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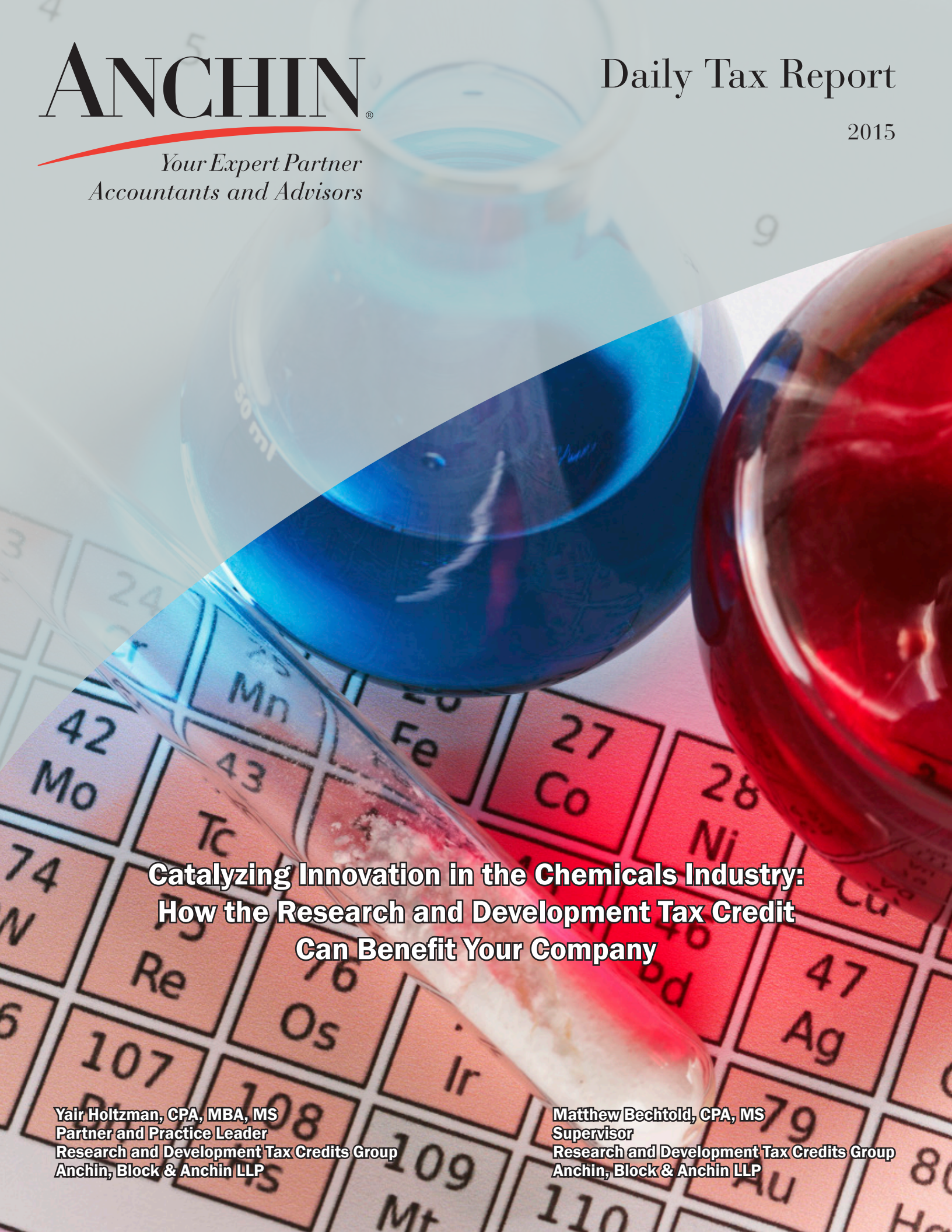

Catalyzing Innovation in the Chemicals Industry: How the Research and Development Tax Credit Can Benefit Your Company

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R&D

Yair Holtzman and Matthew Bechtold of Anchin, Block & Anchin explain the costs that are eligible for—and computations required to claim—research and development tax credits, with a special emphasis on the availability of R&D credits for work undertaken by companies in the chemical industry. ''Often, credits mistakenly are assumed to apply only to the creation of a new product or package, but chemical companies can qualify for research tax credits in a number of ways—including for incremental product and process improvement activities they already perform,'' the authors write.

Catalyzing Innovation in the Chemicals Industry: How the Research and Development Tax Credit Can Benefit Your Company

BY YAIR HOLTZMAN AND MATTHEW BECHTOLD

The chemicals industry is an essential component of the U.S. economy, driving innovation for every other sector. The industry's 10,000 firms produce more than 70,000 products, accounting for more than $800 billion in revenue and touching 96 percent of all manufactured products.

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Innovation has long been considered a cornerstone of growth for the industry, with yearly spending of more than $55 billion over the past five years leading to new products and processes to meet market requirements and demands, according to the American Chemistry Council (ACC).

The chemicals industry is going through a tremendous period of change that will help define opportunities and challenges in both the short and the long term. This includes the nature and role of chemical innovation continuing to move away from the blockbuster breakthroughs that characterized the late 20th century, and toward incremental advances targeted at new solutions for focused specific problems and challenges. There has been an increased commercialization of alternative manufacturing technologies, such as converting coal to liquids and gas to liquids.

Innovative energy sources are now being considered for future use. Certain areas of the Western U.S. contain vast deposits of oil shale. These deposits consist of a complex carbon-based material called kerogen that is found in porous rock formations. One of the challenges with oil shale is that the trapped fuel isn't fluid. As a result, the kerogen can't be pumped out. In order to extract the fuel, the rock needs to be heated to a temperature of at least 250 degrees Celsius in order to decompose the kerogen into smaller molecules. At the present

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R&D Claim Considerations

Chemical industry companies should consider whether they meet requirements to claim research and development credits—many are conducting activities that would qualify. Potential claimants should bear in mind:

- Determining the true cost of R&D can be difficult because few companies have accounting systems that capture many of the costs for support provided by personnel collaborating on research.
- The burden of proof is on the company regarding expenses, so it must maintain documentation to illustrate the connection between expenses and qualifying research activities.
- The documentation must be contemporaneous—it must be created in the ordinary course of conducting the research activities.
- Analysis will be required to determine whether expenses outside the R&D department may be included in the credit calculation.

time, this process is costly and yields large quantities of waste material. This waste material can have a negative impact on the environment. Ethanol is another example of a fuel with the potential to supplement and perhaps one day replace gasoline. Manufacturing technologies are being developed to commercialize these scientific developments.

Chemical innovation is a key driver in helping companies in the industry deliver on strategic goals by getting the right products to market with speed and establishing significant competitive differentiation. Research and development (R&D) is a critical competitive factor for the survival of chemical developers. These companies are constantly working to create new or improved products and improve the functionality, performance, reliability or quality of their products. Accomplishing these objectives is technically challenging and expensive.

Chemical R&D Challenges

Companies within the chemical industry frequently encounter issues related to the sourcing of raw materials and other inputs, supply chain management, compliance with safety and regulatory standards, product yield from chemical reactions, product purity, and scalability while striving to keep pricing competitive to maintain and increase market share. Addressing and overcoming these issues and other scientific technical uncertainties is critical to the success of the business.

Due to the constantly rising cost of raw materials and the need for competitive pricing in a global economy, supply chain management has become increasingly important for chemical companies. This includes the use of electronic procurement, lean manufacturing, and just-in-time inventory systems. Increasingly, companies within the chemicals industry are focusing their efforts on Six Sigma and Kaizen in order to optimize their manufacturing processes and methods. Identifying better and cheaper raw materials and managing the use of other inputs such as fuel and utilities are extremely important for all companies in the industry in order to remain competitive.

Chemical companies must also keep abreast of ever-changing safety and regulatory issues. This includes managing and reducing pollution and optimizing the use of energy and other non-renewable resources. Companies must maintain compliance with federal and state regulations, such as the Toxic Substances Control Act and other chemical regulatory programs.

With the increased terror threat over the past decade, companies must also place an increased importance on safeguarding certain high-risk chemicals. For certain chemical companies, this includes compliance with the U.S. Department of Homeland Security's Chemical Facility Anti-Terrorism Standards. Additionally, the introduction of the European Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) program to the U.S., which addresses the potential impacts of chemicals on humans and the environment, will affect multiple companies and industries going forward.

The ultimate success of a project isn't required in order to qualify for economic R&D incentives since activities related to projects that ultimately fail are rewarded the same as projects that succeed.

Issues related to product yield and purity, and the identification of catalysts and inhibitors, are uncertainties frequently encountered by chemical companies in the development of new or improved products. Another significant technical challenge many times is scalability. The physical characteristics of a system, such as vessel size and material composition, unintentionally affect the chemical reaction, creating diverse results at each iterative size. As a system increases in pilot plant scale, many properties related to the system size change, such as the proportion of surface area to mass, which cause disruptions in laminar and turbulent flow regimes, especially for non-Newtonian fluids. In turn reaction kinetics, fluid mechanics and thermodynamics change in a nonlinear fashion, affecting each other as they change. A productive process at lab scale may not produce the same results in larger scale.

These efforts are often time consuming and expensive. However, overcoming such uncertainties is necessary for companies to develop new products and improve upon existing products. Fortunately, the federal government as well as certain state and local governments provide economic incentives to encounter and overcome such technical uncertainties. Furthermore, the ultimate success of a project isn't required in order to qualify for these incentives since activities related to projects that ultimately fail are rewarded the same as projects that succeed.

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Chemical companies should look closely at these incentives even if, in the past, they didn't believe their activities in developing new products or processes qualified as technological research. Often, credits mistakenly are assumed to apply only to the creation of a new product, process or package, but chemical companies can qualify for research tax credits in a number of ways—including for incremental product and process improvement activities they already perform.

What Is the R&D Tax Credit?

The federal research and development tax credit, also known as the research and experimentation (R&E) tax credit, was first introduced by Congress in 1981. The purpose of the credit is to reward U.S. companies for increasing spending on research and development within the U.S.

The R&D tax credit is available to businesses that uncover new, improved or technologically advanced products, processes, principles, methodologies or materials. In addition to ''revolutionary'' activities, in some cases, the credit may be available if the company has performed ''evolutionary'' activities such as investing time, money and resources toward improving its products and processes.

Correctly calculating the R&D tax credit is critical because the credit can be used to lower the effective tax rate a company pays and to increase cash flow.

How Does the R&D Tax Credit Work?

The R&D tax credit is available to taxpayers who incur incremental expenses for qualified research activities (QRAs) conducted within the U.S.

The credit is comprised primarily of the following qualified research expenses (QREs):

- Internal wages paid to employees for qualified services[1]; this includes those individuals directly performing the science as well as those individuals directly supporting and supervising these individuals.
- Supplies used and consumed in the R&D process.[2]
- Contract research expenses (when someone other than an employee of the taxpayer performs a QRA on behalf of the taxpayer, regardless of the success of the research. See below for a further discussion of these expenses).[3]
- Basic research payments made to qualified educational institutions and various scientific research organizations.[4]

For activities to qualify for the research credit, the taxpayer must show that it meets the following four tests[5]:

- The activities must rely on a hard science, such as engineering, computer science, biological science or physical science.
- The activities must relate to the development of new or improved functionality, performance, reliability or quality features of a structure or component of a structure, including product or process designs that a firm develops for its clients.
- Technological uncertainty must exist at the outset of the activities. Uncertainty exists if the information available at the outset of the project doesn't establish the capability or methodology for developing or improving the business component, or the appropriate design of the business component.
- A process of experimentation (e.g. an iterative testing process) must be conducted to eliminate the technological uncertainty. This includes assessing a design through modeling or computational analysis and experimenting with a material's durability or longevity.

Once it is established that the activities qualify, a thorough analysis must be performed to determine that the taxpayer has assumed the financial risk associated with,[6] and will have substantial rights to,[7] the products or processes that are developed through the work completed.

Appropriate documentation may require changes to the company's recordkeeping processes because the burden of proof regarding all R&D expenses claimed is on the taxpayer.

The next step is to develop a methodology for identifying, quantifying and documenting project costs that may be eligible for the R&D credit. Costs that qualify for the credit include wages of employees involved in developing new or improved products or processes, supplies used or consumed during the research process, and 65 percent of fees paid to outside contractors who provide qualifying R&D services on behalf of the taxpayer.

Determining the true cost of R&D is often difficult because few companies have a project accounting system that captures many of the costs for support provided by the various personnel who collaborate on R&D. The typical project tracking system wouldn't include contractor fees, direct support costs and salaries of high-level personnel who participate in the research effort.

Appropriate documentation may require changes to the company's recordkeeping processes because the burden of proof regarding all R&D expenses claimed is on the taxpayer. The company must maintain documentation to illustrate nexus between qualifying research expenses and qualifying research activities.

[1] Wages are defined to include amounts considered to be wages for federal income tax withholding purposes. I.R.C. Section 41(b)(2)(D)(i), 3401(a).

[2] Supplies are defined as any tangible property other than land or improvements to land, and property subject to depreciation. I.R.C. Section 41(b)(2)(C).

[3] I.R.C. Section 41(b)(3).

[4] I.R.C. Section 41(b)(3)(C)

[5] I.R.C. Section 41(d)(1)

[6] Treas. Reg. Section 1.41-2(e)(2).

[7] Treas. Reg. Section 1.41-2(e)(3); see also *Lockheed Martin Corp. v. United States*, 210 F. 3d 1366 (Fed. Cir. 2000).

According to the Internal Revenue Service Audit Techniques Guide for the R&D credit, the documentation must be contemporaneous, meaning that it was created in the ordinary course of conducting the qualifying research activities.

Furthermore, a careful analysis should take place to evaluate whether expenses associated with eligible activities performed in the company outside of the R&D department may have been missed and can be included in the R&D tax credit calculation. This is accomplished by interviewing personnel directly involved in R&D or those who are in support or supervision of R&D efforts.

In *Union Carbide Corp. v. Commissioner*,[8] the U.S. Tax Court applied the ''Cohan Rule'' to hold that a taxpayer can rely on reasonable estimates when actual expenditures aren't available through oral testimony. Specifically, employees could be interviewed to identify completed research projects, the work performed and the amount of time spent by each employee.

This court opinion is favorable to taxpayers in its application of the type of evidence needed to support a research credit claim. For taxpayers without detailed time records, reasonable estimates based on the longstanding rule in *Cohan v. Commissioner*, 39 F.2d 540 (2d Cir. 1930), may be allowed. However, it is still always preferential to keep contemporaneous documentation in support of research activities.

Claiming Contract Research Expenses

Since contract research organizations (CROs) are commonplace in the chemical industry, we discuss how these expenses should be treated from an Internal Revenue Code Section 41 perspective. A CRO is an organization that provides support to a chemical industry manufacturer in the form of research services outsourced on a contract basis.

Contract research is often an area where taxpayers may neglect to claim and not take Section 41 R&D credits. Research that is reimbursed by customers can qualify if, pursuant to the contract, the taxpayer is economically at risk and retains substantial rights in the research conducted.

Under Section 41(d)(4)(H), the R&D tax credit isn't available to a taxpayer for any research activity to the extent such research is ''funded'' by a grant, contract or other arrangement. Congress enacted the funding limitation to restrict research credit benefits to a single taxpayer in a given transaction. That said, the limitation is imperfect in that two parties often claim the same costs as qualified research expenses (QREs). Alternatively, in some transactions, no party is allowed to claim the expenditures.

The Section 41 regulations provide a major exception to the ''funding'' exclusion (in Treasury Regulations Section 1.41-4A(d)). Under the regulations, research performed by a taxpayer on behalf of another isn't funded if both:

- the taxpayer retains ''substantial rights'' in the research; and
- the payment to the taxpayer is contingent on the success of the research (i.e., the taxpayer is ''at risk'' of bearing the research costs upon failure of the project).

[8] *Union Carbide Corp. v. Commissioner*, T.C. Memo 2009-50 (2009).

Are 'Substantial Rights' in Research Retained?

If your company performs research on behalf of another entity and retains no ''substantial rights'' to the research results under the terms of the contract, the research is treated as funded. Although the Section 41 regulations don't define ''substantial rights,'' they do state that a taxpayer doesn't retain substantial rights when the party for whom the research is performed has the exclusive right to exploit the results of the research and the taxpayer must pay for the right to use the research results (Treas. Reg. Section 1.41-4A(d)(2)).

As the court held in *Lockheed Martin Corp. v. United States*, 210 F.3d 1366 (Fed. Cir. 2000), the right to use research results without paying for such right, even if not an exclusive right, is substantial. Still, if your company must pay a royalty to obtain a non-exclusive license to use the research results, then you don't retain substantial rights in the research.

Thus, so long as exclusive rights aren't vested in another party, you can ''share'' substantial rights in the research results. For example, under the terms of many contracts, taxpayers performing development on behalf of another entity often retain the right to use any knowledge gained while conducting the research in future applications. This is the case even though the technical drawings, blueprints or product specification sheets generated during the research activities remain the property of the customer.

So long as exclusive rights aren't vested in another party, you can ''share'' substantial rights in research results.

Although Treas. Reg. Section 1.41-4A(d)(2) states that incidental benefits retained by a taxpayer (e.g., increased experience in a field of research) don't constitute substantial rights in the research, the Tax Court in *Union Carbide Corp. v. Commissioner*, 97 T.C.M. 1207, 1259, T.C. Memo 2009-50 (2009), when discussing whether Union Carbide's research was funded, stated that the taxpayer had retained all rights to use the results of its plant tests and ''that the information the taxpayer gained from the research was valuable to the researcher irrespective of whether the resulting product was ultimately licensed or not.''

At Risk Test

Amounts paid to a taxpayer under an agreement that are contingent on the success of the research (and thus considered to be payments for the product or research results rather than for research performed on the payor's behalf) aren't treated as funding of the research.

According to *Fairchild Indus. Inc. v. United States*, 71 F.3d 868 (Fed. Cir. 1995), the seminal case on the subject, the determination of whether you are at risk turns on which party bears the research costs upon failure of the project. When retention of payments to you is contingent on performance, such as the successful design or development of a new product or process, you bear the risk of failure.

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The two recent *Geosyntec* court cases highlight the issues related to funded research and are examined below.

Geosyntec Court Case—District Court

A district court decision in the case *Geosyntec Consultants, Inc. v. United States*, No. 9:12-cv-80334 (S.D. Fla. 2013), provides further support for taxpayers who claim fixed-price contract expenses. In *Geosyntec*, the court held, via a summary judgment, that research expenses incurred by a taxpayer under its fixed-price contracts weren't ''funded research'' under Section 41 and were eligible for the research credit.

Geosyntec is a consulting and engineering firm specializing in the environment, natural resources and geologic infrastructure. The firm enters into the following types of contracts with its customers:

- fixed-price, including milestone payment arrangements, where Geosyntec performs work for a fixed total price specified at the outset;
- capped cost-plus, where Geosyntec is paid for labor and other expenses, plus a mark-up, subject to an agreed-upon maximum; and
- cost-plus, where Geosyntec is paid for all time and material costs incurred during the project.

Geosyntec filed suit seeking a tax refund of approximately $1.6 million for qualified research expenses it incurred between 2002 and 2005. As the client assumes the economic risk under cost-plus contracts, Geosyntec agreed with the government that such contracts don't qualify for the Section 41 credit. Therefore, only fixed-price and capped cost-plus contracts were at issue in this proceeding.

Additionally, at the request of the parties, the court didn't consider the retention of substantial rights under these contracts, but instead limited its analysis to which party bore the economic risk under the contracts' payment terms. To expedite the proceedings, the parties agreed to present six representative contracts to the court for review. Three contracts were fixed-price contracts, and three were capped cost-plus contracts.

Geosyntec asserted that the contract principles of risk allocation, including payment mechanisms, conditional acceptance terms and warranty provisions, placed the financial risk of failure on Geosyntec. Therefore, the research expenses weren't funded.

The Internal Revenue Service argued that whether research is funded doesn't turn on routine business risks or potential for financial loss. Instead, the regulations contemplate only excess research costs (i.e., those costs above any funding received) as being unfunded. Further, the IRS contended that the ultimate goal of the contracts was irrelevant and because Geosyntec didn't guarantee success under the contracts, it would be paid for its work regardless of ultimate success.

'Geosyntec' Holding. The court relied on *Fairchild* in order to determine if payment to Geosyntec under each contract was contingent upon the successful development of a specified product or result. If payment is contingent, then Geosyntec bears the risk of failure and the contract costs are eligible Section 41 expenses. Whether Geosyntec was likely to succeed in performing the project isn't determinative.

The court found that Geosyntec was at risk under the fixed-price contracts, but not under the capped cost-plus contracts.

The court held that the:

> nature of fixed price contracts makes them inherently risky to contractors. Under these contracts, to the extent a contractor's performance is unsuccessful, the contractor must remedy the performance without additional compensation. Thus, these contracts generally place maximum economic risk on contractors who ultimately bear responsibility for all costs and resulting profit or loss.[9]

The court also held that capped cost-plus contracts aren't different enough from cost-plus contracts to move them into the ''realm'' of fixed-price contracts. The court decided that capped cost-plus contracts, which obligate clients to make payments for predefined tasks at predefined rates in accordance with a detailed project budget, places minimal risk on the contractor and are, therefore, funded research.

Geosyntec Court Case—Appeals Court

The U.S. Court of Appeals for the 11th Circuit, affirming the district court, found in *Geosyntec Consultants, Inc. v. United States*, 776 F.3d 1330, 2015 BL 21088 (11th Cir. 2015), that Geosyntec wasn't eligible for research tax credits for research expenses incurred under two ''capped contracts,'' because the research was funded by Geosyntec's clients. Under the contracts, Geosyntec was entitled to payment regardless of whether its research was successful, and thus Geosyntec didn't bear the financial risk of failed research.

Geosyntec settled with the IRS with respect to the fixed-price contracts, and appealed the district court ruling as to two of the capped contracts. For both those contracts, Geosyntec argued that it bore the costs of research and should be eligible for the research tax credit.

'Geosyntec' Holding. Geosyntec contended that the capped contracts should be treated as unfunded contracts under the *Fairchild* decision since Geosyntec faced substantial financial risk under the capped contracts because it would only be paid for expenses incurred, eliminating an opportunity to make a profit on the research should it come in under budget, and it bore the risk that its expenses would exceed the ceiling price for each contract. Geosyntec further argued that the totality of the provisions contained in the contracts allocated to Geosyntec the financial risk of the failure of its research to produce the desired product or result—even if success wasn't expressly mandated by the terms of either contract.

The 11th Circuit found Geosyntec's argument misplaced and said its cost-of-performance argument focused on the amount Geosyntec would be paid or the likelihood that its contracts would be profitable; neither of these factors was relevant in determining whether Geosyntec bore financial risk for purposes of the research tax credit analysis. The court said the relevant inquiry was whether payment was contingent on success of the research.

The appeals court found that both contracts were funded contracts based on the fact that Geosyntec was entitled to payment under both the contracts regardless of success. Moreover, additional compensation was

[9] *Geosyntec Consultants, Inc. v. United States*, No. 9:12-cv-80334 (S.D. Fla. 2013), at page 8.

available in certain circumstances. Both of the examined contracts allowed for extra compensation for out-of-scope work or if Geosyntec was faced with unreasonable demands.

The totality of the provisions in the contracts didn't place the risk of failed research on Geosyntec according to the court. Both of the contracts required Geosyntec to perform in accordance with the standard of care applicable to like professionals performing comparable services on the type of project contemplated by the each of the contracts; Geosyntec's work was to be free from negligence, error and defects.

In both cases, the clients contracted to reimburse Geosyntec for labor and costs for pre-defined tasks at pre-defined rates. Neither contract provided that the clients were obligated to reimburse Geosyntec only if Geosyntec produced results that met the contracts' specifications. Under the contracts, Geosyntec was required to submit monthly invoices for services rendered, with no clause requiring the client's review and approval of Geosyntec's work prior to approval.

Under neither of the contracts examined was Geosyntec subject to quality assurance procedures akin to those in *Fairchild*, in which the contract made all work subject to inspection and testing prior to acceptance and provided that payment would be made only after acceptance.

The court determined that because payment to Geosyntec wasn't contingent on the success of its research, Geosyntec didn't bear the financial risk of its own failure, and the two capped contracts were funded by Geosyntec's clients. Therefore, Geosyntec wasn't eligible for research tax credits for research expenses incurred under those contracts.

Recent Developments

The federal R&D tax credit has been evolving ever since it was originally enacted and enjoys broad bipartisan political support. Most recently, the Tax Increase Prevention Act of 2014 (''the 2014 Act''), which was signed into law by President Barack Obama Dec. 19, 2014, retroactively reinstated the federal R&D credit for the one-year period beginning Jan. 1, 2014, through Dec. 31, 2014. In fact, the credit is more likely to be made permanent than it is to go by the wayside.

This most recent extension provided companies of all sizes yet another opportunity to either take advantage of the credit or face competition that already has or will. Qualified companies doing a cost-benefit analysis should consider that most states also offer their own R&D tax credits, which require similar documentation to the federal credit, thereby significantly increasing the benefits side of the equation.

Additionally, the American Taxpayer Relief Act of 2012 (''the 2012 Act''), which was signed into law by President Obama Jan. 2, 2013, also included two significant modifications. First, the 2012 Act modified the treatment of acquisitions and dispositions. Under the 2012 Act, a taxpayer acquiring a trade or business prorates the target's QREs, gross receipts and related base-period impact based on the number of days from the time of acquisition through the end of the controlled group's tax year. The 2012 Act provides for similar treatment in the event of the disposition of a trade or business.

Second, the 2012 Act modified the method by which the R&D credit is allocated to the members of a controlled group of corporations (any two or more corporations connected through a common stock ownership percentage of at least 80 percent). Prior to the 2012 Act, there were two different allocation methods based on the ratio of the stand-alone credit to the group credit, and the ratio of stand-alone QREs to group QREs. The proper method to use depended on the amount of the group credit as compared to the sum of the stand-alone credits. Under the 2012 Act, regardless of the amount of the group credit as compared to the sum of the stand-alone credits, the R&D credit allocable to the member of a controlled group is the proportionate basis to its share of the aggregate of the QREs.

In September 2013, the Treasury Department and the IRS proposed taxpayer-friendly regulations that would amend the Internal Revenue Code Section 174 definition of ''research and experimentation'' (also known as R&D) expenditures. Under the guidance provided in Section 174, taxpayers are allowed to either currently deduct R&D expenditures as they are paid or incurred, or treat them as deferred expenses amortizable over a period not less than 60 months. The existing regulations provide that a determination of whether costs qualify as R&D expenditures depends on whether the costs are required R&D expenses critical to activities intended to discover information that would eliminate uncertainty. The IRS is now proposing that if expenditures do qualify as R&D expenditures during the course of the development effort, it will no longer matter if the resulting product is ultimately sold or is used in the Taxpayer's trade or business.

The R&D credit's previous designation as a Tier I audit issue has long discouraged companies from utilizing the credit for fear of increased audit scrutiny.

In an earlier positive development, the IRS announced in August 2012 that it would no longer use the ''tiered issue process'' to determine exam priorities and address corporate tax issues, freeing the R&D tax credit from its historical designation as a Tier I audit issue. This designation has long discouraged companies from utilizing the credit for fear of increased audit scrutiny. Now the level of compliance risk should be less of a concern for qualified companies wanting to pursue R&D tax credits.

Additionally, a taxpayer can submit a pre-filing agreement application with the IRS in order to request consideration of an R&D tax credit issue before the tax return is filed and thus resolve potential disputes and controversy earlier in the examination process. The effect of the program is to reduce the cost and burden associated with the post-filing examination, to provide a desired level of certainty regarding a transaction, and to make better use of taxpayer and IRS resources. Detailed information about the pre-filing agreement application process can be found in Revenue Procedure 2001-22.

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Government officials, knowing that innovation is critical to any company's success and to overall U.S. economic growth, have legislated alternative calculation options over the years to encourage U.S. companies to invest in research and development and to make the credit more valuable and obtainable. The alternative simplified credit is the most recent example, removing complications inherent in prior calculation methods and easing the documentation burden of the R&D tax credit significantly.

The IRS has recently removed a long-standing restriction limiting the ASC election to originally filed returns. Effective June 3, 2014 the IRS will now allow companies to go back and claim R&D tax credits on amended returns using the ASC methodology for all open tax years. This will significantly ease some record keeping and documentation requirements, which have prevented companies from claiming their research credits in prior years. However, the tax code Section 280C election must still be made on a timely filed return.

Chemical Industry Examples Of Qualifying, Non-Qualifying R&D Activities

Qualifying R&D activities as they apply to the chemical industry fall within four general buckets:

- new product development;
- incremental product development;
- new process development; and
- incremental process development.[10]

Note: New or incremental is determined as related to your company, not the industry or the world.

Specific activities that are examples of qualifying research activities include developing new or improved compounds or other chemical products; developing unique packaging and conducting batch trials, regardless of success or failure; experimentation with scale-up processes; and modification of product formulations or production techniques and processes to increase yields, reduce waste, improve product performance or make other improvements to the efficiency of the manufacturing operation.

Additional examples of qualifying activities include:

- design and development of new products—particularly products that are safer, more effective or have increased functionality, better performance or longer shelf life;
- research of new applications for existing products;
- testing for compliance with domestic or foreign regulatory requirements;
- design, development and implementation of new reagents, testing methods or protocols;
- product experimentation and modification to increase yield or decrease reaction times;
- improvement of manufacturing or production technologies, processes, techniques or procedures to increase yield, reduce waste and byproducts, improve safety, improve energy efficiency or comply with regulatory requirements;
- design and development of scaled-up manufacturing processes;
- development of prototype pilot batches of new product candidates for testing and validation;
- implementation of automated processes or robotics to increase production efficiency;
- software development or information technology initiatives related to product or process improvements; and
- research to receive International Organization for Standardization certifications, fertilizer safety or other similar certifications.

Examples of activities that won't qualify for purposes of the R&D credit include[11]:

- routine testing or inspection activities for quality control;
- development related purely to aesthetic properties of a product or packaging;
- testing and qualification of production lines;
- production line modifications which don't involve technical uncertainty, i.e. trouble shooting involving detecting faults in production equipment or processes;
- market research for advertising or promotions;
- routine data collections;
- research conducted outside the U.S., Puerto Rico or any possession of the U.S.;
- research that is funded by a third party other than the taxpayer; and,
- any other activities that don't meet all of the four tests previously outlined.

Case Studies

The following are three chemical company case studies that further illustrate the types of projects and activities that will potentially qualify for the R&D tax credit. The eligibility of specific activities and expenditures will depend upon a closer examination of the facts and circumstances in relation to applicable guidance.

Case Study One—New Product and Process Development. Company developed a surfactant that it hadn't previously produced. It was uncertain at the start of the project whether the color specification for this product could be met using the company's production processes. To achieve good color and activity on the intermediate, a good vacuum is required on the reactor to remove excess of a feedstock compound. If any air is sucked into the batch during the feedstock compound's removal, the color would darken rapidly. If too much feedstock compound is used, the removal step, and therefore the overall processing time, is increased.

[10] Holtzman, Yair. ''Building Your R&D Tax Credit Claim On A Solid Foundation: The Architectural, Engineering, And Construction Industry.'' Construction Accounting and Taxation May/June (2014): 5-13.

[11] I.R.C. Section 41(d)(4).

Therefore, a balance between product purity and processing time had to be found.

Substantially all of the activities involved in this project were technological in nature and relied on work in analytical and inorganic chemistry. The development involved substantial laboratory work in order to develop the compound and prototyping to optimize the production process. After extensive analysis of the expenditures and activities involved in this project, it was determined to qualify for purposes of the R&D tax credit.

Case Study Two—New Product Development. Company undertook a project to expand on the range and scope of a catalyst family by synthesizing four new compounds. One of the starting materials for the compounds was difficult to manufacture through a reaction. The reaction was difficult to control and gave low yields of production with questionable purity. This led the chemists to examine whether the new compounds could be made from a more stable starting material with higher yield. New methods were developed to make these compounds in higher yields with greater stability and lower costs.

Substantially all of the activities involved in this project were technological in nature and relied on organic chemical synthetic approaches. After extensive analysis of the expenditures and activities involved in this project, it was determined to qualify for purposes of the R&D tax credit.

Case Study Three—Specific Challenges to Process Scale-Up. Company undertook a project to synthesize kilograms of pharmaceutical, where it had previously only successfully synthesized milligrams. Several process scale-up issues arose that needed to be overcome:

■ **Reaction Kinetics.** This relates to the speed at which a chemical reaction takes place. To be useful, a chemical reaction must occur at a reasonable rate. In an effective and efficient system, a state of equilibrium is attained for the solution. In scaling up a reaction, it isn't uncommon for physical and chemical factors to result in non-optimal reaction kinetics. One of the main goals of chemical kinetics is to understand the steps by which a reaction takes place. This series of steps is called the reaction mechanism.

■ **Chemical Equilibrium.** Chemical equilibrium is a dynamic reaction system in which the concentration of all reactants and products remain constant as a function of time. A reaction is only productive when chemical equilibrium is achieved.

■ **Material Properties.** The properties of the materials in contact with process system chemicals are critical. Incorrectly selected materials can influence the reaction, erode over time or make the system unnecessarily expensive.

■ **Fluid Dynamics.** Keeping flow at the correct Reynolds number is important for thermal transfer and mixing efficiency. Fluid dynamics changes at a nonlinear rate as systems increase in size, making changes between laminar and turbulent flow hard to predict.

■ **Thermodynamics.** Heat loss and gain can play a major role in chemical reactions. For example, some reactions discharge heat, increasing system temperature and further speeding up the reaction, letting off even more heat and causing temperatures to rise further. Controlling reaction temperature is important to a successful pilot plant scale-up.

■ **Equipment Selection.** The chemical reaction can be severely impacted by the physical characteristics of the equipment, such as glass versus ceramic equipment, and the size of the flask, vessel or material.

■ **Agitation Issues.** Mixing techniques are extremely important to achieving good reaction kinetics. As systems increase in volume, homogenous mixing becomes more challenging.

After extensive analysis of the expenditures related to the entire effort of the industrial scale-up, the reaction was determined to qualify for purposes of the R&D tax credit as all of the work involved analytical process chemistry as well as organic synthetic chemistry.

Calculating the R&D Tax Credit

There are two standard methods of calculating the Section 41 R&D tax credit. The credit is reported on Form 6765, Credit for Increasing Research Activities, included with the tax return. The methods for calculating the credit are a traditional ''regular credit'' and the alternative simplified method.[12]

Since the ASC only requires examination of expenses in the credit year and for the prior three years, it is a less burdensome method of computation.

Under the traditional method, the credit is 20 percent of the smaller of the current-year qualified research expenses in excess of a base amount or 50 percent of the current-year qualified research expenses. One of the factors used in the calculation of the base amount is historical qualified research expenses. Using the traditional method, some taxpayers are required to determine their qualified research expenses for years as far back as 1984[13].

The ASC credit is 14 percent of the current-year qualified research expenses in excess of 50 percent of the average qualified research expenses for the three tax years preceding the tax year for which the credit is being determined. Since the ASC only requires examination of expenses in the credit year and for the prior three years, it is a less burdensome method of computation.

As such, companies that haven't claimed the research credit in the past or that may have difficulty determining their historical qualified research expenses may find the ASC to be more beneficial, despite the difference in the applied percentage.

Computations are as follows:

[12] I.R.C. Section 41(c)(5)
[13] I.R.C. Section 41(c)(3)

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■ **Alternative Simplified Credit (ASC).** ASC = (Current Year QRE – (Average of Previous Three Years' QRE × 50 percent)) × 14 percent.

■ **Regular (Traditional) Credit Method.** Regular = 20 percent of the smaller of ((Current QRE – Base Period Amount) or (50 percent of Current QRE)) + 20 percent (Current Payments to Universities – Base Period Amount).

■ **Regular (Traditional) Credit Method—Base Period Amount.** Base Period Amount = Fixed Base Percentage × Average of the Prior Four Years' Gross Receipts.

If the special election is made under I.R.C. Section 280C(c)(3) the amount of the allowable credit is determined as follows:

■ **Reduced Credit (ASC Method).** ASC = (Current Year QRE – (Average of Previous Three Years' QRE × 50 percent)) × 9.1 percent.

■ **Reduced Credit (Regular Method).** Regular = 13 percent of the smaller of ((Current QRE – Base Period Amount) or (50 percent of Current QRE)) + 13 percent (Current Payments to Universities – Base Period Amount).

Conclusion

The chemical industry has experienced a dramatic metamorphosis over the past decade. For a company to survive and succeed in this shifting paradigm, it needs to focus its strategic thinking on four critical areas:

■ optimizing manufacturing operations;

■ integrating the use of new technologies in energy exploration and commercialization;

■ developing novel strategies related to product development; and lastly,

■ penetrating new markets.

Chemical manufacturers can address the cost and risk of research and development by leveraging the aforementioned federal, state and local tax incentives. Businesses that have so far not taken advantage of the R&D tax credit have a huge opportunity for improved financial performance.

The R&D tax credit incentivizes an enormous range of activities for companies of all sizes. Many activities that most chemical companies engage in on a regular basis can potentially qualify for the credit. It continues to be underutilized by qualified companies and their business management teams primarily due to a misunderstanding of qualification and documentation requirements for federal and state credits, fear of triggering an IRS audit in the current or prior year tax returns, and the perception of the credits as being limited in scope or fleeting in nature due to their persistent short renewal periods.

The R&D tax credit is an important competitive factor for chemical manufacturers as it can lower the effective tax rate and refuel R&D efforts through increased cash flow. Chemical developers and manufacturers are constantly working on creating new products, improving quality and developing new functionality for existing chemical products.

While claiming the credit requires time, resources and expertise, it can also provide significant monetary and operational benefits to businesses. Even companies currently operating at a loss may benefit because federal R&D credits generated but not used can be carried back one year and forward up to 20 years, creating an opportunity when the company becomes profitable. And, if the company is acquired, the credits can be considered a valuable future asset in negotiating a selling price for the business.

The final value of an R&D tax credit rests with its sustainability upon IRS examination.

The R&D credit can be a powerful incentive, often providing a hidden source of cash from prior years' expenses while also serving to significantly reduce current and future years' federal and state tax liabilities. The R&D credit is also a tool for refueling a company's R&D efforts. Planning ahead by creating an infrastructure that identifies qualifying research activities and collects contemporaneous documentation is essential to reducing future tax liabilities and synthesizing an R&D tax credit that will be sustainable on audit examination.

It is worthwhile for companies in the chemical industry to examine their internal processes and evaluate whether they might benefit from this generous tax credit.