021	4,974,862.50	3,442,625.00	267,759.72	3,174,865.28	1,799,997.22	1,789,649.79
01/01/2022	12,724,725.00	8,835,250.00	-	8,835,250.00	3,889,475.00	3,817,913.34
01/01/2023	12,832,075.00	8,722,750.00	-	8,722,750.00	4,109,325.00	3,974,152.76
01/01/2024	19,450,605.00	15,096,000.00	-	15,096,000.00	4,354,605.00	4,149,139.29
01/01/2025	19,702,240.00	15,100,750.00	-	15,100,750.00	4,601,490.00	4,319,579.95
01/01/2026	19,970,535.00	15,099,250.00	-	15,099,250.00	4,871,285.00	4,505,199.11
01/01/2027	20,259,512.50	15,100,750.00	-	15,100,750.00	5,158,762.50	4,700,439.30
01/01/2028	20,577,340.00	15,099,000.00	-	15,099,000.00	5,478,340.00	4,917,649.43
01/01/2029	20,907,577.50	15,098,000.00	-	15,098,000.00	5,809,577.50	5,137,677.77
01/01/2030	21,267,995.00	15,096,500.00	-	15,096,500.00	6,171,495.00	5,376,699.54
01/01/2031	21,654,815.00	15,098,250.00	-	15,098,250.00	6,556,565.00	5,627,343.98
01/01/2032	22,072,415.00	15,098,250.00	-	15,098,250.00	6,974,165.00	5,894,986.48
01/01/2033	22,522,990.00	15,098,250.00	-	15,098,250.00	7,424,740.00	6,180,797.73
01/01/2034	18,464,979.03	15,098,250.00	-	15,098,250.00	3,366,729.03	2,757,329.09
01/01/2035	18,542,004.00	15,096,750.00	-	15,096,750.00	3,445,254.00	2,780,941.98
01/01/2036	18,639,157.15	15,095,750.00	-	15,095,750.00	3,543,407.15	2,818,874.88
01/01/2037	8,584,300.53	15,098,750.00	-	15,098,750.00	(6,514,449.47)	(5,118,798.69)
01/01/2038	8,420,193.09	15,099,000.00	-	15,099,000.00	(6,678,806.91)	(5,169,334.79)
	311,568,321.30	247,474,125.00	267,759.72	247,206,365.28	64,361,956.03	58,460,240.95

Savings Summary

Dated Date	07/01/2020
Delivery Date	07/15/2020
PV of savings from cash flow	58,460,240.95
Less: Prior funds on hand	(75,000.00)
Plus: Refunding funds on hand	1,639.83
Net PV Savings	58,386,880.78

AGGREGATE DEBT SERVICE

ABC County
OMS-Partial Defeasance 2011 and 2013

Period Ending	OMS-Partial Defeasance 2011 and 2013	Unrefunded Bonds	Aggregate Debt Service
01/01/2021	3,442,625	8,367,710	11,810,335
01/01/2022	8,835,250	6,265,630	15,100,880
01/01/2023	8,722,750	6,374,880	15,097,630
01/01/2024	15,096,000	-	15,096,000
01/01/2025	15,100,750	-	15,100,750
01/01/2026	15,099,250	-	15,099,250
01/01/2027	15,100,750	-	15,100,750
01/01/2028	15,099,000	-	15,099,000
01/01/2029	15,098,000	-	15,098,000
01/01/2030	15,096,500	-	15,096,500
01/01/2031	15,098,250	-	15,098,250
01/01/2032	15,098,250	-	15,098,250
01/01/2033	15,098,250	-	15,098,250
01/01/2034	15,098,250	-	15,098,250
01/01/2035	15,096,750	-	15,096,750
01/01/2036	15,095,750	-	15,095,750
01/01/2037	15,098,750	-	15,098,750
01/01/2038	15,099,000	-	15,099,000
	247,474,125	21,008,220	268,482,345

Notice that the aggregate debt service is finally level. This creates level overall payments for the issuer on all of their debt.

BOND SOLUTION

ABC County
OMS-Partial Defeasance 2011 and 2013

Period Ending	Proposed Principal	Proposed Debt Service	Existing Debt Service	Total Adj Debt Service	Revenue Constraints	Unused Revenues	Debt Serv Coverage
01/01/2021	-	3,442,625	8,367,710	11,810,335	4,974,863	(6,835,473)	42.12296%
01/01/2022	1,950,000	8,835,250	6,265,630	15,100,880	12,724,725	(2,376,155)	84.26479%
01/01/2023	1,935,000	8,722,750	6,374,880	15,097,630	12,832,075	(2,265,555)	84.99397%
01/01/2024	8,405,000	15,096,000	-	15,096,000	19,450,605	4,354,605	128.84609%
01/01/2025	8,830,000	15,100,750	-	15,100,750	19,702,240	4,601,490	130.47193%
01/01/2026	9,270,000	15,099,250	-	15,099,250	19,970,535	4,871,285	132.26177%
01/01/2027	9,735,000	15,100,750	-	15,100,750	20,259,513	5,158,763	134.16229%
01/01/2028	10,220,000	15,099,000	-	15,099,000	20,577,340	5,478,340	136.28280%
01/01/2029	10,730,000	15,098,000	-	15,098,000	20,907,578	5,809,578	138.47912%
01/01/2030	11,265,000	15,096,500	-	15,096,500	21,267,995	6,171,495	140.88030%
01/01/2031	10,075,966	15,098,250	-	15,098,250	21,654,815	6,556,565	143.42599%
01/01/2032	9,843,861	15,098,250	-	15,098,250	22,072,415	6,974,165	146.19188%
01/01/2033	9,615,661	15,098,250	-	15,098,250	22,522,990	7,424,740	149.17616%
01/01/2034	11,830,000	15,098,250	-	15,098,250	18,464,979	3,366,729	122.29880%
01/01/2035	12,420,000	15,096,750	-	15,096,750	18,542,004	3,445,254	122.82116%
01/01/2036	13,040,000	15,095,750	-	15,095,750	18,639,157	3,543,407	123.47288%
01/01/2037	13,695,000	15,098,750	-	15,098,750	8,584,301	(6,514,449)	56.85438%
01/01/2038	14,380,000	15,099,000	-	15,099,000	8,420,193	(6,678,807)	55.76656%
	167,240,488	247,474,125	21,008,220	268,482,345	311,568,321	43,085,976	

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<div align="center">

******* ADVANCED ANALYSIS II *******

</div>

❖ CALCAGENT

You have now completed four variations of the same analysis. You have had to load each file, run each file, and print the results of each run - ONE BY ONE. The **CALCAGENT** feature in the **FILE MENU** facilitates this process by allowing you to save a written "command" to run multiple cases with variations in the bond and escrow yields and print report packets for each. The batch runs are very much like a macro because they automate your tasks.

ASSUMPTIONS

In this analysis, you will be creating a CalcAgent in which you combine the four cases you have already created. In addition, you will also do a sensitivity analysis where escrow yield on the refunding issue will go up .05%. In a sensitivity analysis, you change one variable and see what effect the change has on the results. In the context of a refunding, the most common change is to the scale. This way, you can answer the question "What will happen to the savings if interest rates go up by x% or if they go down y%?"

The first thing you have to do is create the "pieces" you will be combining. In a real analysis you should create a grid such as the one below as this will help you organize the inputs required in DBC. In this analysis, you will run the following permutations:

|	**Base Refund Case**	**Refund Case plus .05%**
PVALL	1	9
SLGSALL	2	10
OMSALL	3	11
OMSCALL	4	12

The grid represents the 8 refundings possible if you combine these series with these cases. To do this by hand would require you to run the case, print the reports, load up the next case, change it to reflect a new combination, run the case, etc. By setting up a CalcAgent you can achieve this all in a single calculation.

❖ File-CalcAgent

CalcAgent give the system the commands to run cash flows for one or several refundings and print reports as well.
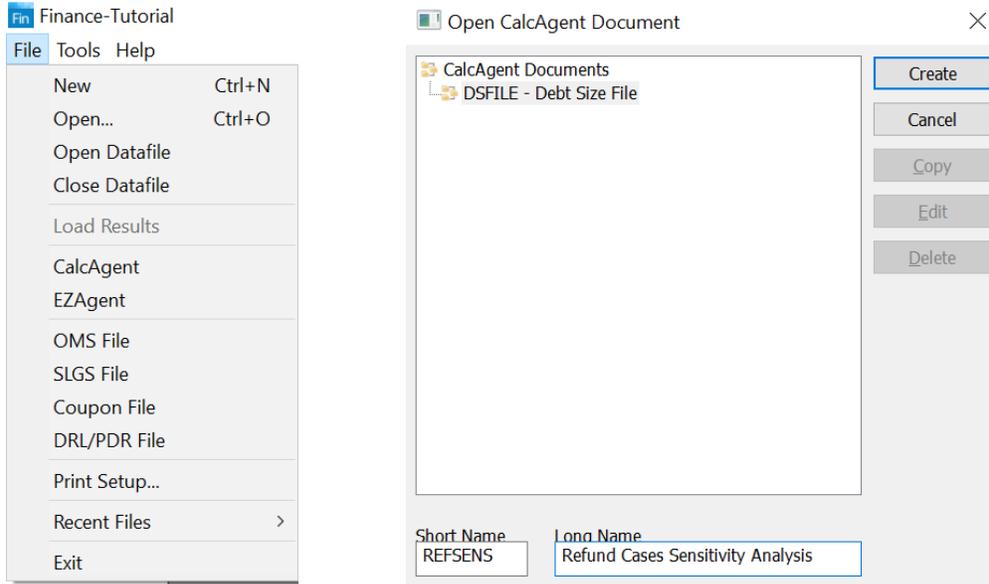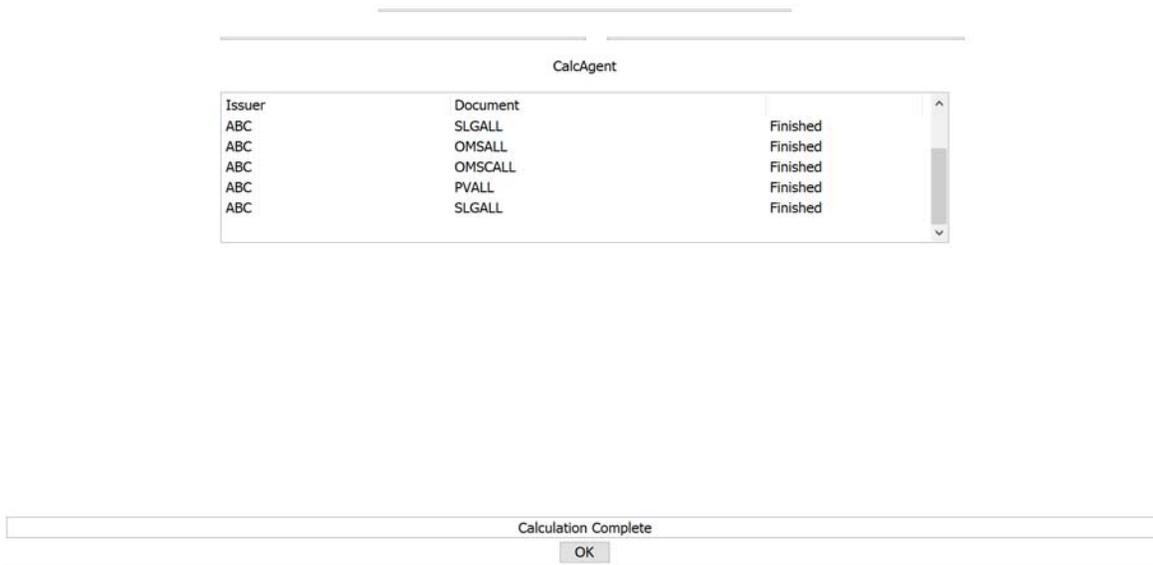

*   **Go to File-CalcAgent and create a file with "REFSENS" as the short name and "Refund Cases Sensitivity Analysis" as the long name.**
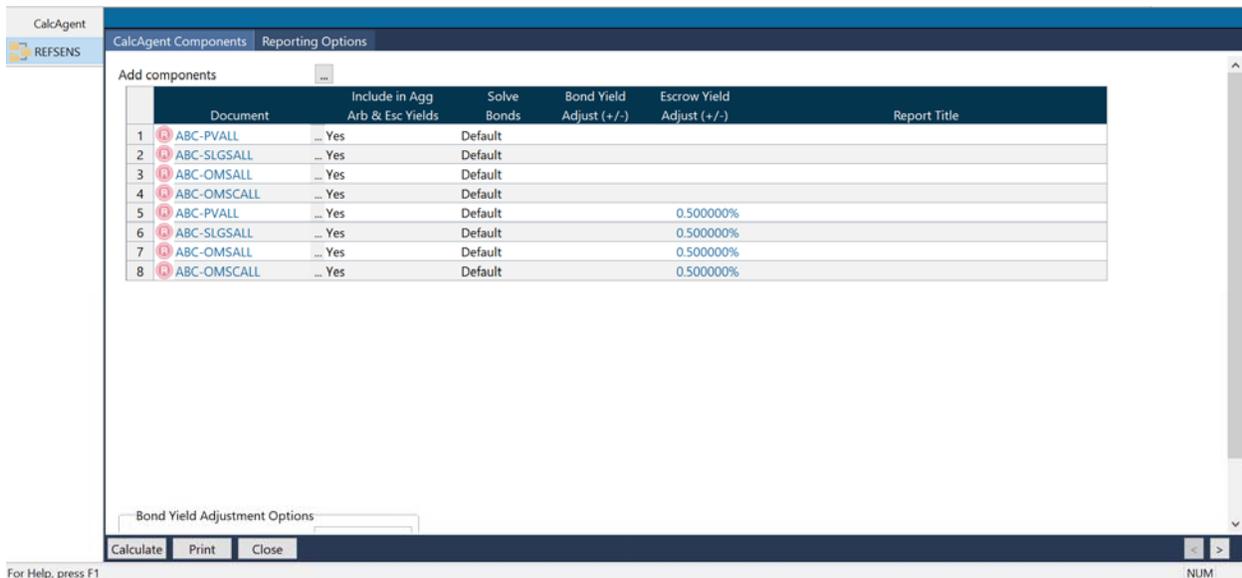
*   **Select "Add components" and select all four of the refund cases. Right click anywhere in the grid and select New Size. In the New Size window, set the number of new lines to 8.**

Copy and paste the four refund cases from lines 1-4 into lines 5-8. Then, for lines 5-8 add a .05% adjustment in the Escrow Yield Adjust (+/-) column.

CalcAgent

Issuer	Document	
ABC	SLGALL	Finished
ABC	OMSALL	Finished
ABC	OMSCALL	Finished
ABC	PVALL	Finished
ABC	SLGALL	Finished

Calculation Complete

OK

* **Click Calculate. CalcAgent allows you to select the reports you wish to print after calculation, therefore, no report packets are needed.**

<div style="border:1px solid black; background:#e6e6e6; text-align:center; padding:1em;">

APPENDICES

</div>

The following appendices are useful for future reference. We strongly urge you to copy these pages and keep them handy. They are listed below.

> **Product Support Numbers**
> **DBC Refund Outline**
> **Navigation Keys**
> **Allowable Expense Terms**
> **Allowable Reserve Fund Terms**

❖ PRODUCT SUPPORT

At DBC, we are working hard to provide our clients with intuitive analytical products. Additionally, we try to provide superior online documentation and tutorials to enable you to work independently in structuring municipal bond issues. However, should you find yourself with a technical question that you cannot answer with the provided tools, please contact our Technical Support Group. Support is available from 9:00 am-6:00 pm ET, Monday to Friday.

Help-Email Data to DBC

The most efficient way of contacting DBC Finance support is to go to Help-Email Data to DBC from within the program. The support staff will receive a copy of your Issuer and will see exactly what you are seeing when you send the file. Response emails will be sent as quickly as possible at the e-mail address provided in Tools-Preferences-Internet Settings:

Telephone & General Email

For non-file specific questions or problems, you can also email dbcsupport@sscinc.com email or call the *DBC Finance* Technical Support line at 646.213.7198

WEB SITE

We post general support information as well as interim update information at are website at the link below:

http://www.dbcinc.com/support/

File	Edit	Data	Calculate	Tools	Window	Help

New	**Cut**	**Refund Assumptions**
		Escrow Sol'n Parameters
		Global Proceeds Escrow
		Advanced
		  General
		  Add'l Series for Arb Yield
		  Escrow Yield Adjs
		  Float Contract Parameters
			Solution Assumptions
			Bond Solution
			Transfer Proceeds
			Solution Adjustments
			Additional D/S for
			Wrapping
			Bond Solution Revenues
			Coverage Factors
			Bond Component Targets
			Mixed Solution Type
			Overlap Maturity Alloc
			Project Finance
				Preferences	**Cascade**	**Contents & Index**

Open	**Copy**	**Prior Debt**
		Defeasance Requirement
		Funds on Hand
		Escrows
		Series Selection
		Prior Debt Service
		Transferred Proceeds
		Advanced
		  General
		  Accelerated Sol'n Adj
		  % of Ref It to Defease
			Calculate	**Import Data**
				Imp Prior Bond Selection
					Tile	**Tutorials**

Close	**Paste**	**Savings Assumptions** General Expenditure Adjustments Prior Debt Service Prior Cashflow Adjs Refunding Debt Service Refunding Cashflow Adjs	**Calculate w/o Solving**	**Export Data**	**Arrange Icons**	**Internet Resources**
Save		**Portfolios** Securities	**Batch Runs**	**Merge Datafile**		**Email Data to DBC**
Save As		**Reportion Options** General Footnotes Prior Series Ordering	**Switch to Monitor**	**Compact Datafile**		**About DBC Finance**
Open Datafile				**Directory of Datafile**		
Close Datafile				**PV Calculator**		
Save All				**Savings Calculator**		
CalcAgent				**Premium CAB Calculator**		
EZAgent				**Debt Service Calculator**		
OMS File				**Component Gallery**		
SLGS File				**Update Registry**		
Coupon File				**Install OMS Files**		
DRL File				**Create DFX File**		
Print				**Define Custom Reports**		
Print Setup						
Exit						

❖ **PRIMARY NAVIGATION KEYS**

Escape	Escape key aborts all changes and returns to the previous dialog
ENTER	Chooses the highlighted selection, or stores inputs into a cell
Home or End	Move to top of column in a grid, or the beginning of an input cell or formula
Double Click or Shift -?	Brings up a list box of all choices for a multiple-choice prompt
Spacebar	Cycles through all choices for a multiple-choice prompt
a,b,c,d ...	In cells with dropdown options: goes to the first choice that begins with the letter or number that was typed
Insert	Begin "Edit" mode for the current cell; alternates between typeover and insert mode while editing data in a cell
Delete	Delete the current component or character
< or >	Moves to the previous dialog or the next dialog
F9	Accept the inputs/changes in the current dialog and move back to the previous input dialog
F10	Accept the inputs/changes in the current dialog and move on to the next input dialog
ADVANCED or F8	Display the Advanced dialog menu, if any
Right Mouse Click or F5	Cut, copy, and paste data, modify data, insert/delete/append lines Protect or Unprotect data (Unprotected=system can override with a calc'd value) Enter dates creates a grid with a start date, end date and frequency Total all the values in a column of a grid
F1	On Line Help utility and index--(context sensitive)
F11	Zoom In on input screens and in Access reports.
F12	Zoom out on input screens and in Access reports.

Alt-F	Go to File Menu
Alt-E	Go to Edit Menu
Alt-D	Go to Data Menu
Alt-C	Go to Calculate Menu
Alt-T	Go to Tools Menu
Alt-W	Go to Window Menu
Alt-H	Go to Help Menu

❖ ALLOWABLE EXPENSE TERMS

**Dollar amounts are entered in formulas in dollars and cents, NOT in thousands!
Commas can separate digits in a dollar value: "1,000,000" is accepted.
Multiple formula lines are evaluated and ADDED together unless Lesser of|Greater of comes before them.
Comments can be entered by beginning line with "#"
Formulas can be up to 180 characters long [version 2.2] but system will not display all at one time.
Simplest expense is a date followed by a dollar amount:
    "1/1/24 125,217.15"
Outstanding par amount is called Bond Value.
Bond Insurance expenses
    [Total] [Adjusted] Bond Interest at xxx% [from mm/dd/yy] [to mm/dd/yy]
        (Adjusted means net of accrued interest--use only when accrued int is retained in gen fund)
    [y% of] [Total] [Adjusted] Debt Service at xxx% [from mm/dd/yy] [to mm/dd/yy]
Partial Bond Insurance only on insured bond components using short name of component
    X% of Total [adjusted] debt service [at Y%] [of SERIALS]
    X% of Total [adjusted] debt service [at Z%] [of TERM2025]
Greater of and Lesser of for upfront or ongoing expenses
    Lesser of|Greater of|Maximum of|Minimum of
    .25% of bond value paid annual starting 1/1/95
    10000 paid annual starting 1/1/95
    20000 paid semiannual for XX months|days|years
    End   (optionally shows the end of choices so additional lines can be added after the conditional)
"Aggregate", "Series Aggregate", and "Related" can refer to Par, Discount, Premium, Accrued Interest,
Proceeds, Principal, Debt Service, Bond Interest
    "Related" refers to other Series in the same Bond Solution Group in Project Finance
    "Aggregate" means current series value plus 'Other D/S'
    "Series Aggregate" means the current series value plus 'Other D/S' only in the current series of a
    Project Finance component.
Refunding formulas: "Prior Bond Value", "Prior Par", "Escrow Cost", "Prior Debt Service"
"Adjusted" can be put in front of Debt Service to mean DS less Accrued Interest on the first Interest
    Payment Date.
Parenthesis can be used to clarify algebraic expressions
Several mathematical operators can be used in an expression
    0.125 * (132/360) * par amount
    par amount + accrued - discount
Expenses can be paid 'in advance', 'in arrears' or 'as of date'
    Default is in arrears (which is defined as the average balance of the prior period)
Surety bond expense
    X% of Maximum annual debt service [from mm/dd/yy] [to mm/dd/yy]
LOC fee definitions
    .35% of bond value paid annual in advance
    .35% of xxx days of interest at x.x% paid annual in advance
Frequencies allowed:
    paid every xx (months, days, years)
    paid when interest pays
    paid (annual [ann], semiannual [sem], monthly [mon], quarterly [qtr], bimonthly [bim])

An expense can be computed as the PV of a future cash flow, paid at delivery from bond proceeds

PV at arbitrage yield of   (put on 1st line, and the 2nd formula line will be PV'd to delivery date)

PV at X% of

You can change the expense and interest day count basis for computing periodic expenses:

Basis Act/Act|30/360|Act/360|Act/365

You can round expense amounts to a dollar value

Round [up|down] to 1,000

You can change the payment dates of an expense:

Align to xx/xx/xx

(Default is the fiscal date)

Expenses can be paid starting whenever and ending whenever, regardless of fiscal date, including expenses paid *before* the bond delivery date.

10000 paid annual starting 6/15/24 through 6/15/33

X% of bond value paid quarterly for XX months|days|years

❖ ALLOWABLE RESERVE FUND TERMS

Balance Requirements (such as for a debt service reserve fund)**:**

Simplest is a dollar amount

10,000,000

Parity Reserve Funds: compute the amount to be added based on existing reserve fund and existing bonds specified in 'Other D/S'

Maximum Annual Aggregate Debt Service - 5,000,000

Drawdown reserves

add "Drawdown" on a separate line after the Balance Requirement formula

Comments can be entered by beginning line with "#"

"Aggregate", "Series Aggregate" and "Related" can refer to Par, Discount, Accrued Interest, Proceeds, Principal, D/S

Parenthesis can be used to clarify expressions

Several mathematical operators can be used in an expression

0.125 * (132/360) * par amount

par amount + accrued - discount

Reserve fund calculations can be based on other than the fiscal date

max annual d/s after 5/31/26 (period would be 6/1 to 5/31)

max annual d/s starting 6/1/26 (period would be 6/1 to 5/31)

Round [up/down] to <dollar amount>

Draw Requirements (such as for Capitalized Interest Funds)

Gross bond interest (all full interest payments) thru a date:

Bond interest through 1/1/23

Gross bond interest (all full interest payments), less Accrued Interest thru a date:

Adjusted Bond Interest through 1/1/23

Partial all full coupons thru a date PLUS accrued bond interest as of that date:

[Adjusted] Bond Interest **accrued through** 3/15/23

Capitalizing a specified percentage of bond interest

X% of [adjusted] Bond Interest [accrued] through 1/1/23

Capitalizing ongoing expenses through a certain date

Expenses through 1/1/23

100,000 paid semiannual through 1/1/30