AN OUTLINE ILLUSTRATING THE PROCESS OF ANALYZING THE TAX IMPACTS OF AN INVESTMENT IN POLLUTION CONTROL EQUIPMENT

Cost Recovery and Depreciation Considerations

1. Ascertain the cost recovery and depreciation alternatives available to the entity
   - Exceptions not qualifying for ACRS
     - Public utility property not accounted for under the normalization method
     - Use of a depreciation method not expressed in years
     - Property subject to amortization; either leasehold improvements or Section 169 pollution control facilities
2. Use of ACRS
   - Confirm method with taxpayer
   - Determine asset recovery class
     - Review guideline tables (Exhibit I)
     - Confirm with taxpayer
   - Determine recovery basis (or more simply cost) of the property, ignoring salvage value
   - Determine statutory annual recovery percentages (refer to Exhibit II)
   - Calculate annual depreciation (recovery) deduction through the application of the recovery percentages to the property's recovery basis
3. Determine if the taxpayer would otherwise elect to utilize the optional recovery period (straight line)
     - Determine optional recovery period

- Determine straight-line depreciation rate
- Determine the annual depreciation charge (the half-year conversion in the first year)

4. Determine if the taxpayer utilizes a use-depreciation method, if so, determine taxpayer's method of depreciation and apply this method to the case at hand

5. Determine if the taxpayer would amortize the investment as a leashold improvement

   - If the required pollution control improvements are made to the leasehold they may be considered as capital investments subject to ACRS
   - If lease term is shorter than the ACRS recovery period the lessee may amortize over the shorter lease term

6. Determine if the investment would qualify as certified pollution control facilities

   - Evaluate whether a more beneficial position (i.e. more rapid write-off) would occur using an ACRS method
   - Pollution control facilities otherwise qualify for a five year write off
   - Determine amortizable basis
   - Calculate amortization on a straight line method over a sixty month period
   - Depreciate any remaining "unamortized adjusted basis using an ACRS method"

7. Determine additional first year expense

   - $5,000 limitations in 1981; raised to $10,000 by 1986

8. Review depreciation recapture effects

   - Applicability may be minimal

Minimum Tax Considerations

1. Determine amounts of annual tax preference items
   - Accelerated portion of depreciation or real (non-recovery) property
   - Accelerated portion of depreciation on leased personal property (non ACRS property)
   - Amortization; excess of rapid amortization
   - Excess of ACRS allowance over a straight-line ACRS on property subject to a lease and real recovery property
2. Calculate preference tax
   - Accumulate total annual tax preference items
   - Deduct from total tax preference the greater of:
     - 10,000, or
     - projected annual income tax liabilities
   - Apply the preference tax rate of 15% on the result to determine the minimum tax

Energy Credits

1) Determine if investment is to be made during the qualifying period and is for qualified energy property
2) Calculate credit at 10% of investment cost

Investment Tax Credits

1) Determine if property qualifies for the investment credit
2) Determine qualifying basis of property
   - new - no limitation
   - used - $125,000 - $150,000 limitation
3) Determine amount of investment credit
   - determine statutory percentages applicable
     - ACRS
     - Depreciation under Section (6)
     - Certified pollution control facilities

4) Review maximum investment credit limitations

California Tax Matters

1) No Investment Tax Credit

2) Depreciation

1) Determine life of asset for California depreciation purposes

2) Determine California depreciation method for California purpose

- Straight-line
- Sum-of-the-years digits
- Declining balance methods
- ADR

3) Additional first year allowance limited to $2,000

4) Amortization of pollution control facilities - accelerated write-off is available

Overall

1) Tax credits have a dollar-for-dollar investment analysis impact

2) Deductions have an impact to the extent of the effective marginal tax rates

- Federal - determine effective marginal tax rate - statutory
- State - determine effect marginal tax rate - statutory

ADDENDUM - THE NEW TAX EQUITY AND FISCAL RESPONSIBILITY ACT OF 1982 (TEFRA)

The Tax Equity and Fiscal Reponsibility Act of 1982 (TEFRA) made several changes which affect the after-tax cost of air pollution control compliance. The following summary of the most significant changes is keyed to the separate previous sections of this report.

Cost Recovery and Depreciation

The cost recovery schedules for personal property (which includes most public utility property) provided by the Economic Recovery Tax Act of 1981 (ERTA) reflect the 150% declining balance method (with a switch to the straight-line method) for the years 1981-84. In 1985, the schedules provided for an acceleration to reflect the 175% declining balance method with a switch to the sum-of-the-years digit (SYD) method. In 1986, they were to accelerate further to reflect the 200% declining balance method with a switch to the SYD method.

The 1982 Tax Act repeals both the 1985 and 1986 accelerations of depreciation, thereby limiting the tax benefits of depreciation to currently existing levels. For real property which currently utilizes a 175% declining balance method under ACRS (with no scheduled increased to 200%) no changes were made.

Special Pollution Control Amortization

The benefits of rapid amortization for pollution control equipment have been reduced by the 1982 Tax Act. Fifteen percent of the basis of pollution control facilities to which an election under Section 169 applies is now treated as if the election did not apply. This 15% reduction in the amortization deduction for pollution control facilities reduces the tax benefit of the Section 169 election and increases the after-tax cost of compliance to the taxpayer. However, as discussed previously in this report, the Section 168 Accelerated Cost Recovery System provided by ERTA may in some cases provide a more rapid write-off than that provided under Section 169, thus minimizing the impact of this change.

Investment Tax Credit

In the past, cost recovery deductions were allowed for 100% of the cost of a depreciable asset, including property for which the regular or energy investment tax credits were allowed. The 1982 Tax Act changes this, requiring a taxpayer to reduce the basis of assets by 50% of the amount of regular and energy investment tax credits. The lower basis must be used to compute cost recovery under ACRS, depreciation recapture, and gain or loss on disposition. The new law is applicable to property placed in service after December 31, 1982. A transitional rule excludes from the new law property (other than public utility property) placed in service before January 1, 1986 for which a contract was entered into after August 13, 1981, and was binding on July 1, 1982, and at all times thereafter.

All public utility property placed in service after December 31, 1982 is subject to the basis reduction rules except to the extent construction expenditures and qualified progress expenditures were incurred prior to 1983.

Taxpayers may elect to reduce the credit by 2% in lieu of making a basis adjustment. This election is made on a property-by-property basis.

The investment tax credit allowed in each year is limited to the first $25,000 of tax liability, plus 90% of the tax liability in excess of $25,000 for taxable years ending after 1981 and $25,000 plus 85% of the excess after 1982.

Leases

Many of the tax benefits derived from the installation of pollution control equipment are in the form of tax credits (investment tax credit) and deductions (depreciation/ amortization). These benefits can be used to reduce income taxes otherwise payable. However, for companies in a loss position which do not have an income tax liability and are unable to utilize these tax benefits, leasing may be a viable alternative to purchasing the equipment. In a properly structured lease or

sale-leaseback transaction, the lessee may be able to reduce its actual cost of the pollution control equipment by in effect selling the tax benefits of the equipment to a lessor which can utilize them.

The lease transaction is generally accomplished in one of two ways. The lessor can purchase the equipment outright and lease it to the lessee. Alternatively, the lessee can purchase the equipment and sell it to the lessor, then enter into a contract to lease the equipment back from the lessor. This later method is known as a sale-leaseback transaction. In either case, the lessee would be given an option to purchase the equipment at the end of the lease term, since such pollution control equipment would have little use to the lessor.

For example, assume a taxpayer is required to install pollution control equipment. Assume further, that the taxpayer has had little or no tax liability during the past few years. The benefit of the investment tax credit and depreciation deductions will not be realized by the taxpayer until income is generated. This reduces, and could eliminate (if the benefits expire before they are used), the tax benefit to the taxpayer of purchasing the pollution control equipment.

If this same taxpayer (T) enters into a transaction where a profitable taxable company (P) purchases the equipment and leases it to T, the tax benefits can be currently recognized by P. The cost to T of obtaining the use of the equipment is reduced based on the value of the tax benefits to P.

For tax purposes, there can be a question as to whether a leasing relationship really exists, or whether the transaction should be treated as a sale. If the transaction is treated as a sale of the equipment from the lessor to the lessee, then the tax benefits would once again be with the lessee company (which is not in a position to utilize them). The Internal Revenue Service has developed a set of guidelines which, if followed, will guarantee lease treatment for the transaction. Leases which do not adhere to these "safe harbor" guidelines can be subject to IRS review and may be reclassified as a sale.

TEFRA contains numerous changes which affect leasing transactions. In general, TEFRA makes the safe harbor guidelines more restrictive through 1983 so that fewer leases will qualify for this beneficial treatment. After 1983, the safe harbor provisions are repealed and are replaced by a new category of "finance" leases (public utility property will not qualify as finance lease property).

There are numerous rules in this area and many are very specific. Generally, the present laws which govern non-safe harbor and safe harbor leases remain in effect through December 31, 1983, with the TEFRA laws effective thereafter. The following sections will provide an overview of the present laws and TEFRA rules for non-safe harbor and safe harbor leasing.

Non-Safe Harbor Leasing - Present Law

The general rule followed for non-safe harbor leases is that the economic substance of a transaction, not its form, determines who is the owner of property for tax purposes. The Internal Revenue Service has issued revenue procedures which provide objective guidelines for determining non-safe harbor lease treatment of leveraged leases of equipment. The guidelines are as follows:

1. Lessor's minimum investment - The lessor must have a minimum of 20% unconditional at-risk investment in the property.

2. Lessee's investment - The cost of the leased property may not be provided by the lessee or any party related to the lessee.

3. Lessee loans or guarantees - The purchase of the property cannot be funded by the lessee. This prohibits direct funding (loans) and indirect funding (guarantees).

4. Purchase options - The lessee may not have an option to purchase the property at the end of the lease at any price other than fair market value determined at the time of exercise. The lessor cannot have a contractual right to require any party to purchase the property.

5. Lessor profit and cash flow - The lessor must expect to receive, independent of tax benefits, a profit and positive cash flow from the lease transaction.

6. Limited use property - Property that can be used only by the lessee is not eligible for lease treatment.

Non-Safe Harbor Leasing - TEFRA

Effective for leases entered into after December 31, 1983, there will be some changes to the non-safe harbor leasing rules stated above. First, a 90 day window is allowed, which means that property leased within 90 days after it has been placed into service will be considered new property. Second, a new category of leases called finance leases has been established. Finance leases need not meet the purchase option and limited use property qualifications listed above. However, the following is a list of requirements which do apply to finance leases:

- Public utility property is not eligible for finance lease treatment.

- The general requirement that lessors must be corporations or partnerships and grantor trusts of one or more corporations.

- New limitations concerning the creation of new operating loss and investment tax credit carrybacks apply.

- Lessor is prohibited from reducing its tax liability by more than 50%. This limitation expires for property placed in service after September 30, 1985 for a lessor's year beginning after such date.

- The investment tax credit is recognized pro-rata over 5 taxable years for property placed in service before September 30, 1985.

- Eligibility requirements are:

  - Maximum lease term cannot exceed the applicable recovery period (5 years for 3-year property, 8 years for 5-year property, and 15 years for 10-year property)or, if greater, 120% of the property's present ADR class life.

  - The interest rate on lessor obligations may not exceed the rate on overpayments and underpayments of federal income tax in effect when the lease agreement is entered into.

- Property acquired by a lessee through finance leases is limited to 40% of the qualified base property placed in service during the year and terminates at the end of 1985. Qualified base property includes new Section 38 property of the lessee, financed leased property, and designated leased property (new property eligible for the investment credit that is used by the lessee under a long-term agreement qualifying as a lease). If property exceeding this limitation is leased, the last properties leased are the ones first disqualified.

- Lessee computes its percentage depletion deduction for property subject to a finance lease as if it owned the property.

Safe Harbor Leasing - Present Law

The exception to the "substance over form" rule for leases is the safe harbor lease. The safe harbor leasing provisions allow lease treatment to transactions which would not otherwise qualify as leases if the following requirements are met:

- Eligibility requirements:

  - The maximum lease term cannot exceed the greater of 90% of the useful life of the property or 150% of the ADR midpoint of the property.

  - The maximum interest rate on lessee obligations may not exceed by more than 3 percentage points the rate on tax overpayments or underpayments, the prime rate, or an arms-length rate.

- Eligible property

  - The property must be "qualified leased property" which, in general, means new equipment eligible for ACRS and the investment credit.

  - The property may be leased within 3 months (the 90-day window) after the property is placed in service without violating the requirement that the equipment be new equipment.

  - Property used by tax-exempt and government organizations is not eligible.

  - Public utility property is eligible.

- ACRS deductions
  - The taxpayer may elect the regular recovery period of 3 years for 3-year property, 5 years for 5-year property, and 10 years for 10-year property.
  - The taxpayer may elect accelerated percentages approximating use of the 150% declining balance method in early recovery years and the straight-line method in subsequent recovery years.
  - 100% of any investment tax credit is allowable when property is placed into service.

Safe Harbor Leasing - TEFRA

TEFRA reduces the benefits of, and after 1983 repeals, the safe harbor lease rules.

- Eligibility requirements
  - The maximum lease term cannot exceed the applicable recovery period to the lessor for the leased property or, if greater, 120% of the property's present ADR class life.
  - The interest rate on lessor obligations may not exceed the rate on overpayments and underpayments of federal income tax in effect when the lease agreement is entered into.
- Eligible property
  - Public utility property cannot be qualified as leased property.
  - Property leased to a governmental unit or to an organization that was tax-exempt at any time within the 5-year period prior to the lease date does not qualify, unless such property is used by the lessee in an activity subject to the unrelated trade or business income tax.
  - Property used by a foreign person not subject to U.S. tax on income derived from using the property is ineligible.
- ACRS deductions and investment tax credit
  - Recovery periods become 5 years for 3-year property, 8 years for 5-year property, and 15 years for 10-year property.

- Cost recovery is based on the 150% declining balance method, changing to straight-line where appropriate, and using a half-year convention in the first year.

- The investment tax credit is recognized pro rata over 5 taxable years. The tax basis of the asset for cost recovery purposes must be reduced by 50% of the investment tax credit allowable on the property.

- Lessee limitatins

  - Eligible property may not exceed 45% of the qualified base property placed in service during that calendar year (i.e., 1982 and 1983). Qualified base property includes all property for which a safe harbor election has been made, all other new Section 38 property of the lessee that is placed in service during the taxable year, and designated lease property (new property eligible for the investment credit by the lessee that is used under a long-term agreement qualifying as a lease under non-safe harbor rules). If property exceeding this limitation is leased, the last properties leased are the first ones disqualified.

  - Percentage depletion limitations based on taxable income are determined as if the lessee owned the leased property. For this purpose, ACRS deductions must be based on the recovery period and method used by the lessor.

  - A lessee cannot enter into safe harbor leasing transactions with related parties.

- Lessor limitations

  - Tax credits and deductions allocable to safe harbor lease property cannot reduce the lessor's income tax, including minimum tax, by more than 50%. Carryover of disallowed deductions and credits is allowed.

  - Net operating loss and credit carrybacks allocable to safe harbor leasing are denied.

  - The at-risk limitations on losses and credits generally do not apply to lessors that are closely-held corporations with respect to qualified leased property for which a safe-harbor election has been made.

Bonds

Funds used to purchase air and water pollution control facilties can be raised by issuing industrial development bonds (IDB). The interest paid to the investors on these bond issues is excluded from federal taxable income of the investors. This tax-free feature is attractive to investors, and thus facilitates the funding of purchasing new pollution control equipment.

The following paragraphs describe the pre and post TEFRA tax laws relating to IDBs issued to purchase air or water pollution control facilities. Generally, TEFRA introduces approval and reporting requirements for bonds issued after December 31, 1982.

Tax-Exempt Bonds - Present Law

The present law regarding tax-exempt bonds is that interest on Industrial Development Bonds (IDB's) is tax exempt if issued to finance air or water pollution control facilities. Accelerated methods of depreciation including ACRS are provided under the Code and IDB financed property also may qualify for the investment tax credit. Present law imposes no reporting requirements on issuers of tax-exempt bonds for private activities. There are no federal procedural requirements governing the manner in which such bonds are issued.

Present law generally prohibits the issuance of IDB's to acquire existing air or water pollution control facilities if a substantial user of the facilities prior to the acquisition will be a substantial user after the acquisition.

Tax-Exempt Bonds-TEFRA

Under TEFRA, a number of amendments to the present law with regard to air and water pollution control facilities have been made. Property placed in service after 1982 is not eligible for "accelerated" ACRS methods if financed with IDBs. Instead, the cost of the equipment financed through an IDB must be recovered using the straight-line method (with a half-year depreciation convention and no salvage value) over the regular ACRS period for the asset. The tax advantage is reduced to the extent of the

disallowed accelerated depreciation. ACRS deductions for IDB financed property are continued for air and water pollution control facilities installed in connection with facilities existing before July 1, 1982, or in connection with converting a facility using oil or natural gas to coal.

- Effective for bonds, including refunding issues, issued after December 31, 1982, issuers of all IDBs are required to report information to the Internal revenue Service on such bonds issued during the preceding quarter. The reports are due on May 15, August 15, November 15, and February 15 of each year.

- TEFRA establishes new approval requirements for private activity IDBs. Approval by an elected official or legislative body for the issuing jurisdiction and the jurisdiction where the facilities are located is required. Failure to comply will result in loss of tax exemption. Public approval requirements are effective for obligations, including refunding issues, issued after December 31, 1982.

- TEFRA permits tax-exempt IDBs to be issued for use by a regional pollution control authority to acquire existing air or water pollution control facilities which the authority itself will operate under certain conditions. The provision applies to expenditures made after the date of enactment.

- The new law establishes a relationship between bond maturity and the life of the assets. TEFRA limits the weighted average maturity of all obligations of an issue to 120% of the weighted average estimated economic life of the assets financed with the proceeds of the issue. The economic life of the assets will be determined on a case-by-case basis.

- Special rules are provided for the treatment of land in determining the weighted economic life of assets. Where less than 25% of the bond proceeds are used to acquire land, the economic life of the assets financed by the bonds is determined without regard to the land. Where 25% or more of the bond proceeds are used to acquire land, the economic life of the assets acquired by the bonds will be determined by assuming that the land has a life of 50 years.

The rules above make it more difficult to initially qualify and continue to qualify for IDB financed air and water pollution control facilities due to approval and reporting requirements.

In addition, the tax benefit of depreciation write off has been reduced from accelerated to straight-line rates. Finally, by linking the asset life to bond maturity, purchases of air and water pollution control equipment face new limitations on the term of the bond offering when financing with IDBs.

Capitalization of Construction Period Interest and Taxes for Real Property

The Act requires that corporations capitalize interest and real estate taxes attributable to the construction of nonresidential real property. Corporations subject to these requirements must now amortize the capitalized amounts over 10 years, 10 percent being deductible in the year paid or incurred. The remaining 90 percent is deductible ratably over 9 years, beginning generally with the year the property is available to be placed in service or held for sale, whichever is later.

The Act also provides that the IRS must issue regulations providing for the allocation of interest to real property under construction.

These provisions are effective for taxable years beginning after December 31, 1982, with respect to construction which begins after that date.

This provision of the Act, Section 189, applies only to real property. Therefore, interest related to the construction of personal property is not required to be capitalized under this provision. Certain items of real public utility property qualify both as Section 38 property for ITC purposes and as Section 1245 class property for ACRS purposes. Therefore, the distinction as to whether an item of tangible property is real or personal, which may not have been important in the past, will likely take on much added significance under the Act for utilities which, historically, have

expensed for tax purposes significant amounts of construction period interest and taxes incurred with respect to all of these property additions. Beginning in 1983 some of those construction period expenditures will have to be capitalized. In addition, for any such expenditures that will have to be capitalized, utilities should consider whether an election to capitalize interest and taxes pursuant to IRC Section 266 might be preferable to capitalization under amended IRC Section 189 because of a possibly more rapid amortization of such costs.

FOOTNOTES

1. For the purposes of this exception, public utility property means property used predominantly in the furnishing or sale of

   a. electrical energy, water, or sewage disposal services,

   b. gas or steam through a local distribution system,

   c. telephone services, or other communication services if furnished or sold by the Communications Satellite Corporation, or

   d. transportation of gas or steam by pipeline

   if the rates for such furnishing or sale have been established or approved by a State, a U.S. agency, or a public service or public utility commission or other similar body of any State or political subdivision thereof.

2. Within the framework of this study, Section 1245 class property is defined for ACRS purposes as tangible depreciable property which is either personal property or is other property (not including a building or its structural components) which is used as an integral part of manufacturing, production, or extracting or of furnishing transportation, communications, electrical energy, gas, water, or sewage disposal services.

3. For ACRS purposes, Section 1250 class property is depreciable real property other than Section 1245 property, as defined in footnote 2.

4. The class life asset depreciation range system (ADR), as outlined in Revenue Procedure 77-10, provides class lives for various asset categories based on broad industry classifications. This depreciation method, which was elective for federal purposes under Section 167, has essentially been replaced by the new accelerated cost recovery system provided under Section 168.

ADR is more fully discussed in the California Tax matters section of this chapter, since it is still in use for California purposes. Also, see Exhibit III for a complete listing of the ADR asset descriptions and class lives. Note that the new ACRS uses ADR class lives as a reference for classifying an asset within one of the five ACRS recovery classes.

5. The ACRS statutory rates, reflected in Exhibit II, for all property other than 15-year real property, comprise accelerated declining balance methods with a general half year convention for the year in which the asset is first placed in service. For the years 1981-1984, the accelerated method incorporated in the table approximates the benefit using the 150-percent declining balance method for the early years of the recovery period with a switch to the straight-line method for the remainder of the recovery period. For 1985, the prescribed accelerated method approximates the benefit of using the 175-percent declining balance method with a switch to the straight-line method. In 1986 and thereafter, the table approximates the benefit of using the 200-percent declining method with a switch to straight-line.

   Exhibit II also reflects the statutory rates for 15 year real property. This Table is set up differently in that there is no half-year convention and the rates are the same for all years. Note however that the Table is divided into 12 columns, with the taxpayer selecting the rate from the column representing the month in the first year the property is placed in service.

6. Under the half-year convention, the depreciation allowance is computed by treating all property acquired during the year as placed in service on the first day of the second half of the taxable year. Thus, no matter when acquired, all property acquired will be depreciated one-half year in the year of acquisition.

7. The term "pollution control equipment" for the purposes of the energy credit does not include any equipment which -

   a. is installed on or in connection with property which, as of October 1, 1978, was using coal (including lignite), and

   b. was required to be installed by federal, state or local regulations in effect on such date.

   For purposes of the preceding definition, in the case of conversion equipment described in clause 5(a) and (b) of the energy credit text, January 1, 1980 should be substituted for October 1, 1978.

8. The term "alternate substance" means any substance other than -

   a. oil and natural gas, and

   b. any product of oil and natural gas.

9. Projects which fall within the rule are those that are expected to have a normal construction period of two years or more. The normal construction begins and ends on the date it is expected the property will be available for placing in service.

10. An investment credit which cannot be fully utilized to lower the tax liability for the taxable year in which it arises can generally be carried back three years and carried over 15 years on a "first-in, first-out" basis. The unused credit for the current year is first carried back for use in the earliest carryback year. Any remaining credit is then applied to each succeeding year in chronological order until it has been completely used.

11. The general rule providing that a credit against income tax is allowed for qualified investment in certain property is supplied by Internal Revenue Code Section 38. However, the rules which govern the actual allowance of the credit are contained in Code Sections 46-48 and the Regulations thereunder. Briefly, Code Section 46 involves determination of the credit and the limitations thereon, while Section 48

provides the definition of what property qualifies for the credit. Section 47 deals with the adjustment of previous investment tax credit taken and increases in tax, where the property on which credit has been taken is disposed of or ceases to be qualifying (Section 38) property prematurely.

12. An exception to the rule that property must be placed in service during the year is provided by Section 46(d) for qualified progress expenditures. This exception is discussed elsewhere in this chapter.

13. Several recent letter rulings by the IRS provide support for treating air pollution control equipment as Section 38 property based on this theory. For example, in Letter Rulings 8002002 and 8002004 a taxpayer (a nuclear electrical generating plant) received a favorable ruling which concluded that various radiation pollution control systems, including a radwaste structure, an off gas filter enclosure, an off gas recombiner enclosure and an off gas stack, did qualify as Section 38 property eligible for investment tax credit. The Service reasoned that, "...these assets are special purpose structures and are an integral part in the production of electrical energy under section 1.48-1 of the regulations."

14. Basis is generally cost, including all items which are properly capitalized, such as freight and installation costs. If property is constructed or erected for taxpayer's own use, the basis of the constructed property includes the cost or other basis of materials entering into such work. Although the Internal Revenue Code distinguishes between cost and basis, in most instances cost and basis will not differ in the acquisition of pollution control equipment and the cost of the equipment may be used by the ARB staff to calculate the qualified investment for both new and used acquisitions.

15. Section 38 property is <u>new</u> if the original use of property commences with the taxpayer and commences after the date acquired. Original use means the first use to which the property is put, whether or not such use corresponds to the use

of such property by the taxpayer. However, it is not necessary that materials entering into construction be new in use for the constructed property to be new Section 38 property. Used Section 38 property is that property of which the taxpayer is not the original user.

16. Where a certified pollution control facility is financed by the proceeds of an industrial development bond, the interest on which is exempt from federal income tax, only 50% of the facility's adjusted basis qualifies for the credit if the taxpayer elects to use the Section 169 special amortization and the useful life of the facility is greater than five years.

17. In the case of self-constructed property (i.e., more than half the construction expenditures will be made directly by the taxpayer), the term "qualified progress expenditures" means the amount which is properly chargeable (during such taxable year) to a capital account with respect to such property.

    In the case of non-self-constructed property, the term "qualified progress expenditures" means the lesser of:

    a) the amount paid during the taxable year to another person for the construction of such property, or

    b) the amount which represents that proportion of the overall cost to the taxpayer of the construction by such other person which is properly attributable to that portion of such construction which is completed during such taxable year.

18. Normal construction period means the period reasonably expected to be required for the construction of the property:

    a) beginning with the date on which physical work on the construction begins (or, if later, on the first day of the first taxable year to which the election applies), and

    b) ending on the date on which it is expected that the property will be available for placing in service.

19. Property that is sold, donated, abandoned or otherwise retired from use (including casualties or thefts) is considered disposed of for recapture purposes. Property is prematurely disposed of if it is disposed of prior to termination of the life originally assigned to it for determining the investment tax credit. For example, if 5-year recovery class property which qualified for the ITC is disposed of after four years, a portion of the credit originally allowed must be recaptured.

20. Any use other than those previously outlined in this chapter as qualifying an investment in tangible depreciable property for investment tax credit treatment is a disqualifying use.

APPLICABLE PERCENTAGE OF QUALIFYING PROPERTY USED TO CALCULATE 10% INVESTMENT TAX CREDIT

Depreciation or amortization under following section:

		Life in years		
		3 - 5	5 - 7	7 +
Section 168	Accelerated cost recovery system (recovery property)	60	100	100
Section 167	General depreciation	33-1/3	66-2/3	100
Section 169	Amortization of certified pollution control facilities	33-1/3	100	100

Note: The life used to calculate ITC should be the same useful life used for calculating depreciation under Section 167 or the cost recovery period under ACRS. For amortization of pollution control facilities, the 60 month amortization period is ignored and the useful life of the property is used to determine the appropriate ITC qualifying property percentage above.

ACRS COST-RECOVERY PERCENTAGES FOR PROPERTY OTHER THAN REAL/ESTATE (by Year Placed in Service)

Property:	Property Placed in Service in 1981-1984	1985	1986 and Thereafter
3-year:			
Year 1	25	29	33
Year 2	38	47	45
Year 3	37	24	22
5-year:			
Year 1	15	18	20
Year 2	22	33	32
Year 3	21	25	24
Year 4	21	16	16
Year 5	21	8	8
10-year:			
Year 1	8	9	10
Year 2	14	19	18
Year 3	12	16	16
Year 4	10	14	14
Year 5	10	12	12
Year 6	10	10	10
Year 7	9	8	8
Year 8	9	6	6
Year 9	9	4	4
Year 10	9	2	2
15-year public utility:			
Year 1	5	6	7
Year 2	10	12	12
Year 3	9	12	12
Year 4	8	11	11
Year 5	7	10	10
Year 6	7	9	9
Year 7	6	8	8
Year 8	6	7	7
Year 9	6	6	6
Year 10	6	5	5
Year 11	6	4	4
Year 12	6	4	3
Year 13	6	3	3
Year 14	6	2	2
Year 15	6	1	1

Refer to note 5.

ACRS COST-RECOVERY PERCENTAGES FOR REAL ESTATE

If the Recovery Year Is:	The applicable percentage is (use the column representing the month in the first year the property is placed in service):											
	1	2	3	4	5	6	7	8	9	10	11	12
1	12	11	10	9	8	7	6	5	4	3	2	1
2	10	10	11	11	11	11	11	11	11	11	11	12
3	9	9	9	9	10	10	10	10	10	10	10	10
4	8	8	8	8	8	8	9	9	9	9	9	9
5	7	7	7	7	7	7	8	8	8	8	8	8
6	6	6	6	6	7	7	7	7	7	7	7	7
7	6	6	6	6	6	6	6	6	6	6	6	6
8	6	6	6	6	6	6	5	6	6	6	6	6
9	6	6	6	6	5	6	5	5	5	6	6	6
10	5	6	5	6	5	5	5	5	5	5	6	5
11	5	5	5	5	5	5	5	5	5	5	5	5
12	5	5	5	5	5	5	5	5	5	5	5	5
13	5	5	5	5	5	5	5	5	5	5	5	5
14	5	5	5	5	5	5	5	5	5	5	5	5
15	5	5	5	5	5	5	5	5	5	5	5	5
16	..	..	1	1	2	2	3	3	4	4	4	5

Refer to note 5.

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
SPECIFIC DEPRECIABLE ASSETS USED IN ALL BUSINESS ACTIVITIES, EXCEPT AS NOTED:				
00.12	Information Systems: Includes computers and their peripheral equipment used in administering normal business transactions and the maintenance of business records, their retrieval and analysis. Information systems are defined as: 1) Computers: A computer is an electronically activated device capable of accepting information, and supplying the results of these processes to the information, and supplying the results of these processes with or without human intervention. It usually consists of a central processing unit containing extensive storage, logic, arithmetic, and control capabilities. Excluded from this category are adding machines, electronic desk calculators, etc. 2) Peripheral equipment consists of the auxiliary machines which may be placed under control of the central processing unit. Non limiting speed printers, optical character readers tape cassettes, mass storage units, paper tape equipment, keypunches, data entry devices, teleprinters, terminals, tape drives, disc drives, disc files, disc packs, visual image projector tubes, card sorters, plotters, and collators. Peripheral equipment may be used on-line or off-line. Does not include equipment that is an integral part of other capital equipment and which is included in other CLADR classes of economic activity, i.e., computers used primarily for process or production control, switching and channeling	5	6	7

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
00.3	Land Improvements: Includes improvements directly to or added to land, whether such improvements are section 1245 property or section 1250 property, provided such improvements are depreciable. Examples of such assets might include sidewalks, roads, canals, waterways, drainage facilities, sewers, wharves and docks, bridges, fences, landscaping, shrubbery, or radio and television transmitting towers. Does not include land improvements that are explicitly included in any other class, and buildings and structural components as defined in section 1.48-1(e) of the regulations. Excludes public utility initial clearing and grading land improvements as specified in Rev. Rul. 72-403, 1972-2C.B.102.		20	
00.4	Industrial Steam and Electric Generation and/or Distribution Systems: Includes assets, whether such assets are section 1245 property or 1250 property, providing such assets are depreciable, used in the production and/or distribution of electricity with rated total capacity in excess of 500 Kilowatts and/or assets used in the production and/or distribution of steam with rated total capacity in excess of 12,500 pounds per hour, for use by the taxpayer in his industrial manufacturing process or plant activity and not ordinarily available for sale to others. Does not include buildings and structural components as defined in section 1.48-1(e) of the regulations. Assets used to generate and/or distribute electricity or steam of the type described above of lesser rated capacity are not included, but are included in the appropriate manufacturing equipment classes elsewhere specified. Steam and chemical recovery boiler systems used for the recovery and regeneration of chemicals used in manufacturing, with rated capacity in excess of that described above,			

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
	with specifically related distribution and return systems are not included but are included in appropriate manufacturing equipment classes elsewhere specified. An example of an excluded steam and recovery boiler system is that used in the pulp and paper manufacturing industry	22.5	28	33.5
10.0	Mining:			
	Includes assets used in the mining and quarrying of metallic and nonmetallic minerals (including sand, gravel, stone, and clay) and the milling, and other primary preparation of such materials	8	10	12
13.1	Drilling of Oil and Gas Wells:			
	Includes assets used in the drilling of onshore oil and gas wells and the provisions of geophysical and other exploration services; and the provision of such oil and gas field services as chemical treatment, plugging and abandoning of wells and cementing or perforating well casings. Does not include assets used in the performance of any of these activities and services by integrated petroleum and natural gas producers for their own account	5	6	7
13.2	Exploration for and Production of Petroleum and Natural Gas Deposits:			
	Includes assets used by petroleum and natural gas producers for drilling of wells and production of petroleum and natural gas, including gathering pipelines and related storage facilities	11	14	17
13.3	Petroleum Refining:			
	Includes assets used for the distillation, fractionation, and catalytic cracking of crude petroleum into gasoline and its other components	13	16	19
13.4	Marketing of Petroleum and Petroleum Products:			
	Includes assets used in marketing petroleum and petroleum products, such as related storage facilities and complete service stations, but not including any of these facilities related to petroleum and natural gas trunk pipelines	13	16	19

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guide-line class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
20.1	Manufacture of Grain and Grain Mill Products:			
	Includes assets used in the production of flours, cereals, livestock feeds, and other grain and grain mill products	13.5	17	20.5
20.2	Manufacture of Sugar and Sugar Products:			
	Includes assets used in the production of raw sugar, syrup, or finished sugar from sugar from sugar cane or sugar beets	14.5	18	21.5
20.3	Manufacture of Vegetable Oils and Vegetable Oil Products:			
	Includes assets used in the production of oil from vegetable materials and the manufacture of related vegetable oil products	14.5	18	21.5
20.4	Manufacture of Other Food and Kindred Products:			
	Includes assets used in the production of foods and beverages not included in classes 20.1, 20.2, and 20.3	9.5	12	14.5
20.5	Manufacture of Food and Beverages-Special Handling Devices:			
	Includes assets defined as specialized materials handling devices, such as returnable pallets, palletized containers, and fish processing equipment including boxes, baskets, carts, and flaking trays used in activities as defined in classes 20.1, 20.2, 20.3, 20.4. Does not include general purpose small tools such as wrenches and drills, both hand and power driven, and other general purpose equipment, such as conveyors, transfer equipment, and materials handling devices	3	4	5
21.0	Manufacture of Tobacco and Tobacco Products:			
	Includes assets used in the production of cigarettes, cigars, smoking and chewing tobacco, snuff, and other tobacco products	12	15	18
22.1	Manufacture of Knitted Goods:			
	Includes assets used in the production of knitted and netted fabrics and lace. Assets used in yarn preparation, bleaching, dyeing, printing, and other similar finishing processes, texturing, and packaging are elsewhere classified	6	7.5	9

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
22.2	Manufacture of Yarn, Thread, and Woven Fabric: Includes assets used in the production of spun yarns including the preparing, blending, spinning, and twisting of fibers into yarns and threads; the preparation of yarns, such as twisting, warping, and winding the production of covered elastic yarn and thread, cordage, woven fabric, tire fabric, braided fabric, twisted jute for packing, mattresses, pads, sheets, and industrial belts; and the processing of textile mill waste to recover fibers, flocks, and shoddies. Assets used to manufacture carpets, man-made fibers, and nonwovens, and assets used in texturing, bleaching, dyeing, printing, and other similar finishing processes are elsewhere classified	9	11	13
22.3	Manufacture of Carpets, and Dyeing, Finishing, and Packaging of Textile Products: Includes assets used in the production of carpets, rugs, mats, woven carpet backing, chenille, and other tufted products, and assets used in the joining together of backing with carpet yarn or fabric. Includes assets used in washing, scouring, bleaching, dyeing, printing, drying, and similar finishing processes applied to textile fabrics, yarns, threads, and other textile products, other than apparel, by creasing, forming, trimming, cutting, and sewing, such as the preparation of carpet and fabric samples, or similar joining together processes (other than the production of scrim reinforced paper products and laminated paper products), such as the sewing and folding of hosiery and panty hose, the creasing, folding, trimming, and cutting of fabrics to produce nonwoven products, such as disposable diapers and sanitary products. Assets used in the manufacture of nonwoven carpet backing, and hard surface floor covering such as tile, rubber, and cork, are elsewhere classified	7	9	11

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
22.4	Manufacture of Textured Yarns: Includes assets used in the processing of yarns to impart bulk and/or stretch properties to the yarn. The principal machines involved are falsetwist, draw, beam-to-beam, and stuffer box texturing equipment and related high-speed twisters and winders. Assets, as described above, which are further classified when located in the same plant in an integrated operation with man-made fiber producing assets. Assets used to manufacture man-made fibers and assets used in bleaching, dyeing, printing, and other similar finishing processes are elsewhere classified	6.5	8	9.5
22.5	Manufacture of Nonwoven Fabrics: Includes assets used in the production of nonwoven fabrics, felt goods including felt hats, padding, batting, wadding, oakum, and fillings from new materials and from textile mill waste. Nonwoven fabrics are defined as fabrics (other than reinforced and laminated composites consisting of nonwovens and other products) manufactured by bonding natural and/or synthetic fibers and/or filaments by means of induced mechanical interlocking, fluid entanglement, chemical adhesion, thermal or solvent reaction, or by combination thereof other than natural hydration bonding as occurs with natural cellulose fibers. Such means include resin bonding, web bonding, and melt bonding. Specifically includes assets used to make flocked and neddle punched products other than carpets and rugs. Assets, as described above, which are used to manufacture nonwovens are elsewhere classified when located in the same plant in an integrated operation with man-made fiber producing assets. Assets used to manufacture man-made fibers and assets used in bleaching, dyeing, printing, and other similar finishing processes, are elsewhere classified	8	10	12

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guide-line class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
23.0	Manufacture of Apparel and Other Finished Products: Includes assets used in the production of clothing and fabricated textile products by the cutting and sewing of woven fabrics, other textile products, and furs; but does not include assets used in the manufacture of apparel from rubber and leather	7	9	11
24.1	Cutting of Timber: Includes logging machinery and equipment and roadbuilding equipment used by logging and sawmill operators and pulp manufacturers for their own account	5	6	7
24.2	Sawing of Dimensional Stock from Logs: Includes machinery and equipment installed in permanent or well established sawmills	8	10	12
24.3	Sawing of Dimensional Stock from Logs: Includes machinery and equipment installed in sawmills characterized by temporary foundations and a lack, or minimum amount, of lumberhandling, drying, and residue disposal equipment and facilities	5	6	7
24.4	Manufacture of Wood Products, and Furniture: Includes assets used in the production of plywood, hardboard, flooring, veneers, furniture, and other wood products, including the treatment of poles and timber	8	10	12
26.1	Manufacture of Pulp and Paper: Includes assets for pulp materials handling and storage, pulp mill processing, bleach processing, paper and paperboard manufacturing, and on-line finishing. Includes pollution control assets and all land improvements associated with factory site or production process, such as effluent ponds and canals, provided such improvements are depreciable but does not include buildings and structural components as defined in section 1.48-1(e)(1)			

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guide-line class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
	of the regulations. Includes steam and chemical recovery boiler systems, with any rated capacity, used for the recovery and regeneration of chemicals used in manufacturing. Does not include assets used either in pulpwood logging, or in the manufacture of hardboard	10.5	13	15.5
26.2	Manufacture of Converted Paper, Paperboard, and Pulp Products: Includes assets used for modification or remanufacture of paper and pulp into converted products, such as paper coated off the paper machine, paper bags, paper boxes, cartons and envelopes. Does not include assets used for manufacture of non-wovens that are elsewhere classified	8	10	12
27.0	Printing, Publishing, and Allied Industries: Includes assets used in printing by one or more processes, such as letterpress, lithography, gravure, or screen; the performance of services for the printing trade, such as book-binding, typesetting, engraving, photoengraving, and electrotyping; and the publication of newspapers, books, and periodicals	9	11	13
28.0	Manufacture of Chemicals and Allied Products: Includes assets used in the manufacture of basic chemicals, such as acids, alkalies, salts, and organic and inorganic chemicals; chemical products to be used in further manufacture, such as synthetic fibers and plastics materials, including petrochemical processing beyond that which is ordinarily a part of petroleum refining; and finished chemical products, such as pharmaceuticals, cosmetics, soaps, fertilizers, paints and varnishes, explosives, and compressed and liquified gases. Does not include assets used in the manufacture of finished rubber and plastic products or in the production of natural gas products, butane, propane, and by-products of natural gas production plants	9	11	13

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
30.1	Manufacture of Rubber Products: Includes assets used for the production of products from natural, synthetic, or reclaimed rubber, gutta percha, balata, or gutta siak, such as tires, tubes, rubber footwear, mechanical rubber goods, heels and soles, flooring, and rubber sundries; and in the recapping, retreading, and rebuilding of tires	11	14	17
30.11	Manufacture of Rubber Products-Special Tools and Devices: Includes assets defined as special tools, such as jigs, dies, mandrels, molds, lasts, patterns, specialty containers, pallets, shells, and tire molds, and accessory parts such as rings and insert plates used in activities as defined in class 30.1. Does not include tire building drums and accessory parts and general purpose small tools, such as wrenches and drills, both power and hand-driven, and other general purpose equipment, such as conveyors and transfer equipment	3	4	5
30.2	Manufacture of Finished Plastic Products: Includes assets used in the manufacture of plastic products and the molding of primary plastic for the trade. Does not include assets used in the manufacture of basic plastics materials nor the manufacture of phonograph records	9	11	13
30.21	Manufacture of Finished Plastic Products-Special Tools: Includes assets defined as special tools, such as jogs, dies, fixtures, molds, patterns, guages, and specialty transfer and shipping devices used in activities as defined in class 30.2. Special tools are specifically designed for the production or processing of particular parts and have no significant utilitarian value and cannot be adapted to further or different use after changes or improvements are made in the model design of			

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guide-line class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
	of the particular part produced by the special tools. Does not include general purpose small tools such as wrenches and drills, both hand and powerdriven, and other general purpose equipment such as conveyors, transfer equipment, and materials handling devices	3	3.5	4
31.0	Manufacture of Leather and Leather Products: Includes assets used in tanning, currying, and finishing of hides and skins; the processing of fur pelts; and the manufacture of finished leather products, such as footwear, belting, apparel, and luggage	9	11	13
32.1	Manufacture of Glass Products: Includes assets used in the production of flat, blown, or pressed products of glass, such as float and window glass, glass containers, glassware and fiberglass. Does not include assets used in the manufacture of lenses	11	14	17
32.11	Manufacture of Glass Products - Special Tools: Includes assets defined as special tools such as molds, patterns, pallets, and specialty transfer and shipping devices, such as steel racks to transport automotive glass used in activities as defined in class 32.1. Special tools are specifically designed for the production or processing of particular parts and have no significant utilitarian value and cannot be adapted to further or different use after changes or improvements are made in the model design of the particular part produced by the special tools. Does not include general purpose small tools, such as wrenches and drills, both hand and power-driven, and other general purpose equipment, such as conveyors, transfer equipment, and materials handling devices	2	2.5	3
32.2	Manufacture of Cement: Includes assets used in the production of cement, but does not include any assets used in the manufacture of concrete and concrete products nor in any mining or extraction process	16	20	24

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
32.3	Manufacture of Other Stone and Clay Products: Includes assets used in the manufacture of products from materials in the form of clay and stone, such as brick, tile, and pipe; pottery and related products, such as vitreous-china, plumbing fixtures, earthenware and ceramic insulating materials; and also includes assets used in manufacture of concrete and concrete products. Does not include assets used in mining or extraction processes	12	15	18
33.1	Manufacture of Primary Ferrous Metals: Includes assets used in the smelting and refining of ferrous metals from ore, pig, or scrap; the rolling, drawing, and alloying of ferrous metals; the manufacture of castings, forgings, and other basic products of ferrous metals; and the manufacture of nails, spikes, structural shapes, tubing, wire, and cable	14.5	18	21.5
33.11	Manufacture of Primary Ferrous Metals - Special Tools: Includes assets defined as special tools such as dies, jigs, molds, patterns, fixtures, gauges, and drawings concerning such special tools used in the activites as defined in class 33.1, manufacture of Primary Ferrous Metals. Special tools are specifically designed for the production or processing of particular products or parts and have no significant utilitarian value and cannot be adapted to further or different use after changes or improvements are made in the model design of the particular part produced by the special tools. Does not include general purpose small tools, such as wrenches and drills, both hand and power driven, and other general purpose equipment, such as conveyors, transfer equipment, and materials handling devices. Rolls, mandrels, and refractories are not included in class 33.11 but are included in class 33.1	5	6.5	8

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
33.2	Manufacture of Primary Nonferrous Metals: Includes assets used in the smelting, refining, electrolysis of nonferrous metals, the manufacture of castings, forgings, and other basic products of nonferrous metals, and the manufacture of nails, spikes, structural shapes, tubing, wire, and cable	11	14	17
33.21	Manufacture of Primary Nonferrous Metals - Special Tools: Includes assets defined as special tools such as dies, jigs, molds, patterns, fixtures, gauges, and drawings concerning such special tools used in the activities as defined in class 33.2, Manufacture of Primary Nonferrous Metals. Special tools are specifically designed for the production or processing of particular products or parts and have no significant utilitarian value and cannot be adapted to further or different use after changes or improvements are made in the model design of the particular part produced by the special tools. Does not include general purpose small tools, such as wrenches and drills, both hand and power-driven, and other general purpose equipment, such as conveyors, transfer equipment, and materials handling devices. Rolls, mandrels, and refractories are not included in class 33.21 but are included in class 33.2	5	6.5	8
34.0	Manufacture of Fabricated Metal Products: Includes assets used in the production of metal cans, tinware, nonelectric heating apparatus, fabricated structural metal products, metal stampings, and other ferrous and nonferrous metal and wire products not elsewhere classified	9.5	12	14.5
34.01	Manufacture of Fabricated Metal Products - Special Tools: Includes assets defined as special tools, such as dies, jigs, molds, patterns, fixtures, gauges, and returnable containers and drawings concerning such special tools used in the activities as defined in class 34.0. Special tools are specifically designed for the pro-			

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
	duction or processing of particular machine components, products, or parts, and have no significant utilitarian value and cannot be adapted to further or different use after changes or improvements are made in the model design of the particular part produced by the special tools. Does not include general purpose small tools, such as wrenches and drills, both hand and power-driven, and other general purpose equipment, such as conveyors, transfer equipment, and materials handling devices	2.5	3	3.5
35.1	Manufacture of Metalworking Machinery: Includes assets used in the production of metal cutting and forming machines, special dies, tools, jigs, and fixtures, and machine tool accessories	9.5	12	14.5
35.11	Manufacture of Metalworking Machinery - Special Tools: Includes assets defined as special tools, such as jigs, dies, fixtures, molds, patterns, gauges, and specialty transfer and shipping devices used in activities as defined in class 35.1. Special tools are specifically designed for the production or processing of particular machine components or shipping devices, used in activities as defined in class 35.1. Special tools are specifically designed for the production or processing of particular machine components and have no significant utilitarian value and cannot be adapted to further or different use after changes or improvements are made in the model design of the particular part produced by the special tools. Does not include general purpose small tools, such as wrenches and drills, both hand and power-driven, and other general purpose equipment, such as conveyors, transfer equipment, and materials handling devices	5	6	7

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years)		
		Lower limit	Asset guideline period	Upper limit
35.2	Manufacture of Other Machines: Includes assets used in the production of such machinery as engines and turbines; farm machinery, construction, and mining machinery; general and special industrial machines, including office machines and nonelectronic computing equipment; miscellaneous machines except electrical equipment; and transportation equipment	9.5	12	14.5
35.21	Manufacture of Other Machines - Special Tools: Includes assets defined as special tools, such as jigs, dies, fixtures, molds, patterns, gauges, and specialty transfer and shipping devices used in activities as defined in class 35.2. Special tools are specifically designed for the production or processing of particular machine components and have no significant utilitarian value and cannot be adapted to further or different use after changes or improvements are made in the model design of the particular part produced by the special tools. Does not include general purpose small tools, such as wrenches and drills, both hand and power-driven, such as conveyors, transfer equipment, and materials handling devices	5	6.5	8
36.1	Manufacture of Electrical Equipment: Includes assets used in the production of machinery, apparatus, and supplies for the generation, storage, transmission, transformation, and utilization of electrical energy, such as; electric test and distributing equipment, electrical industrial apparatus, household appliances, electric lighting and wiring equipment, electronic components and accessories, phonograph records, storage batteries and ignition systems	9.5	12	14.5

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guide-line class	Description of assets included	Asset depreciation range (in years)		
		Lower limit	Asset guideline period	Upper limit
36.11	Manufacture of Electrical Equipment Special Tools: Includes assets defined as special tools, such as jigs, dies, molds, patterns, fixtures, gauges, returnable containers, and specialty transfer devices used in activities as defined in class 36.1. Special tools are specifically designed for the production of processing of particular machine components, products or parts, and have no significant utilitarian value and cannot be adapted to further or different use after changes or improvements are made in the model design of the particular part produced by the special tools. Does not include general purpose small tools, such as wrenches and drills, both hand and power-driven and other general purpose equipment, such as conveyors, transfer equipment, and materials handling devices	4	5	6
36.2	Manufacture of Electronic Products: Includes assets used in the production of electronic detection, guidance, control radiation, computation, test, and navigation equipment or the components thereof, including airborne application. Also includes assets used in the manufacture of electronic airborne communication equipment or the components thereof. Does not include the assets of manufacturers engaged only in the purchase and assembly of components	6.5	8	9.5
37.11	Manufacture of Motor Vehicles: Includes assets used in the manufacture and assembly of finished automobiles, trucks, trailers, motor homes, and buses. Does not include assets used in mining, printing and publishing, production of primary metals, electricity, or steam or the manufacture of glass, industrial chemicals, batteries, or rubber products, which are classified elsewhere. Includes assets used in manufacturing activities elsewhere			

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
	classified other than those excluded above, where such activities are incidental to, and an integral part of, the manufacture and assembly of finished motor vehicles, such as the manufacture of parts and subassemblies of fabricated metal products, electrical equipment, textiles, plastics, leather, and foundry and forging operations. Does not include any assets classified in asset guideline classes 00.11 through 00.4. Activities will be considered incidental to the manufacture and assembly of finished motor vehicles only if 75 percent or more of the value of the products produced under one roof are used for the manufacture and assembly of finished motor vehicles. Parts that are produced as a normal replacement stock complement in connection with the manufacture and assembly of finished motor vehicles are considered used for the manufacture and assembly of finished motor vehicles. Does not include assets used in the manufacture of component parts if these assets are used by a taxpayer not engaged in the assembly of finished motor vehicles	9.5	12	14.5
37.12	Manufacture of Motor Vehicles - Special Tools: Includes assets defined as special tools, such as jigs, dies, fixtures, molds, patterns, gauges, and specialty transfer and shipping devices, owned by manufacturers of finished motor vehicles and used in qualified activities as defined in class 37.11. Special tools are specifically designed for the production or processing of particular motor vehicle components and have no significant utilitarian value, and cannot be adapted to further or different use after changes or improvements are made in the model design of the particular part produced by the special tools. Does not include general purpose small tools, such as wrenches and drills, both hand and power-driven, and other general purpose equipment, such as conveyors, transfer equipment, and materials handling devices	2.5	3	3.5

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guide-line class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
37.2	Manufacture of Aerospace Products: Includes assets used in the manufacture and assembly of airborne vehicles and their component parts including hydraulic, pneumatic, electrical, and mechanical systems. Does not include assets used in the production of electronic airborne detection, guidance, control, radiation, computation, test, navigation, and communication equipment or the components thereof	8	10	12
37.31	Ship and Boat Building Machinery and Equipment: Includes assets used in the manufacture and repair of ships, boats, caisons, marine drilling rigs, and special fabrications not included in asset guideline classes 37.32 and 37.33. Specifically includes all manufacturing and repairing of machinery and equipment, including machinery and equipment used in the operation of assets included in asset guideline class 37.32. Excludes buildings and their structural components	9.5	12	14.5
37.41	Manufacture of Locomotives: Includes assets used in building or rebuilding railroad locomotives (including mining and industrial locomotives). Does not include assets of railroad transportation companies or assets of companies which manufacture components of locomotives but do not manufacture finished locomotives	9	11.5	14.5
37.42	Manufacture of Railroad Cars: Includes assets used in building or rebuilding railroad freight or passenger cars (including rail transit cars). Does not include assets of railroad transportation companies or assets of companies which manufacture components of railroad cars but do not manufacture finished railroad cars	9.5	12	14.5

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guideline class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
38.0	Manufacture of Professional, Scientific, and Controlling Instruments: Includes assets used in the manufacture of mechanical measuring, engineering, laboratory and scientific research instruments; optical instruments and lenses; surgical, medical, and dental instruments, equipment and supplies; ophthalmic goods; photographic equipment and supplies; and watches and clocks	9.5	12	14.5
46.0	Pipeline Transportation: Includes assets used in the private, commercial, and contract carrying of petroleum, gas, and other products by means of pipes and conveyors. The trunk lines and related storage facilities of integrated petroleum and natural gas producers are included in this class. Excludes initial clearing and grading land improvements as specified in Re. Rul. 72-403, 1972-2 C.B. 102, but includes all other related land improvements	17.5	22	26.5
48.31	TOCSC-Electric Power Generating and Distribution Systems: Includes assets used in the provision of electric power by generation, modulation, rectification, channelization, control, and distribution. Does not include these assets when they are installed on customer's premises	15	19	23
49.11	Electric Utility Hydraulic Production Plant: Includes assets used in the hydraulic power production of electricity for sale, including related land improvements, such as dams, flumes, canals, and waterways	40	50	60
49.12	Electric Utility Nuclear Production Plant: Includes assets used in the nuclear power production of electricity for sale and related land improvements. Does not include nuclear fuel assemblies	16	20	24

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guide-line class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
49.121	Electric Utility Nuclear Fuel Assemblies: Includes initial core and replacement core nuclear fuel assemblies (i.e., the composit of fabricated nuclear fuel and container) when used in a boiling water, pressurized water, or high temperature gas reactor used in the production of electricity. Does not include nuclear fuel assemblies used in breeder reactors	4	5	6
49.13	Electric Utility Steam Production Plant: Includes assets used in the steam power production of electricity for sale, combustion turbines operated in a combined cycle with a conventional steam unit and related land improvements	22.5	28	33.5
49.14	Electric Utility Transmission and Distribution Plant: Includes assets used in the transmission and distribution of electricity for sale and related land improvements. Excludes initial clearing and grading land improvements as specified in Rev. Rul. 72-403, 1972-2 C.B. 102	24	30	36
49.15	Electric Utility Combustion Turbine Production Plant: Includes assets used in the production of electricity for sale by the use of such prime movers as jet engines, combustion turbines, diesel engines, gasoline engines, and other internal combustion engines, their associated power turbines and/or generators, and related land improvements. Does not include combustion turbines operated in a combined cycle with a conventional steam unit	16	20	24
49.21	Gas Utility Distribution Facilities: Includes gas water heaters and gas conversion equipment installed by utility on customers' premises on a rental basis	28	35	42

EXHIBIT III

ADR GUIDELINE LIVES FOR SELECTED ASSETS

Asset guide-line class	Description of assets included	Asset depreciation range (in years) Lower limit	Asset guideline period	Upper limit
49.221	Gas Utility Manufactured Gas Production Plants: Includes assets used in the manufacture of gas having chemical and/or physical properties which do not permit complete interchangeability with domestic natural gas	24	30	36
49.222	Gas Utility Substitute Natural Gas (SNG) Production Plant (naptha or lighter hydrocarbon feedstocks): Includes assets used in the catalytic conversion of feedstocks of naphtha or lighter hydrocarbons to a gaseous fuel which is completely interchangeable with domestic natural gas	11	14	17
49.23	Natural Gas Production Plant	11	14	17
49.24	Gas Utility Trunk Pipelines and Related Storage Facilities: Excludes initial clearing and grading land improvements as specified in Re. Rul. 72-403	17.5	22	26.5
49.25	Liquefied Natural Gas Plant: Includes assets used in the liquefaction, storage, and regasification of natural gas, including loading and unloading connections, instrumentation equipment and controls, pumps, vaporizers and odorizers, tanks and related land improvements. Also includes pipeline interconnections with gas transmission lines and distribution systems and marine terminal facilities	17.5	22	26.5

CHAPTER III

ACCOUNTING POLICIES AND PROCEDURES FOR THE CHEMICAL, PETROLEUM, AND REFINING INDUSTRIES

Introduction

The accounting policies and procedures of the chemical and petrochemical* industries will be discussed in their relationship to the accounting for expenditures associated with pollution abatement. The accounting for the petroleum production function, i.e., exploration, construction and lifting costs, is an issue separate from the pollution control costs associated with chemical manufacturing, and is, therefore, not dealt with here.

It should be noted that investments in property necessary to comply with federal, state, and local environmental laws and the added cost of operations associated with compliance are not required to be specifically identified in the accounting records.

SPECIFIC ACCOUNTING PRACTICES AND REQUIREMENTS

Operating Expenses

One of the primary operating expenses relevant to the installation of pollution control equipment is maintenance costs. Maintenance costs are those costs, such as lubrication, cleaning, adjustment, and painting, which are incurred on a more or less continuous basis to keep equipment in normal usable condition; such costs are normally recorded as direct expenditures. However, extraordinary or major repairs involving large capital outlays, which are not recurring and which extend the useful life of the asset, may either be capitalized (by increasing the related asset

* See Appendix A for an explanation of the relationship between refinery operations and petrochemical plants.

account) or may be used to reduce the related accumulated depreciation account. In a 1981 survey conducted by Price Waterhouse, all companies disclosing a maintenance and repair policy indicated that maintenance and repairs were charged to expense as incurred and that major renewals and improvements were capitalized. [1]

Property, Plant, and Equipment

Capital expenditures for property, plant, and equipment relate to the acquisition of assets, the benefits of which extend over one or more accounting periods beyond the current period and are recorded in appropriate asset accounts. [2] Capital expenditures are subsequently "matched" to the future periods benefited through depreciation, amortization or depletion. In cases where (a) a capital expenditure is relatively small, or (b) the future benefit is insignificant, or (c) reasonable measurement of the future benefit is impracticable, practical considerations dictate that the outlay should be accounted for as an expense of the current period. [2] Management policy governs the monetary limit for capitalization vs. expense decisions.

According to the Chemical Manufacturers Association (CMA), to comply with EPA regulations alone it was estimated that the chemical industry last year disbursed $900 million in capital expenditures-10% of the industry's total plant-and-equipment outlays- and $1.8 billion in operating costs. CMA estimates that such expenditures will go up by at least 6%/year in the coming years. [3] The highly capital intensive nature of the industry is indicated by the following statistics.

TABLE 1

CHEMICAL INDUSTRY SURVEY - 1981

KEY RATIOS AND STATISTICS

BASED ON 1980 INFORMATION [4]

	Net fixed assets to total assets (Percentage)		Capital expenditures to net income plus depreciation expense (Percentage)	
	1980	1979	1980	1979
Du Pont	46.2	44.1	84.1	54.0
Dow	49.2	51.1	77.2	89.0
Union Carbide	53.9	50.6	92.8	81.0
Monsanto	53.6	50.9	112.2	90.4
W.R. Grace	49.6	45.2	23.0	122.1
Allied Chemical	52.5	51.5	95.0	102.0
American Cyanamid	45.6	46.1	62.0	76.2
Celanese	45.4	48.3	77.4	67.9
PPG Industries	56.9	51.0	117.7	74.6
Diamond	57.3	57.2	105.5	77.1

Assets Constructed For Own Use

All labor and material costs identifiable with the construction of pollution control equipment should be charged to the new assets. However, capitalization of related overhead costs is somewhat controversial due to the complex problem of identifying specific overhead costs associated with the construction project. The AICPA issued Accounting Research Monograph No. 1 to deal with this issue. It states..."that in the absence of compelling evidence to the contrary, overhead costs considered to have discernible future benefits for the purpose of determining the cost of inventory should be presumed to have discernible future benefits for the purpose of determining the cost of a selfconstructed depreciable asset."

Generally, both normal and incremental overhead costs are charged to inventory and, thus, it may also be considered appropriate to charge such costs to self-constructed assets. [5]

Interest During the Construction Period

Nonregulated industries are required to capitalize debt interest during the construction period in accordance with Statement of Financial Accounting Standards (FAS) 34. [6] The amount of interest to be capitalized is an allocation of interest cost incurred during the developmental period of the asset. The developmental period is defined to be from the first expenditure on the asset to the date when the asset is substantially complete and ready for its intended use. It is not a generally accepted accounting practice to capitalize an imputed interest on equity funds (a practice common to regulated industries).

In a 1981 Price Waterhouse survey, forty chemical companies disclosed the following capitalized interest. The portion attributable to self-construction of pollution abatement equipment was not disclosed. This table demonstrates the magnitude of this accounting practice.

TABLE 2

CAPITALIZATION OF INTEREST COST [7]

($ Millions)

	Capitalized Interest		Total Interest Incurred	
	1980	1979	1979	1980
Du Pont	$61.0	*	$171.0	*
Dow	71.0	*	456.0	*
Union Carbide	45.1	*	198.0	*
Monsanto	51.6	*	163.4	*
W.R. Grace	14.1	*	142.9	*
Allied Chemical	21.0	*	102.0	*
American Cyanamid	Imm	*	62.9	*
Celanese	11.0	*	68.0	*
PPG Industries	15.7	*	51.4	*
Diamond	12.0	*	76.4	*
Hercules	13.9	*	51.3	*
Williams	1.6	$3.1	68.8	$77.9
Nat'l Distillers	N/A	N/A	N/A	N/A
SCM	Imm	*	25.9	*
Olin Corp	4.6	*	34.0	*
Int'l Mineral	11.8	*	42.3	*
Ethyl Corp.	5.1	*	21.9	*
Rohm & Haas	3.3	*	29.9	*
Stauffer Chem.	13.5	12.6	55.2	44.5
Air Products	11.7	*	40.1	*
Cabot	N/A	N/A	N/A	N/A
Pennwalt	1.7	*	27.7	*
Witco Chemical	1.3	.8	12.9	7.4
Texasgulf	29.3	20.5	31.5	35.0
Akzona	5.0	*	35.2	*
Lubrizol	N/A	N/A	N/A	N/A
Reichold	.8	*	8.8	*
Ferro	.9	*	14.3	*
Dow Corning	5.7	*	16.4	*
Freeport	16.0	*	17.6	*

TABLE 2

CAPITALIZATION OF INTEREST COST [7]

	($ Millions)			
	Capitalized Interest		Total Interest Incurred	
	1980	1979	1979	1980
Big Three	5.3	2.0	13.7	12.6
Thiokol	N/A	N/A	N/A	N/A
Nalco	N/A	N/A	N/A	N/A
Dexter	N/A	N/A	N/A	N/A
Int'l Flavors	N/A	N/A	N/A	N/A
Mallinckrodt	.7	*	3.8	*
Liquid Air	3.2	*	13.9	*
H.B. Fuller	N/A	N/A	N/A	N/A
Beker	4.2	3.2	16.3	14.4
Petrolite	N/A	N/A	1.3	1.1

* - Company adopted SFAS 34 on 1/1/80.

Imm - Company disclosed that interest cost capitalized was immaterial.

N/A - Information not presented.

Depreciation

Depreciation allows a company to recover original plant cost, less salvage value, over the estimated useful life of the plant through a series of charges allocated to accounting periods falling within the plant life span. Depreciation is commonly accounted for in the chemical and petrochemical industries by a composite straight-line method for the entire plant.

The depreciation methods used by the companies in the 1981 Price Waterhouse survey are shown below.

TABLE 3

DEPRECIATION METHOD [8]

	Straight Line	Declining Balance	Sum of the Years' Digits "SYD"	"Accelerated Method"
Du Pont				X (a)
Dow		X		
Union Carbide	X			
Monsanto	X		X (b)	X
W.R. Grace	X			
Allied Chemical	X			
American Cyanamid	X			
Celanese	X		X (c)	
PPG Industries	X			
Diamond	X			
Hercules	X			X (d)
Williams	X			
Nat'l Distillers	X			
SCM	X			
Olin Corp	X			
Int'l Mineral	X (f)			
Ethyl Corp.	X			
Rohm & Haas	X F			X (g)D
Stauffer Chem.	X			
Air Products	X			
Cabot	X			
Pennwalt	X			
Witco Chemical	X			
Texasgulf	X			
Akzona	X			
Lubrizol	X	X	X	
Reichold	X			
Ferro	X			
Dow Corning				X (g)
Freeport	X			

TABLE 3

DEPRECIATION METHOD [8]

	Straight Line	Declining Balance	Sum of the Years' Digits "SYD"	"Accelerated Method"
Big Three	X			
Thiokol	X			X (i)
Nalco	X F	X		X D
Dexter	X			
Int'l Flavors	X			
Mallinckrodt	X			
Liquid Air	X			
H.B. Fuller	X			
Beker	X			
Petrolite	X			

F - Foreign

D - Domestic

(a) - An accelerated method which produces results similar to the SYD method.

(b) - SYD used for assets acquired prior to 1/1/72.

(c) - SYD used for assets acquired from 1974 to 1977.

(d) - "Modified" declining balance method for processing facilities.

(f) - Unit of production method used for certain assets.

(g) - Various accelerated methods are used.

(i) - Other accelerated methods used "in part."

Income Taxes

Interperiod Tax Allocation (Timing Differences)

Current financial accounting practice requires that the accounting for income taxes be based upon "book" income. Accordingly, adjustments are made to charge for income taxes when there are "timing differences" between "book income" and "taxable income."

The significance of this practice is that the financial statement presentation of income tax expense is often significantly different from that reflected on a corporation's tax return. These differences are a matter of "timing" of accounting - but are significant to an analyst in determining the cash flow tax implications of an investment in pollution control technology.

The nature and amount of significant timing differences are required to be disclosed in the corporation's financial statements. As such, these disclosures often will provide significant clues to the analyst in determining the "tax" accounting practices of the corporation (with attendant "true" cash flow implications). Also, Schedule "M", of the corporation's income tax return, provides a detail, line-by-line, accounting of the corporation's book-tax timing differences. The tables following indicate the type of disclosures common in corporate annual reports.

Timing differences arise because the periods in which revenue and expense items are recognized on the books are not the same as the period in which these items are recognized on the tax returns. The following represents the typical reasons for timing differences:

A. Book income before taxes is less than taxable income, as a result of:

   1. Revenue deferred for book purposes but currently recognized for tax purposes, or

   2. Expenses recognized for book purposes but deferred for tax purposes.

B. Book income before taxes is more than taxable income, as a result of:

1. Revenue recognized currently for book purposes but deferred for tax purposes, or

2. Expenses deferred (or capitalized) for book purposes but currently recognized for tax purposes.

Timing differences related to pollution control expenditures that were most frequently disclosed in a 1981 Price Waterhouse survey are presented below:

TABLE 4

TIMING DIFFERENCES [9]

	Quantified Disclosures Presented	Depreciation	Interest Capitalization	Percentage of Current Year's Income Tax Expense Currently Payable
Du Pont	X	X		95.3%
Dow	X	X		60.1
Union Carbide	X	X		78.6
Monsanto	X	X	X	42.5
W.R. Grace	X	X		79.2
Allied Chemical	X	X		92.9
American Cyanamid	X			82.2
Celanese	X	X	X	92.7
PPG Industries		X		77.8
Diamond	X	X		53.4
Hercules	X	X	X	101.1
Williams	X	X		44.3
Nat'l Distillers	X	X		126.0
SCM	X	X		109.3
Olin Corp.	X	X	X	398.3
Int'l Mineral	X	X	X	83.6
Ethyl Corp.	X	X		
Rohm & Haas	X	X		
Stauffer Chem.	X	X	X	33.7
Air Products	X	X		68.8
Cabot	X	X		90.0
Pennwalt		X		56.2
Witco Chemical				60.7
Texasgulf	X	X	X	85.6
Akzona	X	X	X	146.9
Lubrizol	X	X		89.8
Reichhold	X	X		59.6
Ferro		X		96.3
Dow Corning	X	X		97.5
Freeport	X	X	X	66.5
Big Three	X	X		77.6
Thiokol	X	X		10.6
Nalco	X	X		96.9
Dexter	X	X		66.4
Int'l Flavors	X	X		102.0
Mallinckrodt	X	X		101.7
Liquid Air	X	X	X	57.2
H.B. Fuller		X		94.1
Beker	X	X	X	17.5
Petrolite		X		2.2

Timing differences require the recording of deferred taxes. For example, when a company depreciates pollution control equipment on a straight-line basis for accounting (book) purposes, but utilizes ACRS for tax purposes, the deferred income taxes are recorded as a liability. The capitalization of interest on the books and the expense of such costs over a different timeframe for tax purposes, for example, would also give rise to a timing difference.

Investment Tax Credit

The effect of the investment tax credit is to reduce, by the amount of the credit (calculated as a percentage of the cost of certain long-lived assets), the amount of taxes that otherwise have to be paid. Proper recognition of ITC can mean significant savings to companies implementing new pollution control devices. There are two acceptable methods for financial accounting for the investment tax credit: 1) the flow-through method and 2) the deferral method.

- The flow-through method involves a current period reduction in income tax expense for the full amount of the credit.

- The deferral method involves the classification (or "capitalization") of the credit as a contra account to the related asset account. This "deferred investment credit" is recognized as a reduction in income tax expense over the useful life of the asset (i.e., with a five-year asset, only one fifth of the benefit is recognized in any one year).

The following methods of accounting for ITC were disclosed by 40 companies in a 1981 Price Waterhouse survey:

TABLE 5

ITC METHOD [10]

	Flow Through	Deferred
Du Pont		X
Dow	X	
Union Carbide	X	
Monsanto	X	
W.R. Grace	X	
Allied Chemical		X
American Cyanamid	X	
Celanese	X	
PPG Industries	X	
Diamond	X	
Hercules	X	
Williams	X	
Nat'l Distillers	X	
SCM	X	
Olin Corp.	X	
Int'l Mineral	X	
Ethyl Corp.	X	
Rohm & Haas	X	
Stauffer Chem.	X	
Air Products		X
Cabot	X	
Pennwalt		X
Witco Chemical		X
Texasgulf		X
Akzona		X
Lubrizol	X	
Reichhold	X	
Ferro	X	
Dow Corning	X	
Freeport	X	

TABLE 5

ITC METHOD [10]

	Flow Through	Deferred
Big Three	X	
Thiokol		X
Nalco	X	
Dexter		X
Int'l Flavors	X	
Mallinckrodt	X	
Liquid Air	X	
H.B. Fuller	X	
Beker	X	
Petrolite	X	

TABLE 6

RECONCILIATION OF EFFECTIVE TAX RATE TO THE STATUTORY RATE

	Applicable U.S. Federal Statutory Rate	State and Local Taxes	Investment Tax Credit	Export Sales or DISC Benefit	Effect of Foreign Taxes	Percentage Depletion	Other	Effective Rate
Du Pont	46.0%	1.4	(4.6)	(2.9)	(3.0)		(1.3)	35.6%
Dow	46.0	.5	(6.1)		(2.4)		(3.7)	34.3
Union Carbide	46.0		(5.1)	(1.7)	(5.2)	(1.7)	1.9	34.2
Monsanto	46.0	.7	(23.6)	(12.4)	19.0		(2.0)	27.7
W.R. Grace	46.0	1.4	(6.1)		3.9	(1.5)	(1.3)	42.4
Allied Chemical *	46.0		(2.1)		25.3		(.4)	68.8
American Cyanamid	46.0		(4.4)		(4.0)		3.9	41.5
Celanese	46.0	1.6	(10.3)	(7.1)	(1.5)		5.5	34.2
PPG Industries	46.0	1.9	(6.8)				(.6)	40.5
Diamond	46.0		(3.6)			(2.4)	(1.0)	39.0
Hercules	46.0		(16.0)	(4.0)	(5.0)		(1.0)	20.0
Williams	46.0	1.7	(3.8)			(4.3)	2.2	41.8
Nat'l Distillers	46.0	3.4	(5.2)				6.9	51.1
SCM	46.0	2.4	(3.5)		(2.7)		(2.2)	40.0
Olin Corp.	46.0	3.0	(32.9)	(7.8)	12.2		(9.0)	11.5
Int'l Mineral	46.0		(5.2)		3.7	(6.6)	4.9	42.8
Ethyl Corp.	46.0	2.4	(6.6)				(.4)	41.4
Rohm & Haas	46.0		(4.1)	(2.2)	(3.6)		1.2	37.3
Stauffer Chem.	46.0	(1.0)	(14.0)		(8.0)	(5.0)	(1.0)	17.0
Air Products	46.0	1.9	(4.4)	(1.1)	(2.5)		(1.4)	38.5
Cabot	46.0	2.5	(2.8)		(.5)		1.7	46.9
Penwalt	46.0		(3.0)		(.6)		(7.5)	34.9
Witco Chemical *	46.0						(2.2)	43.8
Texasgulf	46.0		(3.0)			(11.0)		32.0
Akzona *	(a)	(a)		(a)		(a)	(a)	(a)
Lubrizol *	46.0		(2.3)	(1.7)	(.5)		1.4	42.9
Reichhold	46.0	2.1	(7.1)		(2.4)		.3	38.9
Ferro	46.0		(1.6)		(4.5)		1.2	41.1
Dow Corning	46.0	1.8	(4.6)		(.2)		(.8)	42.2
Freeport	46.0	1.0	(3.0)			(11.0)	(12.0)	21.0

TABLE 6

RECONCILIATION OF EFFECTIVE TAX RATE TO THE STATUTORY RATE

	Applicable U.S. Federal Statutory Rate	State and Local Taxes	Investment Tax Credit	Export Sales or DISC Benefit	Effect of Foreign Taxes	Percentage Depletion	Other	Effective Rate
Big Three *	46.0		(6.2)	(1.2)				38.6
Thiokol *	46.0						1.2	47.2
Nalco	46.0	1.8	(.9)				(2.5)	44.4
Dexter *	46.0						3.0	49.0
Int'l Flavors	46.0				(5.9)		1.7	41.8
Mallinckrodt *	46.0						(.2)	45.8
Liquid Air	46.0	(5.9)		(1.0)			3.0	42.1
H.B. Fuller	46.0	2.3					(3.5)	44.8
Beker	46.0	3.2	(3.1)	(2.5)	.2	(1.9)	(.9)	41.0
Petrolite	46.0		(2.6)	(1.9)			(.7)	40.8

(a) - Akzona incurred a pre-tax loss of $378,000 and an income tax benefit of $5,255,000.

* - Company presented the reconciliation in dollar amounts.
Conversion has been made to percentages for comparative purposes

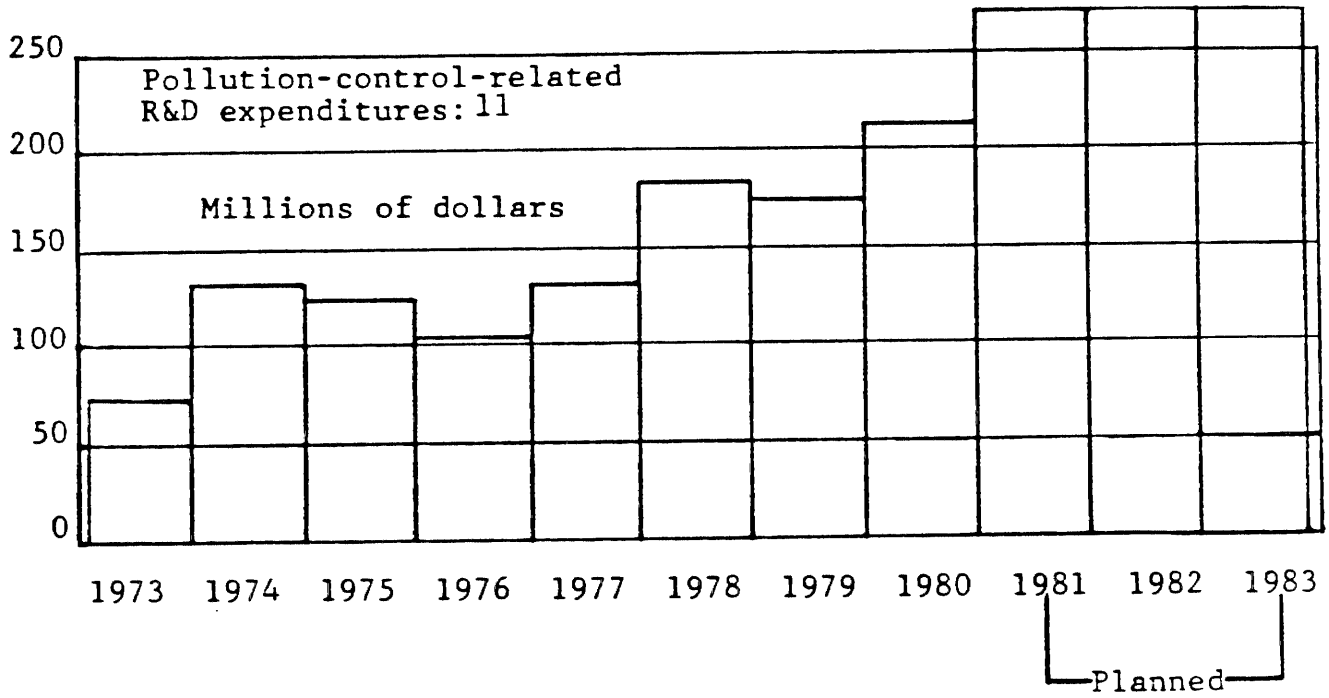
Reconciliation of Effective Tax Rate

Thirty-six of the companies in the 1981 Price Waterhouse survey presented a reconciliation of their effective tax rate to the federal statutory tax rate, as presented in Table 6.

Research and Development Costs

The following pollution-control-related expenditures have been compiled and/or projected for the years 1973-1983.

TABLE 7



FAS 2 defines and prescribes accounting treatment for such costs. Research is defined as the planned search or critical investigation aimed at discovery of knowledge with the hope that such knowledge will be useful in developing a new product or service or a new process or technique or in bringing about a significant improvement to an existing product or service. Development is the translation of research findings or other knowledge into a plan or design for a new product or process or for a significant improvement to an existing product or process whether intended for sale or use. FAS 2 requires that all R&D costs

encompassed by the above definitions, be expensed. Exceptions include tangible assets purchased from others and tangible assets that have alternative future uses; these costs are capitalized and amortized as R&D expense.

Lease Commitments

The Internal Revenue Code, Section 103(c)(4)(F), allows state and local governments to issue industrial development bonds for the purchase of pollution control equipment upon which the interest is not taxable to the bondholders. Therefore, it can be expected that many chemical firms will attempt to lease pollution control equipment from municipalities.

Statement of Financial Accounting Standards No. 13 establishes criteria for classifying leases as capital or operating leases and sets forth various requirements. If a lease, from the standpoint of the lessee, transfers most of the risks and rewards of ownership to the lessee or includes a "bargain purchase" option, the lease is to be classified as a capital lease for which the present value of the minimum lease payments is capitalized. An operating lease is a simple rental agreement which does not meet the criteria for classification as a capital lease (the lessee records rent expense). The most frequent lease accounting procedures disclosed in financial statements are summarized below:

TABLE 8

ITEMS GENERALLY DISCLOSED [12]

	Total Rent Expense for the Year	Minimum Rental Commitments Reduced by Subleases	Commitments Classified by type of Property	Commitments Classified as Capital or Operating	Present Value of Commitments	Effect of Capitalizing Financing Leases - Immaterial	Sublease Rental or Contingent Rental	Executory Costs
Du Pont	X			X	X			X
Dow	X	X	X	X	X		X	X
Union Carbide	X							
Monsanto	X							
W.R. Grace	X			X	X		X	
Allied Chemical	X			X	X		X	
American Cyanamid	X			X				
Celanese	X	X		X		X		
PPG Industries	X	Imm	X	X	X		Imm	X
Diamond	X	X	X	X	X		X	X
Hercules	X							
Williams	X	Imm	X	X	X		X	
Nat'l Distillers	X	Imm		X	X		Imm	
SCM	X	X						
Olin Corp.	X	Imm		X				
Int'l Mineral	X			X	X			
Ethyl Corp.	X		X					
Rohm & Haas	X			X			Imm	
Stauffer Chem.	X	X	X				Imm	
Air Products	X			X	X			
Cabot	X							
Pennwalt	X	X	X	X	X		X	X
Witco Chemical	X		X	X				
Texasgulf	X	X	X	X	X		X	
Akzona	X	X	X				X	
Lubrizol								
Reichhold	X	X	X	X			Imm	
Ferro								
Dow Corning	X			X		X		
Freeport	X							

TABLE 8

ITEMS GENERALLY DISCLOSED [12]

	Total Rent Expense for the Year	Minimum Rental Commitments Reduced by Subleases	Commitments Classified by type of Property	Commitments Classified as Capital or Operating	Present Value of Commitments	Effect of Capitalizing Financing Leases - Immaterial	Sublease Rental or Contingent Rental	Executory Costs
Big Three	Imm			Imm		X		
Thiokol								
Nalco	X						Imm	
Dexter								
Int'l Flavors								
Mallinckrodt								
Liquid Air	X	X						
H.B. Fuller	X							
Beker								
Petrolite								

Imm - company disclosed that this item for the year was not material.

Tax-Exempt Bonds

Tax-exempt bonds are often contemplated by chemical process companies to finance capital spending for pollution-control projects. In 1979, chemical companies used about 25 pollution-control bond issues to raise more than $177 million. [13]

CHEMICAL INDUSTRY RELIES ON

BONDS TO FINANCE POLLUTION CONTROL

Date 1979	Issuing Agency	Company	Amount (in millions)
Jan.	Ohio WDA	PPG Industries	1.20
Jan.	West Side Calhoun Co. Navigation Dist., Texas	Union Carbide	1.90
Feb.	Calvert, Ky.	Air Products & Chem.	12.00
Mar.	Power Co., Id.	FMC	14.50
Mar.	Calvert, Ky.	Air Products & Chem.	1.00
Mar.	Nueces Co. Navig. Dist. No. 1, Tex.	Corpus Christi Petro.	32.00
Mar.	Illinois IPCFA	Olin	17.50
Mar.	Mt. Pleasant IDB, Tenn.	Stauffer Chem.	1.90
Apr.	Detroit, Mich.	Allied Chemical	33.40
June	Gulf Coast WDA, Tex.	Diamond Shamrock	8.75
June	Sterlington, La.	IMC Chemical	10.20
June	Gulf Coast WDA, Tex.	Union Carbide	3.58
June	South Charleston, W. Va.	Union Carbide	5.50
June	Butte-Silver Bow, Mont.	Stauffer Chemical	1.30
June	Camden Co. Dev. Auth., Ga.	Union Carbide	3.60
June	Gulf Coast WDA, Tex.	Union Carbide	3.75
June	Montgomery Co., IDB, Tenn.	Union Carbide	1.00
July	Mo. State Envir. Imp. Auth,	Mobay Chemical	11.00
Aug.	Caribou Co. Id.	Monsanto	4.00
Aug.	Mo. State Envir. Imp. Auth.	Monsanto	2.90
Aug.	Mo. State Envir. Imp. Auth.	American Cyanamid	3.70
Sept.	Spartanburg Co., S.C.	Monsanto	2.70
Oct.	Brazos River Harbor Navig. Dist. Tex.	Dow	10.00
Oct.	Gulf Coast WDA, Tex.	American Hoechst	15.40
Oct.	Ohio Water Develop. Auth.	Stauffer Chemical	1.40
Dec.	Kanawha Co. W. Va.	Diamond Shamrock	4.50

In accounting for these bonds, if used in the companies' self-construction of pollution control equipment, FAS 62 requires capitalization of interest cost of restricted tax-exempt borrowings less any interest earned on temporary investment of the proceeds of those borrowings from the date of borrowing until the specified

qualifying assets acquired with those borrowings are ready for their intended use. This treatment is in contrast to previous FAS 34 treatment in which the amount of interest capitalized was not reduced by interest earned on those borrowings.

APPENDIX A

REFINERY OPERATIONS AND PETROCHEMICAL PLANTS

General Overview

The petrochemical plant may be physically an extension of the refinery, which permits common utility services and facilitates the transfer of feedstocks, or it may be separately located. Some companies have set up subsidiary corporations for petrochemical research, production, and marketing.[14]

Refining and Petrochemical Processes

Some petroleum refining processes are quite similar to petrochemical processes.

However, an important distinction between a refinery process unit and a petrochemical unit is the magnitude of the operation: refinery units have outputs of thousands of barrels per day, while petrochemical units have outputs of hundreds of barrels per day. (Although "barrels" are used here for purposes of comparison, it is usual to measure petrochemical production-like chemical production in general-in pounds rather than barrels.)[15]

Accounting Practices

There are no significant differences in the accounting for pollution control costs between a refinery and a petrochemical plant. The only major difference may be a separate accounting for the two operations. Therefore, the accounting practices and requirements reviewed in the body of the paper are generally applicable to refinery operations.

One area that should be mentioned is the functional segregation of costs. This cost approach allows for managerial responsibility for costs and does affect the accounting for pollution control equipment, although it does not affect the bottom-line costs.

Functional Segregation of Costs

A typical refinery comprises from five to ten different processing units which follow one another in the processing sequence. While it may not be possible conclusively to identify specific costs with specific products, it is possible to segregate costs by areas of managerial responsibility for cost control purposes. These areas of responsibility include production processes or units, utilities and other units which directly serve production units, materials and product handling units, and various administrative and general service units. Production units may also include the various processes involved in the production of petrochemicals, although petrochemical production facilities are often separate from the refinery.

The costs which are segregated according to these various production and service units include investment in plant and equipment and operating costs. Investment in plant and equipment is segregated by units primarily for the purpose of facilitating the distribution of depreciation expense by units.[16] Therefore, equipment and operating costs associated with pollution control will be segregated according to these production units.

The following accounting areas further indicate the similarity in accounting for petrochemical plant and refining operations.

Materials and Supplies

Where petrochemical operations are integrated with refinery operations, both are generally served by the same supply unit. If the petrochemical plant is independently operated, it generally has an independent materials and supplies unit for which the accounting follows the same pattern as for the refinery.

Plant Investment and Maintenance

Plant investment is segregated by production processes and by such service or other units as may be identified with the petrochemical plant. Repairs, replacements, and improvements involve the same considerations as in refinery operations.

Because petrochemical operations are not as interrelated as refinery operations, and because different production units may be constructed at different times, depreciation is not generally computed for the petrochemical plant as a whole. For each unit, however, depreciation is commonly computed on a composite straight-line basis.

Accumulation and Redistribution of Operating Costs

If petrochemical operations are integrated with refinery operations, petrochemical production units share with refinery production units in the redistribution of utility operating costs, service unit operating costs, and overhead costs. If the petrochemical plant is independently operated, it has its own utility and other service and overhead costs.[17]

NOTES

1. Chemical Industry Survey; 1981 Survey of Financial Reporting and Accounting Developments, Price Waterhouse, p. 25 (1981)
2. Intermediate Accounting, Welsch, Zlatkovich, Harrison, pp. 446-447 (1979)
3. "A New Relationship? Washington says so...industry is wary" Chemical Week, p. 73 (October 29, 1980)
4. Price Waterhouse, p. 9
5. Welsch, Zlatkovich, Harrison, P. 456
6. FAS 34 requires capitalization of interest cost for all assets that require a period of time to get them ready for their intended use. (Later amended by FAS 42, "Determining Materiality for Capitalization of Interest Cost", so that interest on construction not meeting certain materiality requirements is not required to be capitalized.)
7. Price Waterhouse, p. 46
8. Price Waterhouse, p. 25
9. Price Waterhouse, p. 31
10. Price Waterhouse, p. 33
11. "A New Relationship? Washington says so...industry is wary," Chemical Week, p. 73 (October 29, 1980)
12. Price Waterhouse, p. 34
13. "Pollution Control: A Taxing Issue," Chemical Week, p. 39 (June 11, 1980)
14. Petroleum Accounting Practices, Stanley P. Porter, p. 39 (1965)
15. Stanley P. Porter, p. 433
16. Stanley P. Porter, pp. 418-419
17. Stanley P. Porter, p. 441

CHAPTER IV

ACCOUNTING POLICIES AND PROCEDURES FOR REGULATED ELECTRIC UTILITIES

INTRODUCTION

This section of this report deals with the accounting practices of the regulated electric utility industry. Nonregulated industries (chemical, petrochemical and refining) must comply with generally accepted accounting principles (GAAP) and Security and Exchange Commission (SEC) requirements. Regulated electric utilities must comply with the accounting regulations set forth by the Federal Energy Regulatory Commission (FERC), and state regulatory commissions, as well as with GAAP and SEC requirements.

The California Public Utilities Commission (CPUC) regulates 12 of the 46 electric utilities operating within the state. Of those utilities not regulated by the CPUC, the majority are municipally owned enterprises. This portion of the report pertains only to regulated electric utilities. Because rate-making procedures intimately affect the accounting for these electric utilities, one must first review the rate-making process and general accounting procedures before dealing with accounting procedures specific to the industry and to individual firms within the industry.

The Rate-Making Process

Generally, rates are set by: 1) estimating the utility's reasonable expenses and 2) adding to that a fair and reasonable return on its investment.[1] The investment referred to includes investment in plant facilities used to supply utility services to the consumer and other non-property items (such as working capital) that regulatory bodies authorize for inclusion when calculating total utility investment. It is commonly referred to as the rate base.

The specific method used by the California Public Utilities Commission to determine rates is referred to as the "revenue requirements" method. This method equates "revenue requirements" with the total of: operating and maintenance expenses, depreciation, taxes, and the cost of capital consisting of interest, dividends on preferred stock, and a return on common equity.

A test year is selected as the basis for determining this revenue requirement. A total of the recorded or estimated amounts for operating and maintenance expenses, depreciation, interest, dividends on preferred stock, and taxes for the test year is deducted from revenues generated during that year to determine net operating income realizable at current rates. This represents the balance available for return.

The utility's investment in facilities and other assets used in supplying utility service (rate base) is also determined. The required rate of return is determined by analyzing the components of the capital structure to produce the composite rate of return required to meet the capital requirements adequately. The cost of capital for each regulated electric utility is subject to intensive discussion during CPUC deliberations. The rate base multiplied by this composite rate of return results in the required return.

By comparing the required return to the balance available for return, the income deficiency can be determined. This deficiency, adjusted for the income tax and other factors, then is converted to a gross revenue deficiency or rate increase required. This method can be illustrated by a simplified example, assuming a rate base of $1,000 and a capital structure composed of: [2]

	Ratio	Cost of Capital	Weighted Cost of Capital
Debt	50%	7%	3.5%
Equity	50%	13%	6.5%
	100%		10.0%

(Assumes no preferred stock outstanding)

Test Period Results

Revenues	$ 660
Less: Operating expenses	460
Depreciation	50
Taxes	90
Net operating income	$ 60
Required return on rate base ($1,000 x 10%)	$100
Net operating income	60
Net operating income deficiency	40
Tax conversion factor (50% tax rate)	÷(.50)
Gross revenue increase required	$ 80

Although utilities cite the added cost of pollution abatement expenditures in the need for rate increases, the basis for recovery of these costs in CPUC rate cases is not different from that allowed for any other costs.

Uniform System of Accounts

To aid in the comparability of the accounting data, the FERC requires electric utilities to maintain their accounts in accordance with the Federal Power Commission [3] Uniform Systems of Accounts for Public Utilities and Licensees, Classes A,B,C, and D. The FERC amends the Uniform System of Accounts from time to time and issues Orders as to their use on a generic basis and, in addition, issues Orders that affect the application of the system by specific utilities. (Exhibit 1 displays a generic system of

accounts for electric utilities.) State public utility commissions usually adopt the FERC Uniform System of Accounts for utilities in their jurisdiction (adopted in California).

It should also be noted that as the regulatory commissions are authorized to control only those items pertinent to the firm's operations in providing a regulated public utility service, accounting procedures also reflect the separation of regulated from nonregulated activities. Exhibit 2 indicates this separation in financial statement format.

EXHIBIT 1. A Typical System of Accounts for Public Utilities [4]

BALANCE SHEET ACCOUNTS (100–299)

ASSETS AND OTHER DEBITS (100–199)

101–120 Utility Plant
121–128 Other Property and Investments
131–174 Current and Accrued Assets
181–188 Deferred Debits

LIABILITIES AND OTHER CREDITS (201–299)

201–217 Proprietary Capital
221–224 Long-term Debt
231–242 Current and Accrued Liabilities
251–256 Deferred Credits
261–265 Operating Reserves
271 Contributions in Aid of Construction
281–283 Accumulated Deferred Income Taxes

RETAINED EARNINGS ACCOUNT (436–439)

216 Unappropriated R/E (at beginning of period)
433 Balance Transferred from Income
436 Appropriations of R/E
Net Additions to R/E
437–438 Dividends Declared
439 Adjustments to R/E
216 Unappropriated R/E (at end of period)

INCOME ACCOUNTS (400–435)

UTILITY OPERATING INCOME (400–414)

400 Operating Revenues

Operating Expenses
401 Operating Expense
402 Maintenance Expense
403 Depreciation Expense
404–407 Amortization Expense
408 Taxes Other than Income Taxes
409 Income Taxes
410 Provision for Deferred Income Taxes
411 Income Taxes Deferred in Prior Years—Cr.
Total Utility Operating Expenses
Net Operating Revenues
412–414 Other Operating Income
Net Utility Operating Income
415–421.1 Other Income
421.2–426 Other Income Deductions
408–420 Taxes Applicable to Other Income Deductions
427–431 Interest Charges
434–435 Extraordinary Items
409.3 Net Income

NOTE: Based on Federal Power Commission, *Uniform System of Accounts Prescribed for Public Utilities and Licensees* (Washington, D.C.: U.S. Government Printing Office, 1973).

EXHIBIT 2

FINANCIAL REPORTING IN THE

PUBLIC UTILITY INDUSTRY

TYPICAL UTILITY INCOME STATEMENT

	Year Ended December 31, 19XX
Operating Revenue:	
Electric	$XXX,XXX
Gas	XXX,XXX
Total Operating Revenues	XXX,XXX
Operating Expenses:	
Operation:	
Fuel	XXX,XXX
Interchange and purchased power, net	XXX,XXX
Other	XXX,XXX
Maintenance	XXX,XXX
Depreciation	XXX,XXX
Taxes - other than income	XXX,XXX
Federal and state income taxes:	
Current	XXX,XXX
Deferred	XXX,XXX
Total Operating Expenses	XXX,XXX
Operating Income	XXX,XXX
Other Income and (Deductions):	
Allowance for equity funds used during construction	XXX,XXX
Other income (net of related expenses)	XXX,XXX
Miscellaneous income deductions	XXX,XXX
	XXX,XXX
Income Before Interest charges	XXX,XXX
Interest Expense:	
Interest on long-term debt	XXX,XXX
Other interest	XXX,XXX
Allowance for borrowed funds used during construction - (Credit)	(XXX,XXX)
Amortization of debt premium, discount and expense	XXX,XXX
	XXX,XXX
Net income	XXX,XXX
Preferred stock dividend requirements	XXX,XXX
Income for common stock	$XXX,XXX
Average common shares outstanding	XXX,XXX
Earnings per common share	$ X.XX

SPECIFIC ACCOUNTING PRACTICES AND REQUIREMENTS IN CALIFORNIA

It should be recognized that despite the regulated nature of the industry and the use of uniform systems of accounts, investments in property necessary to comply with federal, state, and local environmental laws and the added cost of operations associated with compliance are not required to be specifically identified in the accounting records.

Operating and Maintenance Expenses

Operating and maintenance expenses relevant to the installation of pollution control equipment include depreciation and taxes. Expenditures incurred by the utility predicated on forces beyond the firm's full control are allowed as expenses of operation.[5] Therefore, operating expenses related to the maintenance of pollution abatement equipment should be accounted for as above-the-line expenses. Depreciation and taxes are dealt with in later sections of this report. Additional operating expenses might also include increased costs of electricity generation due to lower efficiency caused by the addition of pollution control equipment.

Utility Property and Plant

Utility property and plant consists of both tangible and intangible items. Utility property and plant is composed of several sub-accounts the most important of which is "Electric Plant in Service". Electric plant in service is the control account identifying that portion of the plant used to produce utility service. This account less the related depreciation and deferred taxes plus allowances for working capital (and other such authorized items) is the rate base used in determining the utility's revenue requirements.

Construction Work in Progress

Construction Work in Progress (CWIP) includes the capitalization of all material and labor costs necessary for the construction of a project undertaken by the electric utility. In

addition, it also includes certain overhead costs of construction (e.g., engineering, general office salaries, insurance, taxes, etc.) that ordinarily would be charged to expense by other businesses, as well as an allowance for funds used during construction (AFUDC) if CWIP is not allowed in the rate base.

Presently, the California PUC does not allow CWIP in the rate base, rather AFUDC is capitalized. Therefore, when a utility undertakes the construction of pollution abatement equipment (which includes AFUDC), it can expect revenue reimbursement for such equipment to be included in the utility's rate base, but not until the equipment is in use is that rate relief obtained.

Allowance For Funds Used During Construction (AFUDC)

Allowance for funds used during construction, addressed by FERC Order 560 and SEC Staff Accounting Bulletin No. 15, is a bookkeeping entry capitalizing interest cost plus an imputed return on common equity. A note from the financial statements of a regulated utility in a midwestern state clearly describes AFUDC and how it affects utility accounts:

> "We pay interest and dividends to our investors for the use of their money. This is called the cost of money. The Public Utilities Commission of Ohio and FERC allow us to include a portion of the cost of money as part of the total cost of constructing new assets. Such cost of money is recorded as the Allowance for Funds Used During Construction (AFUDC).
>
> The amount of AFUDC for an accounting period is determined by applying a rate of AFUDC to the accumulated construction costs...the rate represents the average cost of money we are using for construction costs...the part of the rate which represents interest is reduced to recognize that interest is tax deductible. The amount of AFUDC appears on our income statement in two places: under Non-Operating Income as "AFUDC" and under Interest Charges as "Allowance for Borrowed Funds Used During Construction." On the balance sheet the AFUDC becomes part of the Construction Work in Progress."

> When construction is completed, we stop recording AFUDC. At this point, the total cost of the new asset, including AFUDC, is used to determine the rate we charge our customers for service. Since the rates we charge for our product include all costs, we are being allowed to recover in cash all costs of the property, including AFUDC.
>
> The amount of AFUDC recorded in each accounting period varies. The variation occurs because of (1) the number of dollars being spent on construction, (2) the length of the construction period, and (3) the rate used in computing AFUDC." [6]

The California Public Utilities Commission does not allow CWIP in the rate base but does follow the FERC method for calculating AFUDC.

Under the FERC system of accounts (followed in California), utilities that capitalize AFUDC debit the account "Construction work in progress" for the full amount of allowance capitalized. When the project is placed in service, the "construction work in progress" account then is cleared to a "Utility plant" account, and at that point the amount transferred can become part of the utility's rate base. Although the debit to the accounts for AFUDC capitalized contains an imputed amount representing an allowance capitalized on the utility's other funds, this imputed amount always has been considered a necessary component of construction cost. The following table illustrates the plant section of the utility balance sheet containing the accounts used. [7]

TABLE 1

ABC Utility, Partial Balance Sheet,

Assets and Other Debits

Utility Plant	
Utility plant in service [a]	XXX
Less: Accumulated provision for depreciation	XXX
Net utility plant	XXXX
Utility plant leased to others	XXX
Construction work in progress [b]	XXX
Utility plant acquisition adjustments	XXX
Total net utility plant	XXXX

[a] When plant is placed in service, construction work in progress generally is cleared to this account.

[b] Initial debit for allowance for funds used during construction goes into this account.

The concept of capitalizing the equity portion of AFUDC has been reinforced under generally accepted accounting principles for regulated entities by the FASB in Accounting Statement 71 on "Accounting for the Effects of Certain Types of Regulation".

Construction Intermediaries

Some electric utility companies finance construction of a generating plant or their share of a jointly owned plant through the use of a "construction intermediary." Staff Accounting Bulletin No. 28, issued by the SEC in December 1978, addresses this type of financing arrangement and the related accounting treatment. The Bulletin states that:

> ...an electric utility using a construction intermediary to finance its construction should include the intermediary's work in progress in the appropriate caption under utility plant. The related debt should be included in long-term liabilities-...[furthermore,] capitalized interest included as part of an intermediary's construction work in progress...should be recognized...as interest expense with a corresponding offset to allowance for borrowed funds during construction. [8]

Depreciation

Above-the-line depreciation expenses do not include depreciation on plant and equipment used for purposes other than providing a utility function. Depreciation accounting allows the utility to recover original plant cost, plus or minus salvage value, over the estimated useful life of the plant through a series of charges allocated to accounting periods falling within the plant life span.

Depreciation policies and practices of the California PUC include:

- Prescribing specific depreciation rates for various classes of property, both for ratemaking and accounting purposes.
- Requiring regulated firms to conduct depreciation rate studies.
- Use of straight line remaining life method for calculating depreciation. [9]

In a Price Waterhouse survey of 85 utilities companies, most stated that depreciation rates are based on estimated service lives. Fifty companies disclosed a composite percentage rate of depreciation applicable to total depreciable plant in service during 1980. The table below summarizes the rates reported by the companies using a composite rate in either 1979 or 1980.

TABLE 2

COMPOSITE DEPRECIATION RATES [10]

Percentage	Electric & Combination		Gas		Water	
	1979	1980	1979	1980	1979	1980
1.40%-2.00%.....					3	3
2.01%-2.50%.....					1	1
2.51%-2.75%.....	3	3				
2.76%-3.00%.....	3	5	1	1		
3.01%-3.25%.....	13	10	2	2		
3.26%-3.50%.....	13	12				
3.51%-4.50%.....	9	10	1	1		
4.51%-4.75%.....	—	—	2	2	—	—
	41	40	6	6	4	4

Leasing

Leases for pollution abatement equipment are generally of two types: operating or capital. If a lease, from the standpoint of the lessee, transfers most of the risks and rewards of ownership to the lessee or includes a "bargain purchase" option, the lease is to be classified as a capital lease. An operating lease is a simple rental agreement which does not meet the criteria for classification as a capital lease.

However, it is currently common practice for utilities to record capital leases as operating leases for rate-making purposes. In a Price Waterhouse survey of 85 companies, 23 electric and combination companies stated that leases were not capitalized in accordance with FAS 13 because the regulatory authorities having jurisdiction over their operations require treatment of the leases as operating leases for rate-making purposes. Furthermore, only two of twelve companies that capitalized leases stated that all leases, as defined by FAS 13, had been capitalized. These companies made no reference to the rate-making treatment for capitalized leases. [11] This issue is dealt with by the FASB in their Accounting Statement 71 on "Accounting for the Effects of Certain Types of Regulation", which required a modification of utility accounting practices for leases in the future.

ACCOUNTING FOR INCOME TAXES

Complexities arise in accounting for income taxes largely due to differences between tax accounting and financial accounting. Revenues and expenses are often reported for tax purposes in periods other than those for which they are reported on the books resulting in a taxable income different from book income. For example, it is common for depreciation for tax purposes to be greater than book depreciation because of differences in the estimated life or depreciation method used. If the tax effects of transactions are realized in periods other than those in which the transactions are recorded on the books, "timing differences" (as described more fully in Chapter II) occur between book and tax accounting and deferred taxes must be recorded. The following table, based on a Price Waterhouse survey of 85 utility companies, shows the items most frequently reported for which deferred tax provisions were disclosed in the 1980 and 1979 annual reports.

TABLE 3

TIMING DIFFERENCES [12]

	Number of Companies	
Timing differences resulted from	1980	1979
Accelerated tax depreciation and amortization (recognized in many different degrees)	77	79
Capitalized interest, pension, tax and other indirect plant costs (including AFUDC)	44	34

Tax and Book Timing Differences

The majority of electric utilities utilize accelerated depreciation for tax purposes. However, for rate-making and book reporting purposes, alternative accounting methods may be utilized (straight-line depreciation for example). Regulatory commissions

have, in the past, authorized two approaches for accounting for this tax-book issue. These have become known as the normalization and the flow through methods.

A. Normalization - this method requires that the utility reflect on its financial statement a "deferred" tax such that the entire federal income tax expense reported for income statement purposes is equivalent to that which would have been paid if the entity utilized its book accounting methods (straight-line depreciation, for example) for tax reporting purposes as well as for financial accounting. In other words, on its income statement, the utility also accrues the tax differential between (the tax) accelerated and (book) straight-line depreciation. For rate-making purposes, the utility receives revenues on the basis of this normalization procedure.

B. Flow-Through Accounting - If required by regulatory authorities to use the flow-through accounting method, the utility would flow through the tax savings which are realized by the utility's use of accelerated depreciation, etc. In this case, the utility's income statement would reflect depreciation expense using straight-line depreciation (the book method); however, income tax expenses would be reflected based on actual taxes paid, or to be paid (utilizing "tax" accelerated depreciation methods for example).

   Since revenues would not be established at a level to recover a provision for deferred income taxes, the income statement would not reflect deferred income taxes. The tax savings are, in effect, passed to the ratepayers.

   The FASB Accounting Statement 71 on "Accounting for the Effects of Certain Types of Regulation" will require note disclosure of the cumulative net amount of income tax timing differences for which deferred income taxes have not provided.

Accounting for the Investment Tax Credit

Two methods of accounting for the investment tax credit occur in practice, flow through and normalization. The flow through concept provides for an immediate reduction in income tax expense (an income statement effect) in the year of investment in the qualified property. This method is subscribed to by those

who believe the investment tax credit is a "tax reduction". The full effect of the credit is allowed to flow through to net income and plant investment remains at cost. Normalization encompasses the theory that the amount of the credit should be considered to be a reduction, or discount, in the cost of the plant, to be matched to income over future accounting periods corresponding to the life of the asset, a "cost reduction" concept. While these two methods are different in the method of income accounting, there is commonality in cashflow implications. Over the long term both methods provide that the investment credit is eventually realized as income.

Regulatory Requirements

Until recently, the FERC allowed either the flow through or the normalization method for both rate-making and accounting purposes. Essentially all book-tax timing differences are now normalized for ratemaking and accounting purposes by FERC and CPUC jurisdiction companies. Of particular importance to FERC and state commission ratemaking is that, under the provisions of ERTA, a normalization method of accounting must be used for ACRS and ITC applied to property placed in service after December 31, 1980. A transitional rule is provided for utilities that have previously used a method of accounting other than a normalization method.

ACRS - Under ERTA, public utility property will not be recovery property (and therefore not eligible for ACRS) unless the taxpayer uses a normalization method of accounting. Unlike the law prior to the Act, there is no provision with respect to ACRS property permitting the use of a flow-through method of accounting based on prior practice.

Failure to normalize causes public utility property to be treated as not qualifying for ACRS. In that event, depreciation for federal income tax purposes must be calculated by using the book method and a life no shorter than book life. ADR is not available as an alternative for companies that do not qualify for ACRS because of a failure to normalize.

The effect of the transition rule is to permit a regulated public utility that was using a proper method of accounting under prior law to use the new ACRS method if by terms of its first rate order determining cost of service with respect to post-1980 property (which is put into effect after August 13, 1981), a normalization method of accounting is used. Such a rate order must be put into effect on or before January 1, 1983, where rates in effect on August 13, 1981 were established under a test year that included post-1980 property.

ITC - ERTA has liberalized the amount of ITC that may be claimed. The applicable percentages for recovery property placed in service after 1980 are 100% (in effect, a 10% credit) for otherwise qualifying 5-year, 10-year, or 15-year public utility property and 60% (in effect, a 6% credit) for 3-year property.

Under law prior to ERTA, the benefits of a 4% ITC credit could have been flowed through immediately to cost of service if the taxpayer was on a flow-through method of accounting for depreciation purposes and if the flow-through option for the credit had been elected. This election was provided under the Revenue Act of 1971 when rate and accounting limitations with respect to ITC for public utility property were first introduced within the Internal Revenue Code. A similar election was provided for the additional 6% ITC credit under the Tax Reduction Act of 1975 to a taxpayer who had elected the immediate flow-through option under the 1969 Act. With regard to the 1975 Act, those who had elected immediate flow-through relative to the 4% credit also could have elected cost of service normalization for the additional 6% credit or opted for rate base normalization by making no election.

However, similar treatment was not provided under the provisions of ERTA for post-1980 property. ERTA includes a transition rule for utilities which had elected the immediate flow-through treatment. In general, it provides that a utility must meet the new rules in its first rate order determining cost of service involving post-1980 property which becomes effective after August 13, 1981, and on or before January 1, 1983.

To provide for compliance with ERTA, the California PUC, under an Interim Order, ordered that conventional normalization methods shall be used. [13]

The California PUC decision would not necessarily mean that all California public utilities automatically meet the ERTA normalization rules. The California PUC "decision" represents preliminary guidelines issued by the Commission in late 1981 to all utilities which disclosed their desire and intention to comply with the new normalization rules. It would, of course, still require each utility to have a specific rate order in effect by December 31, 1982 that is in full compliance with the ACRS and ITC normalization requirements of ERTA.

(For a discussion of the latest tax developments affecting utilities, the reader should consult the addendum on the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) at the end of Chapter II.)

Reconciliation Between Income Tax Expense and the Amount Computed Using the Applicable Statutory Income Tax Rate

In the aforementioned survey of 85 utility companies, effective tax rate reconciliations are reported to include the following items: [14]

TABLE 7

EFFECTIVE TAX RATE RECONCILIATION ITEMS

	Number of Companies	
	1980	1979
Capitalized interest and tax expenses (including AFDC).....	68	67
Investment tax credits.....	61	57
Accelerated tax depreciation and amortization.....	52	55

FASB Statement 71 - "Accounting for the Effects of Certain Types of Regulation"

To provide guidance to public utilities and certain other rate-regulated companies in preparing general purpose financial statements, the FASB released the above-entitled statement. The statement provides an outline of accounting procedures to be followed by regulated industries and would replace portions of 27 existing accounting pronouncements. [15]

The most important effect on public utilities and certain other rate-regulated companies is that Statement 71 now requires them to charge refunds to current income when they can be estimated instead of retroactively adjusting income of the year in which the refunded amounts were collected. The Statement also requires those companies to capitalize leases in the same manner as nonregulated companies.

If it is assured that incurred costs will be recovered in the future, Statement 71 requires that those costs be capitalized. The Statement also requires that if regulation provides for current recovery of costs expected to be incurred in the future, those receipts should be recognized as liabilities.

Statement 71 continues the existing practice of public utilities of recording an allowance for the cost of funds used during construction instead of capitalizing the amount of interest cost as is generally required. It also continues the practice of not eliminating from net income certain profits on sales to regulated affiliates.

Except for the rules specified in Statement 71, regulated companies would continue to apply authoritative accounting pronouncements that apply to other companies.

The Statement is effective for fiscal years beginning after December 15, 1983, except for the standards applying to the capitalization of leases. Statement 71 provides a four-year transition period before retroactive application of lease capitalization is required. [16]

Summary

The rate-making process has precipitated some distinct accounting issues for regulated industries in comparison to those that are nonregulated. Although the FERC prescribes a uniform system of accounts and regulations for public utility accounting, each state commission also has discretion in adopting various acceptable accounting techniques. Utilities may thus experience overlapping requirements if involved in multi-state operations, or if governed in part by the FERC.

Variations in the reported gross cost of pollution control equipment between regulated and nonregulated industries, as well as companies within either industry, may result from differences in overhead capitalization policies, capitalization of the cost of equity funds, capitalization of research and development costs, and different treatments for capitalizable leases. In addition, variation in accounting for costs may result from varying policies regarding the inclusion of CWIP in the rate base and the use of normalization vs. flow-through procedures in accounting for income taxes. The net cost of pollution control may also differ after considering the income tax effect of special rules for utility depreciation and investment credit.

Due to the above differences, an evaluation of the appropriateness of costs presently quoted for any purpose by utilities as being attributable to compliance with environmental laws and regulations would first require a study of each utility's methodology for developing the data.

NOTES

1. Public Utilities Commission Annual Report, Public Utilities Commission State of California, p. 177 (1980)
2. Public Utilities Manual, Deloitte, Haskins and Sells, p. 13 (January 1980)
3. The Federal Power Commission (FPC) was abolished at the time the Federal Energy Regulatory Commission (FERC) was created, on October 1, 1977.
4. Allowance for Funds Used During Construction, Lawrence S. Pomerantz and James E. Suelflow, p. 10 (1975)
5. Public Utility Accounting: Theory and Application, James E. Suelflow, p. 67 (1973)
6. Cleveland Electric Illuminating Company, Annual Report 1981, p. 29.
7. Pomerantz and Suelflow, p. 116.
8. 1981 Survey of Financial Reporting and Accounting Developments in the Public Utility Industry, Price Waterhouse, p. 52
9. National Association of Regulatory Utility Commissioners
10. Price Waterhouse, p. 20
11. Price Waterhouse, p. 34
12. Price Waterhouse, p. 25
13. CPUC Decision 93848 (December 15, 1981)
14. Price Waterhouse, p. 27
15. "Accounting for the Effects of Certain Types of Regulation", Financial Accounting Standards Board, Statement 71, (December 28, 1982)

The statement requires the following amendments to existing pronouncements:

a. ARB No. 44 (Revised), Declining-Balance Depreciation, as amended by APB Opinion No. 6, Status of Accounting Research Bulletins. Delete paragraphs 8 and 9.

b. ARB 51. Delete the last sentence of paragraph 6.

c. APB Opinion No. 1, New Depreciation Guidelines and Rules. Delete paragraph 7.

d. APB Opinion No. 2, Accounting for the "Investment Credit." Delete paragraph 17.

e. APB Opinion 11. In the second sentence of paragraph 6, delete the words "(a) to regulated industries in those circumstances where the standards described in the Addendum (which remains in effect) to APB Opinion No. 2 are met and (b)".

f. APB Opinion No. 16, Business Combinations. Delete paragraph 6.

g. APB Opinion No. 17, Intangible Assets. Delete paragraph 7.

h. APB Opinion 20. Delete the last two sentences of paragraph 3.

i. APB Opinion No. 23, Accounting for Income Taxes - Special Areas. Delete paragraph 4.

j. APB Opinion No. 24, Accounting for Income Taxes. Delete paragraph 3.

k. APB Opinion No. 26, Early Extinguishment of Debt. Delete the last sentence of paragraph 2.

l. APB Opinion No. 29, Accounting for Nonmonetary Transactions. In the first sentence following subparagraph 4(d), delete the words "applies to regulated companies in accordance with the Addendum to APB Opinion No. 2, Accounting for the Investment Credit, 1962 and it."

m. FASB Statement No. 2, Accounting for Research and Development Costs. Delete paragraph 14.

n. FASB Statement No. 5, Accounting for Contingencies. Delete paragraph 13.

o. FASB Statement No. 7, Accounting and Reporting by Development Stage Enterprises. Delete the second sentence of paragraph 5.

p. FASB Statement No. 13, Accounting for Leases. Delete paragraph 3.

q. FASB Statement No. 15, Accounting by Debtors and Creditors for Troubled Debt Restructurings. Delete paragraph 9.

r. FASB Statement 16. Delete paragraph 9.

s. FASB Statement No. 19, Financial Accounting and Reporting by Oil and Gas Producing Companies. Delete paragraph 9.

t. FASB Statement No. 22, Changes in the Provisions of Lease Agreements Resulting from Refundings of Tax-Exempt Debt. Delete paragraph 11.

u. FASB Statement 34. Delete paragraph 5.

v. FASB Statement No. 43, Accounting for Compensated Absences. Delete paragraph 3.

w. FASB Statement No. 49, Accounting for Product Financing Arrangements. Delete paragraph 7.

x. FASB Interpretation No. 18, Accounting for Income Taxes in Interim Periods. Delete paragraph 4.

y. FASB Interpretation No. 22, Applicability of Indefinite Reversal Criteria to Timing Differences. Delete paragraph 8.

z. FASB Interpretation No. 25, Accounting for an Unused Investment Tax Credit. Delete paragraph 9.

In addition, the statement supersedes the Addendum, Accounting Principles for Regulated Industries, to APB Opinion 2.

16. "Accounting Guidelines Issued for Certain Rate-Regulated Companies", Status Report, FASB No. 138 (December 28, 1982).

CHAPTER V

SIMPLIFIED HYPOTHETICAL "CASE STUDIES"

Examples I and II following illustrate the major themes discussed in the preceding chapters. The examples present simplified cases which demonstrate the major issues to be examined and provide a structure or framework for analyzing pollution control investments. The reader should bear in mind that these are simplified examples and do not illustrate all of the complexities of "real-world" situations. Considerations such as the following add to the complexity of "real-world" analyses:

- Provisions of new state or federal tax legislation (such as TEFRA;
- CPUC or FERC rulings as they apply generally to the electric utility industry and to individual companies;
- Specific features of the capital structure of individual companies; and
- Changing accounting and financial disclosure standards promulgated by bodies such as the Securities and Exchange Commission or the FASB.

The following discussion reviews the various steps followed in developing these examples. (Chapter references to earlier discussions in this report are included where appropriate.)

EXAMPLE I

A Non-Regulated Corporation

Assumptions

The first portion of the example, immediately following this discussion, details the assumptions used in preparing the illustration.

Definitions & Assumptions

Capital Investment Cost	- Pollution control equipment and installation costs.
Estimated Useful Life (years)	- The assumed estimated economic life of equipment. This will be the basis for calculating book depreciation. It may differ from depreciable life used for tax purposes.
ACRS GROUP (Chapter II)	- The Accelerated Cost Recovery System (ACRS) property category assumed for calculating depreciation expense for tax purposes.
Eligible for California Rapid Depreciation?	- The example assumes the property may be amortized in 12 months under Section 17226, California Revenue and Tax Code.
Annual Operating and Maintenance Costs	- Cost assumption based on examples used in a previous ARB study. Assumes no inflation over life of project. This assumption could be changed to reflect projected inflation rates. Additional operating costs might include increased costs due to lower production efficiency due to the addition of pollution control equipment.
Salvage Value	- Scrap value of equipment assumed at end of useful life. If a value is assumed to otherwise be evident, such an amount would affect cash flow in the final year of analysis.
Date Put in Service	- Assumed to be January 1 of the year following the capital expenditure. If this assumption were to provide for a later date of service inception, it would affect the calculation of depreciation deductions.

Capital Structure (Chapter I)	- Assumed hypothetical capital structure of the firm with an assumed pre-tax cost of each element of capital evidenced. "Post-tax cost" reflects the tax deductibility of debt interest payments from net income. The tax effect of debt is calculated by multiplying the pre-tax interest rate by (1-tax rate).
Weighted Average Cost of Capital	- Calculated in manner discussed in the cost of capital chapter.
Tax Rates (Chapter II)	- Statutory federal and state corporate income tax rates. The combined rate reflects the fact that state taxes are deductible when calculating federal tax liabilities.
Investment Tax Credit (ITC) Percentage	- Property is assumed to qualify for the full 10% investment tax credit.
ACRS 5-year Class Depreciation Rates	- Annual percentage depreciation rate applied to depreciable property base.
Additional Revenue	- Revenue increase assumed attributable to the pollution control investment. One possible source would be sale of byproducts.

CALIFORNIA AIR RESOURCES BOARD
Example I
A Simplified Hypothetical Case Study
for a
Non-Regulated Corporation

Assumptions:

Capital Irvest. Cost	1000000
Est. Useful life(years)	10
ACRS Group	5
Eligible for Calif.rapid amortization?	yes
Annual operating & maintenance costs	200000
Salvage value	0
Date put in service	01/01/xx

Capital Structure	Pre-tax Share	Pre-tax Cost	Post-tax Cost	Weighted Cost
Debt	.6	.16	.0781056	.0468634
Equity	.4	.2	.2	.08
Weighted Average Cost				.1268634

Tax Rates

Federal	.46
Calif.	.096
Combined rate	.51184
Investment Tax Credit (ITC) percentage	.1

ACRS 5 Year Class Depreciation Rates

Year 1	.15
2	.22
3	.21
4	.21
5	.21
6	0
7	0
8	0
9	0
10	0

Equipment & Installattion cost	1000000

Additional Revenue due to investment	0

Depreciation Schedule

This portion of the example shows the difference between book depreciation and that allowed for purposes of computing state and federal income taxes. The book depreciation only affects the corporate balance sheet and book income statement. It does not impact the corporate cash flow anlaysis as discussed below. The federal depreciation tax deductions reflect the ACRS schedule mentioned above. State law allows full amortization of qualified facilities in a 12-month period. The reader should note, however, that 12 month amortization is only advantageous to a corporation that has enough other taxable income to fully utilize this deduction in the year it is claimed. Since California law does not allow excess deductions to be carried over or back to other tax years, such large deductions are only useful for reducing current year taxes. This assumption is carried on throughout this example (Chapter II).

Investment Tax Credit Schedule

This section shows the timing of the claim for ITC. The full amount of ITC is assumed claimed and received in the year that the equipment is put in operation. The issue of whether or not the hypothetical facility would otherwise qualify for ITC immediately as a qualified progress expenditure has not been addressed. The implications of TEFRA have not been addressed. As the table indicates, California law does not provide for a similar credit (Chapter II).

Example I (cont.)

Depreciation Schedule:

Year	a. Book	b. Federal Tax	c. Calif. Tax
0	0	0	0
1	100000	150000	1000000
2	100000	220000	0
3	100000	210000	0
4	100000	210000	0
5	100000	210000	0
6	100000	0	0
7	100000	0	0
8	100000	0	0
9	100000	0	0
10	100000	0	0

Notes on Calculations

a. Capital investment cost by useful life.
b. ACRS rate times capital ment cost.
c. Reflects 12 month amort per Calif. Rev. & Tax C

Invest. Tax Credit Schedule:

Year	Book & Federal Tax	Book & Calif. Tax
0	0	0
1	100000	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0

California Tax Schedule

This section illustrates the effect of the mandated pollution control investment and the related increase in operating costs on the firm's California tax liability (Chapter II).

Additional Revenue	Revenue increase attributable to this investment. Assumed to be zero in this case. It could be positive if by-products recovered from pollution control were sold by the firm.
Operating and Maintenance Expense	Reflects increased operating costs due to the use of this new equipment. These costs are deductible business expenses.
California Depreciation Deduction	The amount of the annual depreciation deduction the firm claims under California law. In this example, the firm exercises the 12-month amortization option. This is beneficial to the firm if it has sufficient taxable income from other operations which can be offset by this deduction. If not, the firm can elect to use other depreciation methods such as 60-month amortization, accelerated depreciation, straight-line depreciation, or ADR guideline lives and methods.
California Taxable Income	This column reflects the result of subtracting the additional tax deductions listed above from the additional revenue generated by the project. It is negative in this example since no additional revenue is generated. California law does not allow tax losses in one year to be carried forward or back to other tax years. It is assumed that the firm must have an equal or greater amount of taxable income from other operations during the same year in order to reap the full benefit of the tax effects shown in the example.
California Tax Rate	The current statutory California Bank and Corporation Tax rate applied to taxable corporate income.

California Tax Liability — The result of multiplying taxable income by the tax rate shown. A negative amount reflects the fact that the example serves to reduce California taxes (on income from other operations) by the amounts shown. It is assumed that the firm does have sufficient other tax liabilities to utilize the full amounts shown. If a firm has no other tax liabilities, the value in this column would be zero for any year where there was no tax liability.

Federal Tax Schedule

This section illustrates the effect of the mandated pollution control investment and the related increase in operating costs on the firm's federal tax liability (Chapter II).

Additional Revenue — Same as California Tax Schedule.

Operating and Expense — Same as California Tax Schedule.

Federal Depreciation Module — The amount of the annual depreciation deduction claimed under federal law. In this example it is based on 5 year property under ACRS.

California Income Tax — The amount of state income tax paid is an allowable federal tax deduction. In this example the deduction is negative, reflecting the fact that California taxes are reduced by the effects of this investment.

Federal Taxable Income — This column reflects the result of subtracting the additional tax deductions listed above from the increased revenue generated by the project. It is negative in this example since no additional revenue is generated. Federal law allows tax losses to be carried back to prior years and forward to succeeding years (triggering refunds when amended returns for prior years are filed).

Federal Tax Rate — The statutory federal tax rate applied to corporate net income over $100,000. Lower rates applicable to the first $100,000 of corporate net income have been ignored.

Federal Tax Before Credits	The result of multiplying the taxable income by the statutory tax rate.
Less ITC	This column shows the dollar-by-dollar reduction in federal taxes when the ITC is claimed.
Federal Tax Liability	The result of adjusting the tax before credits to reflect the effect of tax credits. A negative amount reflects the fact that the example serves to reduce federal taxes otherwise due by the amounts shown. It is assumed that the firm has sufficient other tax liabilities to utilize the tax savings shown.

Example I (cont.)

California Tax Schedule

Year	Add. Revenue	Deductions: O.& M. Expense	Deductions: Calif. Deprec. Deduc.	Calif. Taxable Income	Calif. Tax Rate	Calif. Tax Liabil.
0	0	0	0	0	.096	0
1	0	200000	1000000	-1200000	.096	-115200
2	0	200000	0	-200000	.096	-19200
3	0	200000	0	-200000	.096	-19200
4	0	200000	0	-200000	.096	-19200
5	0	200000	0	-200000	.096	-19200
6	0	200000	0	-200000	.096	-19200
7	0	200000	0	-200000	.096	-19200
8	0	200000	0	-200000	.096	-19200
9	0	200000	0	-200000	.096	-19200
10	0	200000	0	-200000	.096	-19200
Total	0	2000000	1000000	-3000000		-288000

Federal Tax Module

Year	Add. Revenue	Federal Deductions: O.& M. Expense	Federal Deductions: Federal Deprec. Deduc.	Calif. Income Tax	Federal Taxable Income	Federal Tax Rate	Fed.Tax Before Credits	Less ITC	Federal Tax Liab.
0	0	0	0	0	0	.46	0	0	0
1	0	200000	150000	-115200	-234800	.46	-108008	-100000	-208008
2	0	200000	220000	-19200	-400800	.46	-184368	0	-184368
3	0	200000	210000	-19200	-390800	.46	-179768	0	-179768
4	0	200000	210000	-19200	-390800	.46	-179768	0	-179768
5	0	200000	210000	-19200	-390800	.46	-179768	0	-179768
6	0	200000	0	-19200	-180800	.46	-83168	0	-83168
7	0	200000	0	-19200	-180800	.46	-83168	0	-83168
8	0	200000	0	-19200	-180800	.46	-83168	0	-83168
9	0	200000	0	-19200	-180800	.46	-83168	0	-83168
10	0	200000	0	-19200	-180800	.46	-83168	0	-83168
Total	0	2000000	1000000	-288000	-2712000		-1247520	-100000	-1347520

For purposes of investment analysis, state and federal tax deductions for interest expense have been excluded.

Corporation Cash Flow/Investment Analysis

This section illustrates the cash flow analysis of the proposed investment from the perspective of the corporation. It uses the cost of capital and investment analysis techniques discussed earlier in this report (Chapter I).

Additional Revenue	See discussion above.
Capital Expenditure	Pollution control equipment and installation cost.
Operating and Maintenance Expense	See discussion above.
California Income Tax	The example shows the reduction in California taxes due to the investment and related operating expenses.
Federal Income Tax	This example shows the reduction in Federal taxes due to the investment and related operating expenses.
Net Cash Flow	The result of subtracting capital expenditures, O. & M. expenses, and tax expense (or savings) from additional revenue.
Net Present Value (NPV)	Shows the net present value using the weighted average cost of capital shown above as the discount rate.

Comment on Interest Expense

While interest expense is a deductible item for purposes of computing federal and state income taxes, it is not included in the tax and cash flow analyses of this corporation's investment. The reason for this is that the discount rate (the weighted average cost of capital) reflects the after-tax cost of debt and thus adjusts the net present value of the cash flow stream to reflect the tax effects of debt.

Example I (cont.)

Corporation Cashflow/Investment Analysis

Year	Add. Revenue	Capital Expend.	O.& M. Expense	Calif. Income Tax	Federal Income Tax	Net Cash Flow
0	0	1000000	0	0	0	-1000000
1	0	0	200000	-115200	-208008	123208
2	0	0	200000	-19200	-184368	3568
3	0	0	200000	-19200	-179768	-1032
4	0	0	200000	-19200	-179768	-1032
5	0	0	200000	-19200	-179768	-1032
6	0	0	200000	-19200	-83168	-97632
7	0	0	200000	-19200	-83168	-97632
8	0	0	200000	-19200	-83168	-97632
9	0	0	200000	-19200	-83168	-97632
10	0	0	200000	-19200	-83168	-97632
Total	0	1000000	2000000	-288000	-1347520	-1364480
Net Present Value at weighted average cost of capital (adjusted for the tax advantage of debt.)	0	1000000	1098991	-190695	-828069	-1080227

EXAMPLE II
A Regulated Utility

Assumptions

The first portion of the example, immediately following this discussion, details the assumptions used in preparing the illustration. (Chapter references to earlier discussions in this report are included where appropriate.)

Capital Investment Cost - Pollution control equipment and installation costs.

Estimated Useful Life (years) - The assumed estimated economic life of equipment. This will be the basis for calculating book depreciation. It may differ from depreciable life used for tax purposes.

ACRS Group (Chapter II) - The Accelerated Cost Recovery System (ACRS) property category assumed for calculating depreciation expense for tax purposes.

Eligible for California Rapid Depreciation? - The example assumes the property may be amortized in 12 months under Section 17226, California Revenue and Tax Code.

Annual Operating and Maintenance Costs - Cost assumption based on examples used in a previous ARB study. Assumes no inflation over the life of the project. This assumption could be changed to reflect projected inflation rates. Additional operating costs might include increased costs of electricity generation due to lower efficiency caused by the addition of pollution control equipment.

Working Capital Requirement - The CPUC allows utilities a provision for working capital in determining the rate base. Working capital equals 1/12 of the annual operating and maintenance costs. It reflects the fact that there is a lag between customer

billing and collection and the payment of expenses by the utility. It is added to the rate base.

Spare Parts Requirement - The CPUC allows utilities a provision for spare parts in calculating total investment in a project. In this example, it equals 5% of the equipment cost. It is added to the rate base but is not depreciated.

Salvage Value - Scrap value of equipment assumed at end of useful life. If a value is assumed to otherwise be evident, such an amount affects cash flow and depreciation.

Date Put in Service - Assumed to be January 1 of the year following the capital expenditure. If this assumption were to provide for a later date of service inception, it would affect the calculation of depreciation deductions.

Capital Structure (Chapter I) - Assumed hypothetical capital structure of the firm with a hypothetical CPUC authorized cost of each element of capital evidenced. The CPUC authorized rates reflect the "imbedded cost" of debt not the current market cost for additional debt. (See Appendix II to Chapter I).

Weighted Average Cost of Capital - Calculated in manner discussed in the cost of capital chapter.

Tax Rates - Statutory federal and state corporate income tax rates. The combined rate reflects the fact that state taxes are deductible when calculating federal tax liabilities.

Investment Tax Credit (ITC) Percentage	-	Property is assumed to qualify for the full 10% investment tax credit.
ACRS 5-year Class Depreciation Rates	-	Annual percentage depreciation rate applied to depreciable property base.
Construction Period: Term in Years		Construction is assumed to take one year to complete.
Construction Cost		Equipment and installation cost.
Construction Period Interest		The interest expense on the construction cost for the one year construction period. (Which is a portion of the Allowance for Funds Used During Construction - AFUDC). It is calculated by multiplying the construction cost times the share of debt in the capital structure times the pre-tax interest rate.
Imputed Equity Earnings		The imputed earnings on equity capital required to finance construction costs during the construction period. It is calculated by multiplying the construction cost times the share of equity in the capital structure times the CPUC authorized rate of return on equity. (Which is a portion of AFUDC).
Amount Eligible for Inclusion in CPUC Rate Base		The CPUC does not allow utilities to currently recover, during the construction period of pollution control or any other equipment, interest costs or earn a return on equity capital used to finance construction work in progress. It does allow the capitalized interest cost (see above) and an imputed return on equity capital used to finance construction to be added to the rate base for recovery over the life of the project. Provisions for working capital and spare parts are also included in the rate base.

CAIFORNIA AIR RESOURCES BOARD
Example II
A Simplified Hypothetical Case Study
for a
Regulated Utility Corporation

Assumptions:

Capital Invest. Cost	1000000
Est. Useful life(years)	10
ACRS Group	5
Eligible for Calif.rapid amortization?	yes
Annual operating & maintenance costs	200000
Working capital requirement	16667
Spare parts requirement	50000
Date put in service	01/01/xx
Salvage value	0

Capital Structure	Share	Pre-tax Cost	Post-tax Cost	Weighted Cost
Debt	.6	.12	.0585792	.0351475
Equity	.4	.17	.17	.068
Weighted Average Cost (reflects imbedded cost of debt and author. return on equity) (See Appen. II to Chap. I)				.1031475

Tax Rates

Federal	.46	
Calif.	.096	
Combined rate	.51184	(Reflects interactions of state & federal tax systems.)
Investment Tax Credit (ITC) percentage	.1	

ACRS 5 Year Class Depreciation Rates

Year 1	.15
2	.22
3	.21
4	.21
5	.21
6	0
7	0
8	0
9	0
10	0

Depreciation Schedule

Federal Tax	The federal tax deductions reflect the ACRS schedule mentioned above.
California Tax	State law allows full amortization of qualified facilities in a 12-month period. The reader should note, however, that 12-month amortization is only advantageous to a corporation that has enough other taxable income to fully utilize this deduction in the year it is claimed. See Example I for a fuller discussion.
CPUC Depreciation	CPUC allowance for depreciation of the rate base. The rate base includes the capitalized interest from the construction period. Note that provisions for working capital and spare parts are not depreciated.

Construction Period Interest Schedule

Under California and prior Federal tax laws, construction period interest was deductible in the year incurred. Under the new TEFRA provisions, this would apply only if the acquisition is deemed to be personal property (as opposed to real property). For purposes of this example, the construction interest was deducted currently for tax purposes. This is based on the assumption that the equipment is personal property. In practice, this assumption should be examined closely, as there is some ambiguity in this area of the law. Note that construction period interest is part of AFUDC and its amortization over 10 years is included in the CPUC depreciation figure.

Investment Tax Credit Schedule

This section shows the timing of the claim for ITC. For federal tax purposes the full amount of the ITC is claimed and received in the year that the equipment is put in operation. As

the table indicates, California law does not provide for a similar credit. For CPUC rate making purposes the normalization method of accounting for the ITC is used. The credit is spread over the useful life of the equipment rather than applied entirely in the first year to reduce the cost of service to the rate payer (Chapter II).

Example II (cont.)

Construction Period:
Term in Years: 1
Construction Cost: 1000000
Const. Period Int. 72000 ; Allowance for Funds Used During
Imputed Eq. Earn. 68000 Construction (AFUDC)

Amount eligible
for inclusion in
CPUC rate base: 1206667 (includes const.cost, AFUDC, working cap., and spare parts.)

Depreciation Schedule:

Year	a. Federal Tax	b. Calif. Tax	c. CPUC Deprec.
0	0	0	0
1	150000	1000000	114000
2	220000	0	114000
3	210000	0	114000
4	210000	0	114000
5	210000	0	114000
6	0	0	114000
7	0	0	114000
8	0	0	114000
9	0	0	114000
10	0	0	114000

Notes on Calculations

a. ACRS rate times capital investment cost.
b. Reflects 12 month amortization per Calif. Rev.& Tax Code.
c. (Cap.invest. cost + const. per. int.) divided by useful life. Working capital and spare parts are not depreciated.

Const. Per. Interest Schedule:

Year	d. Federal Tax	d. Calif. Tax	d. Book & CPUC
0	72000	72000	0
1	0	0	7200
2	0	0	7200
3	0	0	7200
4	0	0	7200
5	0	0	7200
6	0	0	7200
7	0	0	7200
8	0	0	7200
9	0	0	7200
10	0	0	7200

d. Construction period interest divided by useful life(10 years) for book purposes while it is expensed in the year incurred for tax purposes.

Invest. Tax Credit Schedule:

Year	e. CPUC& Book	Federal Tax	Calif. Tax
0	0	0	0
1	10000	100000	0
2	10000	0	0
3	10000	0	0
4	10000	0	0
5	10000	0	0
6	10000	0	0
7	10000	0	0
8	10000	0	0
9	10000	0	0
10	10000	0	0

e. ITC divided by useful life (10) Reflects normalization method.

Deferred Tax Balance

This section shows the cumulative tax effect of the timing differences between book and tax treatment of depreciation and ITC. The CPUC treatment of ITC and depreciation spreads these credits and deductions over the life of the investment. Federal and California tax laws allow accelerated depreciation in the early years of the investment's life. As a result, actual tax payments are lower in the early years than book income tax calculations and higher in later years. The cumulative amount of this difference builds during the early years and then is reduced to zero by the last year. The same total amount of taxes is paid, only the timing differs. This timing difference is reflected in a balance sheet account as a liability (i.e., Deferred Income Taxes).

CPUC Rate Base

Law requires the CPUC to allow a fair return on a utility's investment. The utility rate base and the authorized rate of return are the crucial variables in determining this return. This module describes how the rate base used for computing authorized return (a part of the revenue requirement) is calculated.

Beginning Gross Amount — The total amount eligible for inclusion in the rate base is described above. Each year this amount is reduced by the CPUC depreciation expense described above.

Less Deferred Taxes — Since deferred taxes (see above) are a credit on the firm's balance sheet, they can be thought of as a "free" source of capital (no interest is paid to government for deferred taxes). This "free" source of capital is subtracted from the gross rate base to arrive at the net rate base that must be financed by company debt and equity.

Net Rate Base — The result of reducing the gross rate base by the amount of the deferred tax balance. This is the figure upon which the rate of return on debt and equity is calculated for purposes of setting utility rates.

Example II (cont.)

Deferred Tax Balance:

Year	a. Federal Tax	b. Calif. Tax	Total Balance
0	0	0	0
1	142808	92621	235429
2	184696	82330	267026
3	221984	72038	294022
4	259272	61747	321019
5	296560	51456	348016
6	237248	41165	278413
7	177936	30874	208810
8	118624	20582	139206
9	59312	10291	69603
10	0	0	0

Notes on Calculations

a. (Fed.ACRS deduc.- straight line deprec.)X Fed.tax rate plus (ITC-CPUC normalization ITC) plus (Fed. Const. Int. deduc. - book)X Fed. tax rate

b. State same as Federal except state tax rates are used and there is no ITC.

The above calculations are based on the accumulated amounts in each category.

CPUC Rate Base:

Year	c. Begin. Gross Amount	d. Less Deferred Taxes	Net Rate Base
0	0	0	0
1	1206667	-235429	971238
2	1099467	-267026	832441
3	992267	-294022	698244
4	885067	-321019	564047
5	777867	-348016	429851
6	670667	-278413	392254
7	563467	-208810	354657
8	456267	-139206	317060
9	349067	-69603	279463
10	241867	0	241867

c. Amount included in rate base reduced each year by CPUC allowed depreciation.

d. Deferred taxes from above sched.

CPUC Revenue Requirement

This section shows the components that go into calculating the revenue requirement (rate increase) needed to cover the utility's expenses and provide the authorized rate of return on capital invested in pollution control equipment.

The example discussed below reflects the most widely used method for treating ITC for utility rate making in California (referred to as "option 2" by the CPUC). It is used by all major electric utilities with the exception of Pacific Gas and Electric Company. Under it, the normalization method of treating ITC is used to reduce the cost of service for rate making purposes. Under "option 1", the ITC is applied to reduce the rate base directly, rather than lowering income tax expense and the cost of service. According to CPUC staff, "option 1" results in a slightly lower revenue requirement than "option 2".

Operating and Maintenance Expense	-	Same as described above.
Interest Expense	-	The interest expense for financing the net rate base. Calculated by multiplying net rate base times debt's share of the overall capital structure times the pre-tax interest rate on debt.
Depreciation Expense	-	CPUC allowed depreciation expense. (See Depreciation Schedule).
Income Tax	-	This is the federal and state income tax that must be paid on the utility's earnings. It is not the actual tax paid in a given year, since the CPUC treats depreciation and ITC differently for rate making purposes than do federal and state tax authorities. The amount of this income tax expense is a function of the statutory tax rates. Because of income taxes, net income before tax must be approximately twice the amount of after tax income authorized for equity holders.

Post-Tax Equity Earnings - This is the amount of the return allowed for equity capital used to finance the pollution control equipment. It is calculated by multiplying the net rate base times equity's share of the firm's capital structure times the authorized rate of return on equity capital. It should be noted that this is only an authorized rate of return.

Total Revenue Requirement - This is the sum of the various cost elements listed above. It represents the theoretical rate increase that would be granted to the utility after this investment is put in service.

Net Present Value NPV) - This shows the net present value to the rate payers of the increased rates charged to finance the equipment and operating expenses which is one perspective in analyzing the impact of the investment. The discount rate is the utility's weighted average cost of capital (see above).

Note: While the firm makes the original outlay in year zero, the rate payer only begins paying when it is put in service. Hence, NPV is calculated from years 1 to 10.

Example II (cont.)

CPUC Revenue Requirement:

Year	O.& M. Expense	Deprec. Expense	a. Debt Finance	b. Equity Earn.	c. Income Tax	Total Revenue Require.
			‡‡Rate of Return‡‡			
0	0	0	0	0	0	0
1	200000	114000	69929	66044	59248	509221
2	200000	114000	59936	56606	49352	479894
3	200000	114000	50274	47481	39784	451538
4	200000	114000	40611	38355	30216	423182
5	200000	114000	30949	29230	20648	394827
6	200000	114000	28242	26673	17967	386883
7	200000	114000	25535	24117	15287	378939
8	200000	114000	22828	21560	12606	370994
9	200000	114000	20121	19004	9925	363050
10	200000	114000	17414	16447	7245	355106
Total	2000000	1140000	365841	345516	262277	4113634
d. NPV	1212471	691109	250224	236323	187163	2577289
Per cent	47.04	26.82	9.71	9.17	7.26	100.00

Notes on Calculations

a. (Net rate base) X (Debt share of capital) X (Debt interest rate)

b. (Net rate base) X (Equity share of capital) X (Allowed return on equity)

c. Income tax due on the amount of net income before tax needed to provide the after tax equity earnings calculated above. The formula used is:

$$\left(\frac{\text{(Equity earn. after tax}}{\text{(1 - tax rate)}} \times \text{(Tax rate)} \right) - \frac{\text{(ITC)}}{\text{(useful life)}}$$

d. Net present value using after tax cost of capital.

California Tax Schedule

This section illustrates the effect of the mandated pollution control investment and the related increase in operating costs on the firm's California tax liability. This is the firm's actual tax liability and differs from tax calculations used in rate making (Chapter II).

Additional Revenue	Revenue increase attributable to this investment. Reflects CPUC authorized rate increase.
Operating and Maintenance Expense	Reflects increased operating costs due to the use of this new equipment. These costs are deductible business expenses.
California Depreciation Deduction	The amount of the annual depreciation deduction the firm claims under California law. In this example, the firm exercises the 12-month amortization option. This is beneficial to the firm if it has sufficient taxable income from other operations which can be offset by this deduction. If not, the firm can elect to use other depreciation methods such as 60-month amortization, accelerated depreciation, straight-line depreciation, or ADR guideline lives and methods.
Construction Period Interest	Annual deduction for construction period interest (see earlier discussion).
California Taxable Income	This column reflects the result of subtracting the additional tax deductions listed above from the additional revenue generated by the project. It is negative in the first year since a large depreciation deduction is claimed. California law does not allow tax losses in one year to be carried forward or back to other tax years. It is assumed that the firm must have an equal or greater amount of taxable income from other operations during the same year in order to reap the full benefit of the tax effects shown in the example.

California Tax Rate	The current statutory California Bank and Corporation Tax rate applied to taxable corporate income.
California Tax Liability	The result of multiplying taxable income by the tax rate shown. A negative amount reflects the fact that the example serves to reduce California taxes (on income from other operations) by the amounts shown. It is assumed that the firm does have sufficient other tax liabilities to utilize the full amounts shown.

Federal Tax Schedule

This section illustrates the effect of the mandated pollution control investment and the related increase in operating costs on the firm's federal tax liability (Chapter II).

Additional Revenue	Same as California Tax Schedule.
Operating and Expense	Same as California Tax Schedule.
Federal Depreciation Module	The amount of the annual depreciation deduction claimed under federal law. In this example it is based on 5 year property under ACRS.
Construction Period Interest	Same as California Tax Schedule.
California Income Tax	The amount of state income tax paid is an allowable federal tax deduction.
Federal Taxable Income	This column reflects the result of subtracting the additional tax deductions listed above from the increased revenue generated by the project.
Federal Tax Rate	The statutory federal tax rate applied to corporate net income over $100,000. Lower rates applicable to the first $100,000 of corporate net income have been ignored.
Federal Tax Before Credits	The result of multiplying the taxable income by the statutory tax rate.

Less ITC	This column shows the dollar-for-dollar reduction in federal taxes when the ITC is claimed.
Federal Tax Liability	The result of adjusting the tax before credits reflect the effect of tax credits. A negative amount reflects the fact that the example serves to reduce federal taxes otherwise due by the amounts shown. It is assumed that the firm has sufficient other tax liabilities to utilize the tax savings shown.

Example II (cont.)

California Tax Module

Year	Add. Revenue	California Deductions: O.& M. Expense	Calif. Deprec. Deduc.	Constr. Period Int.Ded.	Calif. Taxable Income	Calif. Tax Rate	Calif. Tax Liabil.
0	0	0	0	72000	-72000	.096	-6912
1	509221	200000	1000000	0	-690779	.096	-66315
2	479894	200000	0	0	279894	.096	26870
3	451538	200000	0	0	251538	.096	24148
4	423182	200000	0	0	223182	.096	21426
5	394827	200000	0	0	194827	.096	18703
6	386883	200000	0	0	186883	.096	17941
7	378939	200000	0	0	178939	.096	17178
8	370994	200000	0	0	170994	.096	16415
9	363050	200000	0	0	163050	.096	15653
10	355106	200000	0	0	155106	.096	14890
Total	4113634	2000000	1000000	72000	1041634		99997

For purposes of investment analysis, state and federal tax deductions for interest expense have been excluded in both the state and federal tax computations shown on this page.

Federal Tax Module

Year	Add. Revenue	Federal Deductions: O.& M. Expense	Federal Deprec. Deduc.	Constr. Period Int.Ded.	Calif. Income Tax	Federal Taxable Income	Federal Tax Rate	Fed.Tax Before Credits	Less ITC	Federal Tax Liab.
0	0	0	0	72000	-6912	-65088	.46	-29940	0	-29940
1	509221	200000	150000	0	-66315	225536	.46	103747	-100000	3747
2	479894	200000	220000	0	26870	33024	.46	15191	0	15191
3	451538	200000	210000	0	24148	17390	.46	8000	0	8000
4	423182	200000	210000	0	21426	-8243	.46	-3792	0	-3792
5	394827	200000	210000	0	18703	-33877	.46	-15583	0	-15583
6	386883	200000	0	0	17941	168942	.46	77713	0	77713
7	378939	200000	0	0	17178	161760	.46	74410	0	74410
8	370994	200000	0	0	16415	154579	.46	71106	0	71106
9	363050	200000	0	0	15653	147397	.46	67803	0	67803
10	355106	200000	0	0	14890	140216	.46	64499	0	64499
Total	4113634	2000000	1000000	72000	99997	941637		433153	-100000	333153

Corporation Cash Flow/Investment Analysis

This section illustrates the cash flow analysis of the proposed investment from the perspective of the corporation. It uses the cost of capital and investment analysis techniques discussed earlier in this report (Chapter I).

Additional Revenue	See discussion above.
Capital Expenditure	Pollution control equipment and installation cost.
Operating and Maintenance Expense	See discussion above.
California Income Tax	See discussion above.
Federal Income Tax	See discussion above.
Net Cash Flow	The result of subtracting capital expenditures, O. & M. expenses, and tax expense (or savings) from additional revenue.
Net Present Value (NPV)	Shows the net present value using the weighted average cost of capital as the discount rate.

The net present value figure ($185,949) shown on the table that follows represents the present value of the net income earned by utility shareholders as a result of the mandated pollution control investment. This reflects the fact that the regulated electric utility is authorized a rate of return on the equity capital used to finance the pollution control equipment. These funds are the compensation new or existing shareholders are paid for the capital they supply for this new investment.

This figure ($185,949) may be contrasted with the net present value of the increased rates paid by consumers displayed in the earlier table entitled "CPUC Revenue Requirement". That table showed the net present value ($2,577,289) of the rates consumers must pay over a 10 year period to finance the construction, operation, and maintenance of the pollution control equipment.

Comment on Interest Expense

While interest expense is a deductible item for purposes of computing federal and state income taxes, it is not included in the tax and cash flow analyses of this corporation's investment. The reason for this is that the discount rate (the weighted average cost of capital) reflects the after-tax cost of debt and thus adjusts the net present value of the cash flow stream to reflect the tax effects of debt.

Example II (cont.)

Corporation Cashflow/Investment Analysis

Year	Add. Revenue	Capital Expend.	O.& M. Expense	Calif. Income Tax	Federal Income Tax	Net Cash Flow
0	0	1000000	0	-6912	-29940	-963148
1	509221	0	200000	-66315	3747	371789
2	479894	0	200000	26870	15191	237833
3	451538	0	200000	24148	8000	219391
4	423182	0	200000	21426	-3792	205549
5	394827	0	200000	18703	-15583	191707
6	386883	0	200000	17941	77713	91229
7	378939	0	200000	17178	74410	87351
8	370994	0	200000	16415	71106	83473
9	363050	0	200000	15653	67803	79595
10	355106	0	200000	14890	64499	75717
Total	4113634	1000000	2000000	99997	333153	680484
NPV at weighted average cost of capital (adjusted for tax advantage of debt).	2577289	-1000000	-1212471	-43999	-174902	182770

Assessing the Case Studies

The two hypothetical studies presented in this section illustrate how the major concepts discussed throughout this report can be brought together to analyze pollution control investments. A review of the case studies also helps to highlight several specific areas that bear on any assessment of the overall impact of pollution control investments:

A. Two Perspectives - Customer and Corporation

In Case I, the non-regulated firm, a key assumption was that the firm was unable to pass through the added costs in the form of higher prices. The firm was assumed to absorb the entire capital and operating costs net of the federal and state tax benefits. The case concluded with an estimate of the net present value of the stream of cash flows (largely negative) caused by the project. The size of the reduction in the firm's net value is mitigated by the ITC and the tax benefits of the accelerated depreciation deductions. The customer is assumed to be held harmless in this case. An analysis of the true impact on customers would require an economic model of the affected industry to forecast the effect of higher production costs on the quantity of goods produced and their price. Such an analysis was clearly outside the scope of this project.

In Case II, the regulated utility, the customer must bear the cost of financing the capital and operating and maintenance costs. The regulatory body (CPUC) must adjust rates to reflect the higher costs imposed on the utility by the mandated pollution control equipment. The Case II analysis shows what the impact is on the customer as well as that on the firm. The Case II analysis concludes with an estimate of the effects of the investment (and

related rate adjustment) on the net present value of the utility. In the example, it increases net value of the firm by $185,949, which represents the present value of the increased return to shareholders. This result, however, is critically dependent on the workings of the regulatory process, inflation, and the timing of rate relief and the ability of the firm to hold operating costs in line with allowed revenues.

B. Key Factors Affecting the Total Impact

Several key factors affect the results in each case. These are:

- Estimated annual operating costs make up a significant part of the discounted present value of the costs to consumers in Case II. Engineering estimates of these costs should be closely scrutinized due to possible large impact on total project costs.
- The Investment Tax Credit (ITC) plays a major role in determining the impact in both cases.
- Accelerated depreciation deductions also play a large role in determining the costs of the mandated investments.
- The cost of capital, since it is used as the discount rate, plays a key role in calculating the net present value of the stream of costs imposed by the mandated technology. Inflationary expectations play a key role in shaping the cost of capital at the present time.
- For ratemaking purposes the CPUC uses the imbedded cost of capital rather than the marginal cost of capital. Due to fluctuations in past rates of interest on debt and dividends on preferred stock, these two measures can differ significantly.

- The impact on a regulated utility (as a profit making firm) can be greatly affected by regulatory lag. If the regulatory authority does not promptly allow increases in rates to compensate the firm for higher costs, the results shown in Case II would change significantly. The firm might have to bear additional costs in the early years of the project without additional revenues. This would negatively impact the net present value of the project for the firm and positively impact it for the rate payer (at least in the short run).

Each of these factors should be closely scrutinized in the review of the financial impact of a pollution control investment. When comparing ARB staff analyses with those prepared by subject firms, careful attention should be paid to identifying similarities and differences in assumptions affecting these issues.

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