MECHANIZATION OF THE INCOME TAX ACCRUAL USING SAS
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ABSTRACT

Once each month, accountants in public utilities across the nation put pencil to paper and attempt to prepare workpapers to support the monthly income tax accrual. This task can become quite unmanageable as earnings estimates, schedule "M" projections, ITC forecasts and numerous other variables change constantly throughout the year. Accountants have traditionally tried to solve the problem of documenting a complex series of tax calculations by finding the best workpaper format. Certainly a well-organized, logical approach to the problem will do much to make the job easier. Even the best workpaper format, however, will do little to recompute the calculations when an assumption is modified or review the workpapers for math errors.

At San Diego Gas & Electric (SDG&E), the tax accrual was becoming more and more complex. Additional regulatory requirements and changes brought on by the Economic Recovery Tax Act of 1981 and Tax Equity and Fiscal Responsibility Act of 1982 resulted in even more complications. These factors, combined with tight financial statement reporting deadlines and the desire of management to have better support for the tax accrual gave us a problem which was becoming more and more complex. Excellent workpaper technique has its limits. Something was needed which would allow us to keep pace with all these changes.

In 1984, the situation changed dramatically at SDG&E. With the use of a high-level, user-oriented computer language called the Statistical Analysis System (SAS), all tax input information is now maintained on direct-access computer files. A SAS computer program was developed which processes these input files, prepares workpapers and even prepares the monthly journal entries. With the entire process taking less than 15 minutes, the accountant concentrates on analysis rather than worrying about whether or not Schedule 15 foots or if the number on Schedule 17 really comes from Schedule 10. The pencils and 10-column pads now gather dust. The age of computer-generated tax workpapers has arrived at SDG&E.

COMPLEXITIES OF THE INCOME TAX CALCULATIONS
FOR A MULTI-DEPARTMENT PUBLIC UTILITY

In order to truly appreciate why a computerized tax accrual is so important to us at SDG&E, we must first briefly examine the problems unique to public utility income taxes.

Some of the major complications for the accrual at a public utility are:

Allocation of income tax expense - We, in the utility business, must be concerned that tax expense is properly allocated to each operating department so adequate rate relief can be secured. The number of accounts required to do this is generally a function of the number of utility departments you have to track. At SDG&E, for each of four departments, we have the following expense accounts:

- Current tax expense
- Deferred tax expense - balancing accounts
- Deferred tax expense - other (current portion)
- Deferred tax expense - other (non-current portion)
- Current year normalized ITC
- Amortization of normalized ITC (one account per year) for previous years
- Amortization of various other deferred tax charges and credits

In all, we had over 40 income tax expense and balance sheet accounts to track in 1983. This is certainly quite different from the 8 to 10 income tax accounts which a non-regulated company may require.

Allocation of interest expense - In most companies, interest expense is simply an expense for books and is deductible on the tax return. In a multi-department utility, this interest expense must be allocated to the departments according to the requirements of the State Utility Commission. At SDG&E, the California Public Utilities Commission requires us to use a relatively complicated technique which takes into account such factors as:

- Plant balances by department
- Long-term interest expense
- Bankers' acceptances interest expense
- CWIP balances by department
- Commercial paper balances by month
- Bank loan balances by month
- Long term debt balances
- Capitalization by month
- Total interest expense

Just this computation alone is probably more complex than the entire tax calculation in many companies.

Many timing differences - Public utilities capitalize many items for books while expensing these items for the tax return. Tax laws unique to the utility business and regulatory requirements create timing differences which do not exist in the non-regulated world. One excellent example at SDG&E is the Accounting treatment for the fuel in our nuclear power plant. On the books the fuel is expensed as it is consumed. The Federal tax law allows for a faster write-off and California law has yet another treatment. With three units and an average five batches of fuel for each in
various stages of production at any one time, you will have 15 timing differences each for federal and state—a total of 30 timing differences just for the nuclear fuel category. At SDG&E, we generally have 50 to 60 major categories of timing differences. Many (like nuclear fuel) have sub-categories as well. In each category, the timing differences must be allocated between three operating departments and one non-operating department. If the timing difference is not the same for federal and state, this must be accounted for also. With 60 categories, 4 departments and 2 types of tax, simple multiplication shows us we have 480 (60x4x2) numbers to track. This is many more than most non-regulated companies.

Other complications — Rather than go into great detail about other complications which exist, I will simply list several to give you a more complete idea of some of the other problems we encounter.

- Flow through timing differences vs. normalized
- Regulatory balancing accounts
- Accounting for subsidiary taxes
- Transactions treated separately
- Allocation of monthly expense
- Flow through/normalized ITC
- Analysis of income tax balance sheet accounts
- Allocation of ITC to departments

I think it is obvious that the complications I have described, when combined with changing forecasts and tax laws, would create chaos if an organized approach is not developed. This certainly can be done without the assistance of a computer. We did it that way for years. The major problem with a manual accrual was that the process involved many hours and required a check of each computation to be sure that no math errors were made. If a math error was noted or an assumption or input variable changed, major portions of the accrual would have to be redone as a change would often carry through the entire calculation. The need to recalculate the accrual often occurred when there was no time to go through the entire process. The result was that an entry was reflected in the accounting records that had little or no support in the tax workpapers. This made the monthly income tax expense extremely difficult to explain to interested parties such as auditors and management. With our computerized tax accrual, this type of problem has virtually disappeared at SDG&E.

### SOME BARRIERS TO A COMPUTERIZED TAX ACCRUAL

There are several reasons this type of system has not been developed at most companies. The most notable is that programmer backlog often prevents a project such as this from even being considered. Even if the task is attempted, the traditional approach of the user describing his requirements to the systems analyst who in turn assigns a programmer to write the necessary programs does not work well in this case. The task is so complex and so specialized that communication problems between user and programmer make progress extremely slow and, as a result, quite costly. Even if a system is successfully completed, the nature of the subject area is such that changes occur quite often. Thus, the same communication problems that existed during the initial development stage will continue as maintenance is required.

This application is different than most business applications. Most business applications have large amounts of input data with relatively few mathematical operations. For example, an accounts receivable system may have thousands of customers but the math needed for each is relatively simple (add invoices and subtract payments). The tax accrual application has little input data but many mathematical calculations. This factor, combined with the need for very detailed output reports, makes the project quite complex.

The logical answer would seem to be that the accountant should both design and program the system. Unfortunately, traditional programming languages, even if the accountant is familiar with them, are extremely time consuming to master and the time commitment necessary for a project such as this is more than most companies are willing to spare.

With the situation described above still existing at many companies throughout the nation, it is not surprising that many accountants are still chained to their pencils and calculators.

### HOW IT WAS DONE AT SDG&E

There are several basic reasons the task was accomplished at SDG&E:

- Management perceived the accrual as a problem area.
- SAS was available for general use.
- The accountant was given training in SAS.
- Time was made available (approximately 1,500 hours over three years) for system development by the accountant.

I think the real key to the successful completion of the system was the fact that the accountant both designed and programmed the system. In other words, with a high level language like SAS available, it is easier to turn accountants into programmers than vice-versa.

A comment I often hear from accountants is that there is no time for them or their staff to learn to become programmers. It is my contention that, with higher level languages like SAS, nearly all the people in most organizati-
tions will effectively become programmers. In the early 1900’s, existing technology in the telephone system in the United States was such that every call required an operator. As the telephone system expanded, it became obvious that in a short time the number of operators required to operate the system would be tremendous. The obvious solution was to make it possible for users of the telephone system to perform the function of the operator. Now we all are telephone operators every time we dial a phone. The current situation with computers is similar to telephones in the early part of the century. The demand for computer services will only be satisfied if computer users can perform functions previously performed by computer programmers. High level languages like SAS allow users of the computer to perform the functions of programmers.

**ILLUSTRATION OF A SIMPLE SAS TAX ACCRUAL PROGRAM**

To illustrate the use of SAS to accomplish the task of computing income taxes and creating supporting work papers, I have written a simple program which accumulates Schedule M adjustments and calculates the taxable income for the “Anywhere Gas & Electric Company.” (See Figure 1.)

This program consists of the following four data steps:

<table>
<thead>
<tr>
<th>Data Step</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORK.SCHM1</td>
<td>Reads Schedule M file and sorts by description. Adds the Schedule M’s for each department to obtain a total for the entire company. Accumulates the Schedule M’s for each department and in total.</td>
</tr>
<tr>
<td>WORK.SCHM2</td>
<td>Keeps the total of the Schedule M’s for use later in the program.</td>
</tr>
<tr>
<td>WORK.TAXABLE1</td>
<td>Input the income before tax from each department and obtain a company total.</td>
</tr>
<tr>
<td>WORK.TAXABLE2</td>
<td>Merge the income before tax with the Schedule M adjustments. Calculate taxable income.</td>
</tr>
</tbody>
</table>

I have printed all the observations and variables contained in the SAS data sets created by each data step. This output is also shown in Figure 1.

Although SAS has the ability to print nice looking reports with very few program instructions, a report such as a tax accrual which duplicates manually prepared workpapers must be tailored to provide all headings, column titles, references, line numbers, descriptions, page numbers and underscores contained in workpapers. SAS also has the ability to do this.

With “formatted output” you can design your output to look exactly the way you want it.

In program lines 73-119 (see Figure 2), I prepare SAS 79.6 style “MACRO” statements. These “MACRO” statements allow the programmer to give a name to sections of code which will be used often in the program and call these sections of code by referring to the MACRO name later in the program. For example, in program lines 80-84, I create the MACRO called HEADING1 and call this MACRO later in the program at program line 166 and 235. This can be a real time saver if long sections of code are to be used several times in your program.

The code which creates Schedule 1 and Schedule 2 is contained in Figure 2 in program lines 120-173 and 185-242, respectively. The Schedules themselves also appear in Figure 2.

It took a few hundred SAS statements to input the data, process the data, make program comments, and generate two tailored reports. Granted, the example was trivial, but it illustrates some basic principles which also exist in larger programs.

Now that you have a basic understanding of SAS and the complexities of public utility taxes, I will describe the SAS system which was developed at SDG&E. The entire tax accrual system is over 27,000 SAS statements.

**Design of the Tax Accrual System (TAS)**

TAS is a menu-driven system utilizing the TSO command language to enter and exit SAS. Most input data is maintained on permanent SAS datasets using SAS/FSP as an editor. TAS is modular in design with a main program which receives input from several other subsystems, user-maintained permanent SAS datasets and other accounting databases. These subsystems are completely independent of one another.

Thus, a change in the input to subsystem “A” will not affect subsystem “B.” There are several advantages obtained from utilizing independent subsystems:

- Maintenance is easier.
- Individual subsystems can be run simultaneously and, therefore, faster.
- If a subsystem has had no changes in input data, it does not have to be rerun. The permanent SAS data sets it has created when it was last run still exist.
- The addition of more independent subsystems is relatively easy to accomplish as they can be created independently from the rest of TAS and merged into the main program when the new section has been completely tested.
NOTE: SAS RELEASE 8.2A AT SAN DIEGO GAS & ELECTRIC COMPANY (01682001).

1 TSO ALLOC FCMDATA DA(ARTICLE.PROGRAM(DATA));
2
3 OPTIONS NODATE NONOTES;
4
5 * S.A.S. EXAMPLE PROGRAM *
6 *
7 * ANYWHERE GAS & ELECTRIC COMPANY TAX ACCRUAL *
8 *
9 * WRITTEN BY :
10 JAMES H. SORENSON
11 SAN DIEGO GAS & ELECTRIC
12 P.O. BOX 1831
13 SAN DIEGO, CA 92112
14
15

---------------------------------------------------------*
16 INPUT SCHEDULE "Mn H; 17 ADJUSTMENTS FOR EACH
18 FOR EACH DEPARTMENT ;
19 OBTAIN TOTALS BY "M" ;
20 FOR EACH DEPARTMENT ;
21 AND ENTIRE COMPANY ;
22 KEEP THE TOTAL "M'S" ;
23 FOR USE LATER IN THE ;
24 KEEP THE TOTAL "M'S" ;
25 SET SCHM1 END=EOF;
26 KEEP ETOTAL GTOTAL GRANDTOT X;
27 IF EOF THEN OUTPUT ;
28 INPUT INCOME BEFORE TAXES ;
29 MERGE INCOME BEFORE TAXES & SCHEDULE "M" ;
30 MERGE TAXABLE SCHMZ ;
31 BY X ;
32 CALCULATE THE TAXABLE ;
33 INCOME BY DEPARTMENT ;
34 AND IN TOTAL ;
35 ETAXABLE = EBTAX + ETOTAL ;
36 GTAXABLE = GBTAX + GTOTAL ;
37 TTAXABLE = TBTAX + GRANDTOT ;

DATA WORK.SCHM1
OBS M TITLE ELEC M GASM T OTALM ETOTAL GTOTAL GRANDTOT
1 DEPRECIATION -75 -25 -100 -75 -25 -100
2 PAYROLL TAX CAPITALIZED -50 -50 -100 -50 -100 -200
5 RESEARCH AND DEVELOPMENT 25 25 50 -100 -50 -150

DATA WORK.SCHMZ
OBS ETOTAL GTOTAL GRANDTOT X
1 -150 -50 -150 1

DATA WORK.TAXABLE1
OBS X EBTAX GBTAX TBTAX
1 1 500 100 600

DATA WORK.TAXABLE2
OBS X EBTAX GBTAX TBTAX ETOTAL GTOTAL ETOTAL GRANDTOT ETAXABLE GTAXABLE TTAXABLE
1 1 500 100 600 -100 -50 -150 400 50 450

FIGURE 1.

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ANYWHERE GAS & ELECTRIC COMPANY

SCHEDULE 1

TAXABLE INCOME

JANUARY, 1983

REFERENCE ELECTRIC

GAS TOTAL

1. INCOME BEFORE TAX

500 100 600

2. SCHEDULE M ADJUSTMENTS

-100 -50 -150

TAX DEPT.

-75 -25 -100

PAYROLL TAX CAPITALIZED

-50 -50 -100

RESEARCH AND DEVELOPMENT

25 25 50

SCHEDULE 2

ANYWHERE GAS & ELECTRIC COMPANY

SCHEDULE M ADJUSTMENTS

JANUARY, 1983

REFERENCE ELECTRIC

GAS TOTAL

TAX DEPT.

-75 -25 -100

PAYROLL TAX CAPITALIZED

-50 -50 -100

RESEARCH AND DEVELOPMENT

25 25 50

FIGURE 2.
The Output of TAS

TAS generates 50 indexed schedules which are formatted just as an accountant would prepare workpapers. For example, items which appear on more than one schedule are cross referenced from or to another schedule within the set of schedules or an outside source is indicated. The schedules provide a level of detail sufficient to find obvious errors as nothing is "buried." If one number is added to another within the program, both numbers and the sum will appear on a schedule. The sum will be referenced and the source of the numbers added will be indicated. This was done to avoid the "black box" problem that exists with so many financial models. Models will output answers but the details behind these answers are buried in lines of unintelligible computer code. When TAS is reviewed and errors in input data are noted, the errors can be quickly corrected and a new set of schedules generated which reflects the corrections in minutes. This ability to generate the accrual quickly also is quite handy when copies are needed for auditors or people in other areas of the company.

OTHER FEATURES

Several other features exist which enhance the usefulness of TAS. A comparison system was developed which allows the user to compare different versions of the output. For example, a comparison of the February budget with the February actual is simple and easy as telling TAS which months and versions you want to compare. TAS also calculates the required information for the income tax footnote to the financial statements and, within a few months, TAS will be linked to the nuclear fuel accounting system. This will result in the elimination of much manual input. By mid-1984, TAS will be able to forecast several years into the future as opposed the current single-year format.

Impact

More important than how TAS is organized or technical issues relating to how TAS works are the results which TAS has brought. The process of preparing and reviewing the accrual has changed dramatically. We are now more concerned with reviewing input data and basic assumptions rather than with the process of reviewing the calculations. The answers to questions like, "Why was the budget for Federal tax expense for March $2 million higher than the actual?" can now be answered with precise detail. This helps to mitigate the problem of management attempting to oversimplify taxes by trying to find an explanation of tax variances like, "Taxes went up because income went up." which implies a one-to-one correlation in changes in tax expense with some other single variable. The truth is that many variables impact the amount of tax expense for a given month. TAS allows us to explain differences down to the level of detail necessary to avoid over-simplification while not becoming buried in minor details. The accountant is now able to analyze the impact of changes in key input variables without lifting his pencil. The focus of the nature of the accountant's job as it relates to the tax accrual has gone from a number-cruncher to that of an analyst. The days in which an accountant is judged by his ability to add columns of figures with his ten-key are numbered. At SDG& E, the accountant's tools are rapidly changing from pencil, eraser and ruler to the terminal, modem and disc drive. The change has meant tremendous increases in productivity from which the entire organization benefits.

THE FUTURE OF TAS

Once TAS was in place at SDG& E, we found the only limit to improving it was the imagination of the designer. Any major change which was attempted was completed without any assistance from others. TAS probably will never be "complete" as changes in tax laws, regulatory requirements and the information requirements of management change constantly. TAS was designed with this in mind and even major modifications can be done quickly and easily by Accountants.

CONCLUSION

As outside factors continue to make the job of the accountant more complex, we must make improvements in the methods we use to perform accounting functions. As the information requirements change, the job of the accountant must change. At SDG& E, the use of SAS has allowed us to continually redefine the nature and scope of our jobs to meet the constantly changing requirements for information.

Any questions or comments about TAS or this article should be referred to:

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