Section 41.—Credit for Increasing Research Activities

26 CFR 1.41–4: Qualified research for expenditures paid or incurred in taxable years ending on or after December 31, 2003.

T.D. 9104

DEPARTMENT OF THE TREASURY
Internal Revenue Service
26 CFR Parts 1 and 602

Credit for Increasing Research Activities

AGENCY: Internal Revenue Service (IRS), Treasury.

ACTION: Final regulations.

SUMMARY: This document contains final regulations relating to the definition of qualified research under section 41(d) for the credit for increasing research activities. These final regulations reflect changes to section 41(d) made by the Tax Reform Act of 1986.

DATES: *Effective Dates*: These regulations are effective January 2, 2004.

Applicability Dates: For dates of applicability of these regulations, see §1.41–4 (e) and Effective Dates under SUPPLEMENTARY INFORMATION.

FOR FURTHER INFORMATION CONTACT: Nicole R. Cimino at (202) 622–3120 (not a toll-free number).

SUPPLEMENTARY INFORMATION:

Background

On December 2, 1998, the Treasury Department and the IRS published in the **Federal Register** a notice of proposed rulemaking (REG–105170–97, 1998–2 C.B. 729 [63 FR 66503]) under section 41 (1998 proposed regulations) relating to the credit for increasing research activities (research credit). The 1998 proposed regulations addressed, in relevant part, (1) the definition of qualified research under section 41(d), (2) the application of the exclusions from the definition of qualified research, and (3) the application of the shrinking-back rule. Comments responding to the 1998 proposed regulations were received and a public hearing was held on April 29, 1999.

On January 3, 2001, the Treasury Department and the IRS published in the **Federal Register** final regulations relating, in relevant part, to the definition of qualified research under section 41(d) (T.D. 8930, 2001–1 C.B. 433 [66 FR 280]). In response to taxpayer concerns regarding T.D. 8930, on January 31, 2001, the Treasury Department and the IRS published Notice 2001–19, 2001–1 C.B. 784, announcing that the Treasury Department and the IRS would review T.D. 8930 and reconsider comments previously submitted in connection with the finalization of T.D. 8930. Notice 2001–19 also provided that, upon the completion of the review, the Treasury Department and the IRS would announce changes to the regulations, if any, in the form of proposed regulations.

On December 26, 2001, the Treasury Department and the IRS published in the **Federal Register** a notice of proposed rulemaking (REG–112991–01, 2002–1 C. B. 404 [66 FR 66362]) reflecting the Treasury Department and the IRS' review of T.D. 8930 (2001 proposed regulations). Comments responding to the 2001 proposed regulations were received and a public hearing was held on March 27, 2002. After considering the comments received and the statements made at the public hearing, portions of the 2001 proposed regulations are adopted as revised by this Treasury Decision.

Explanation of Provisions

This document amends 26 CFR part 1 to provide revised rules for the research credit under section 41. These final regulations generally retain the provisions of the 2001 proposed regulations but clarify the provisions relating to the requirement in section 41(d)(1)(C) that qualified research be research "substantially all of the activities of which constitute elements of a process of experimentation." These final regulations, however, do not contain final rules for research with respect to computer software "which is developed by (or for the benefit of) the taxpayer primarily for internal use by the taxpayer" for purposes of section 41(d)(4)(E).

Process of Experimentation—In General

The Tax Reform Act of 1986, Public Law 99–514 (100 Stat. 2085) (the 1986 Act), which narrowed the definition of the term *qualified research*, amended the definition of qualified research by adding a process of experimentation requirement. Section 41(d)(1) provides that in order to constitute qualified research, substantially all of the activities of the research must constitute elements of a process of experimentation related to a new or improved function, performance, or reliability or quality. The legislative history to the 1986 Act explained that "[t]he determination of whether research is undertaken for the purpose of discovering information that is technological in nature depends on whether the process of experimentation utilized in the research fundamentally relies on principles of the physical or biological sciences, engineering, or computer science." H.R. Conf. Rep. No. 99–841, at II–71 (1986). The legislative history further explained that the term *process of experimentation* means, "a process involving the evaluation of more than one alternative designed to achieve a result where the means of achieving that result is uncertain at the outset." *Id.*, at II–72. In addition, a process of experimentation may involve developing one or more hypotheses, testing and analyzing those hypotheses (through, for example, modeling or simulation), and refining or discarding the hypotheses as part of a sequential design process to develop the overall component. *Id.*

The 1998 proposed regulations defined a process of experimentation as "a process to evaluate more than one alternative designed to achieve a result where the means of achieving that result are uncertain at the

outset." Further, the 1998 proposed regulations specified that a process of experimentation is a four-step process requiring that the taxpayer: (i) develop one or more hypotheses designed to achieve the intended result; (ii) design a scientific experiment (that, where appropriate to the particular field of research, is intended to be replicable with an established experimental control) to test and analyze those hypotheses (through, for example, modeling, simulation, or a systematic trial and error methodology); (iii) conduct the experiment and record the results; and (iv) refine or discard the hypotheses as part of a sequential design process to develop or improve the business component. Commentators generally objected to this prescribed four-step test arguing that it would not be appropriate for evaluating the qualification of certain commercial and industrial research activities.

In response to these comments, the Treasury Department and the IRS in T.D. 8930 provided that taxpayers conducting a process of experimentation may, but were not required to, engage in the four-step process described in the 1998 proposed regulations, but eliminated, for this purpose, the specific recordation requirement. (As an addition to the general recordkeeping requirement under section 6001, T.D. 8930 instead included a contemporaneous documentation requirement that was intended to be less burdensome than the specific recordation requirement. The contemporaneous documentation requirement in T.D. 8930 was eliminated in the 2001 proposed regulations.) Consistent with the legislative history, however, T.D. 8930 retained the underlying process of experimentation requirement in the 1998 proposed regulations by providing that a process of experimentation "is a process to evaluate more than one alternative designed to achieve a result where the capability or method of achieving that result is uncertain at the outset."

The 2001 proposed regulations further clarified the definition of a process of experimentation and provided, in relevant part, that "a process of experimentation is a process designed to evaluate one or more alternatives to achieve a result where the capability or the method of achieving that result, or the appropriate design of that result, is uncertain as of the beginning of the taxpayer's research activities." More specifically, however, the general requirement was modified in the 2001 proposed regulations to provide, first, that "a process of experimentation is a process *designed* to evaluate *one or more* alternatives to achieve a result." (Emphasis added). The 2001 proposed regulations also provided that a process of experimentation may exist if a taxpayer performs research to establish the appropriate design of a business component even when the capability and method for developing or improving the business component are not uncertain. The 2001 proposed regulations further stated that a taxpayer's activities do not constitute elements of a process of experimentation where the capability and method of achieving the desired new or improved business component, and the appropriate design of the desired new or improved business component, are readily discernible and applicable as of the beginning of the taxpayer's research activities so that true experimentation in the scientific or laboratory sense would not have to be undertaken to test, analyze, and choose among viable alternatives. Finally, the 2001 proposed regulations emphasized that the determination of whether a taxpayer has engaged in a process of experimentation was dependent on the facts and circumstances of the taxpayer's research activities and, for this purpose, contained three non-dispositive and non-exclusive factors that tend to indicate that a taxpayer has engaged in a process of experimentation.

In response to the 2001 proposed regulations, a number of commentators expressed concern with the rules for the process of experimentation requirement, and, in particular, stated that the rules and terms used (including *uncertainty*, *appropriate design*, and *readily discernible and applicable*) did not provide clear guidance for the requirement. More specifically, commentators stated that the term *readily discernible and applicable* was highly subjective in nature, and thus arguably could be construed as a variant of the discovery test of T.D. 8930. In addition, one commentator expressed concern regarding the meaning and scope of the term *uncertain* and suggested adding examples illustrating the factors that tend to indicate that a taxpayer has engaged in a process of experimentation. Another commentator also noted that the 2001 proposed regulations appeared to allow the inclusion of all design costs as qualified research expenditures to the extent that the appropriate design of the desired result is never certain at the outset of the typical design process.

The Treasury Department and the IRS continue to believe that the process of experimentation test requires an evaluation of the facts and circumstances of a taxpayer's research activities. As reflected by the changes made in the 2001 proposed regulations, this requirement is not intended to be inflexible or overly narrow. Nevertheless, the Treasury Department and the IRS continue to believe that the requirement in the 2001 proposed regulations that a process of experimentation is "a *process* designed to evaluate one or more alternatives to achieve a result" (emphasis added) implies that research activities must contain certain core elements in order to constitute a process of experimentation within the meaning of section 41(d)(1)(C). These final regulations, therefore, make the following clarifications relating to the process of experimentation requirement in the 2001 proposed regulations.

Process of Experimentation—Requirements

The final regulations retain, but further clarify, the requirement in the 2001 proposed regulations that "a process of experimentation is a process designed to evaluate one or more alternatives to achieve a result where the capability or the method of achieving that result, or the appropriate design of that result, is uncertain as of the beginning of the taxpayer's research activities." Further, the final regulations emphasize that the taxpayer's activities must be directed at resolving uncertainty regarding the taxpayer's development or improvement of a business component, and that the process of experimentation must fundamentally rely on the principles of the physical or biological sciences, engineering, or computer science in attempting to resolve the uncertainty. Although these concepts are stated explicitly in the 1986 legislative history and are implicit in the statute, they may not have been given appropriate or necessary weight in prior proposed or final guidance on the process of experimentation requirement.

The final regulations, therefore, set out what the Treasury Department and the IRS have concluded to be the core elements of a process of experimentation for purposes of the research credit. As noted above and consistent with the statute's wording which requires purposeful activity (*i.e.*, "undertaken for the purpose of discovering information"), a taxpayer is required to identify the uncertainty regarding the development or improvement of a business component that is the object of the taxpayer's research activities. A taxpayer is also required to identify one or more alternatives intended to eliminate that uncertainty. Additionally, a taxpayer is required to identify and to conduct a process of evaluating the alternatives. The final regulations provide that such a process may involve, for example, modeling, simulation, or a systematic trial and error methodology.

The final regulations further provide that a process of experimentation "*must* be an evaluative process and generally *should* be capable of evaluating more than one alternative." (Emphasis added). Although the identification and evaluation of more than a single alternative is not required to satisfy the process of experimentation requirement, the Treasury Department and the IRS believe that a taxpayer's activities, in order to qualify for the research credit, generally should be capable of evaluating more than one alternative and, in any event, must be designed to evaluate the alternative, or alternatives, being considered.

The final regulations state that the mere existence of uncertainty regarding the development or improvement of a business component does not indicate that all of a taxpayer's activities undertaken to achieve that new or improved business component constitute a process of experimentation, even if the taxpayer, in fact, does achieve the new or improved business component. The Treasury Department and the IRS believe that the inclusion of a separate process of experimentation requirement in the statute makes this proposition clear. However, the Treasury Department and the IRS have included this clarification in the final regulations out of concern that taxpayers have not been giving sufficient weight to the requirement that a taxpayer engage in a process designed to evaluate one or more alternatives to achieve a result where the capability or the method of achieving that result, or the appropriate design of that result, is uncertain as of the beginning of the taxpayer's research activities. In particular, this clarification is intended to indicate that merely demonstrating that uncertainty has been eliminated (*e.g.*, the achievement of the appropriate design of a business component when such design was uncertain as of the beginning of a taxpayer's activities) is insufficient to satisfy the process of experimentation requirement. A taxpayer bears the burden of demonstrating that its research activities additionally satisfy the process of experimentation requirement.

As noted above, all of the facts and circumstances of a taxpayer's research activities are taken into account to determine whether the taxpayer identified uncertainty concerning the development or improvement of a business component, identified one or more alternatives intended to eliminate that uncertainty, and identified and conducted a process of evaluating the alternatives. Although the final regulations set out the core elements of a process of experimentation, how a taxpayer's qualified research activities will reflect these core elements will depend on the facts and circumstances. These core elements will not necessarily occur in a strict, sequential order. A process of experimentation is an evaluative process, and as such, often involves refining throughout much of the process the taxpayer's understanding of the uncertainty the taxpayer is trying to address, modifying the alternatives being evaluated to eliminate that uncertainty, or modifying the process used to evaluate those alternatives.

Accordingly, the final regulations do not provide detailed guidance as to how the regulatory provisions are to be applied to a given factual situation. Rather, the Treasury Department and the IRS have concluded that the application of these provisions will depend on the specific activities being claimed by a taxpayer as qualified research, the nature of the taxpayer's business and industry, and the uncertainties being addressed by the taxpayer's research activities. The Treasury Department and the IRS believe that additional, industry-specific guidance may be appropriate and request comments on the form of such guidance.

The final regulations do not include the rule contained in the 2001 proposed regulations that a taxpayer's activities do not constitute a process of experimentation where the capability and method of achieving the desired new or improved business component, and the appropriate design of the desired new or improved business component, are readily discernible and applicable as of the beginning of the taxpayer's research activities. A number of commentators expressed concern that this rule was too vague and susceptible to conflicting interpretations. In light of the clarifications made in these final regulations, the Treasury Department and the IRS have concluded that this rule is no longer necessary because such activities do not constitute a process of experimentation under the final regulations.

As noted above, the 2001 proposed regulations do not contain a specific recordkeeping requirement beyond the requirements set out in section 6001 and the regulations thereunder. No change regarding recordkeeping is being made in these final regulations. The clarifications being made to the process of experimentation requirement do not impose any recordkeeping requirement on taxpayers beyond the requirements set out in section 6001 and the regulations thereunder.

Process of Experimentation—Substantially all Requirement

The 2001 proposed regulations retained the rule in T.D. 8930 that the "substantially all" requirement of section 41(d)(1)(C) is satisfied only if 80 percent or more of the research activities, measured on a cost or other consistently applied reasonable basis (and without regard to §1.41–2(d)(2)), constitute elements of a process of experimentation for a purpose described in section 41(d)(3). This requirement is applied separately to each business component.

The Treasury Department and the IRS requested comments on the application of the substantially all rule and, in particular, whether research expenses incurred for non-qualified purposes (*i.e.*, relating to style, taste, cosmetic, or seasonal design factors) are includible in the credit computation provided that substantially all of the research activities constitute elements of a process of experimentation for a qualified

purpose. After consideration of the comments received, the Treasury Department and the IRS have concluded that the substantially all requirement can be satisfied even if some portion of a taxpayer's activities are not for a qualified purpose.

Accordingly, these final regulations clarify the substantially all rule and provide that the substantially all requirement is satisfied if 20 percent or less of a taxpayer's research activities do not constitute elements of a process of experimentation for a purpose described in section 41(d)(3), so long as these remaining activities satisfy the requirements of section 41(d)(1)(A) and are not otherwise excluded under section 41(d)(4). Example (6) of §1.41–4(a)(8) of the 2001 proposed regulations has been modified to illustrate the application of this rule, and appears as example (4) in these final regulations.

Other Issues

Patent Safe Harbor

Section 1.41–4(a)(3)(iii) of the 2001 proposed regulations generally provided that the issuance of certain patents is conclusive evidence that a taxpayer has discovered information that is technological in nature that is intended to eliminate uncertainty concerning the development or improvement of a business component. Some commentators requested that this patent safe harbor be expanded to cover all requirements contained in sections 41(d)(1) and (3). After consideration of these comments, and in light of the clarifications being made in these final regulations to the provisions relating to the process of experimentation requirement, the Treasury Department and the IRS continue to believe that the patent safe harbor is appropriately limited and, therefore, have not changed the patent safe harbor provision.

Shrinking-Back Rule

Some commentators expressed concern that the language of the shrinking-back rule in §1.41–4(b)(2) of the 2001 proposed regulations implied that not all of a taxpayer's qualified research expenses would be eligible for the research credit as a result of the application of the rule. This provision has been revised in these final regulations to clarify that the rule is not intended to exclude qualified research expenses from the credit, but rather is intended to ensure that expenses attributable to qualified research activities are eligible for the research credit for purposes of section 41(d)(1).

Research After Commercial Production

Some commentators requested additional clarification regarding the scope of the research after commercial production, adaptation, and duplication exclusions set out in section 41(d)(4)(A), (B) and (C), and §1.41–4(c)(2), (3) and (4) of the 2001 proposed regulations. After consideration of these comments, the Treasury Department and the IRS believe that the multitude of factual situations to which these exclusions might apply make it impractical to provide additional clarification that is both meaningful and of broad application. The Treasury Department and the IRS believe these three specific exclusions do not cover research activities that otherwise satisfy the requirements for qualified research. Taxpayers, however, should carefully review (including, as appropriate, the application of the shrinking-back rule) research activities that might otherwise fall within these exclusions to ensure that only eligible activities are being included in their credit computations.

One commentator expressed concern that the language of §1.41–4(c)(2)(iv), relating to the clinical testing of pharmaceutical products, could exclude from credit eligibility clinical trials performed under an arrangement where the Food and Drug Administration has granted conditional approval for a pharmaceutical product contingent upon the results of additional clinical trials. Another commentator expressed concern that the language would exclude otherwise qualifying activities because the research was not required to be approved by the Food and Drug Administration. Section 1.41–4(c)(2)(iv) is not a rule of exclusion. As stated above, the Treasury Department and the IRS believe that the research after commercial production exclusion (as well as the adaptation and duplication exclusions) do not cover research activities, including these additional clinical trials, so long as such trials satisfy the requirements for qualified research.

Gross Receipts

These final regulations retain the broad definition of gross receipts contained in T.D. 8930. In response to Notice 2001–19, a number of commentators reiterated earlier comments that this definition was overly broad. As stated in the preamble to the 2001 proposed regulations, the Treasury Department and the IRS continue to believe that the definition of gross receipts should be construed broadly, and, accordingly, no change has been made in these final regulations to the definition contained in T.D. 8930.

Examples

The examples in the regulations have been changed to remove references to "readily discernible and applicable." While the Treasury Department and the IRS continue to believe that the activities in *Examples 4* and *5* of §1.41–4(a)(8) of the 2001 proposed regulations would not qualify under the final regulations, these examples were removed as the only purpose of these examples was to illustrate the "readily discernable and applicable" standard. Minor changes to the facts in *Example 4* of §1.41–4(a)(8) in the final regulations (*Example 6* of §1.41–4(a)(8) of the 2001 proposed regulations) were made to illustrate more clearly the application of the substantially all requirement of §1.41–4(a)(6). These changes do not indicate that the Treasury Department and the IRS believe that the integration activities removed from the example, as contained in the 2001 proposed regulations, are or are not qualified activities standing alone. The determination of whether activities are qualified research is based on the specific facts and circumstances of those activities.

Additionally, minor changes were made to the examples in §1.41–4(c)(10) to remove references to "readily discernable and applicable" and to make some clarifications based on comments received. *Example 1* of §1.41–4(c)(10) was modified to remove the conclusion regarding qualification of expenses under section 174. Although the Treasury Department and the IRS continue to believe that the conclusion in the 2001 proposed regulations is correct, the Treasury Department and the IRS believe that the point illustrated in the removed portion of the example would be

more appropriately addressed in guidance issued under section 174, rather than in guidance under section 41.

Effective Date

Notice 2001–19 stated, in relevant part, that the provisions of T.D. 8930, including any changes to T.D. 8930, would be effective no earlier than the date when the completion of the Treasury Department and the IRS' review of T.D. 8930 was announced. The 2001 proposed regulations provided, in relevant part, that final regulations would apply to taxable years ending on or after December 26, 2001, the date the proposed regulations were published in the **Federal Register**.

Because these final regulations only clarify the provisions of the 2001 proposed regulations, these final regulations apply to taxable years ending on or after December 31, 2003. For taxable years ending before December 31, 2003, the IRS will not challenge return positions that are consistent with these final regulations.

Special Analyses

It has been determined that these regulations are not a significant regulatory action as defined in Executive Order 12866. It also has been determined that section 553(b) of the Administrative Procedure Act (5 U.S.C. chapter 5) does not apply to these regulations, and because these regulations do not impose a collection of information on small entities, the Regulatory Flexibility Act (5 U.S.C. chapter 6) does not apply. Therefore, a Regulatory Flexibility Act Analysis is not required. Pursuant to section 7805(f), the notice of proposed rulemaking preceding these regulations was submitted to the Chief Counsel for Advocacy of the Small Business Administration for comment on its impact on small business.

Drafting Information

The principal author of these regulations is Nicole R. Cimino of the Office of Associate Chief Counsel (Passthroughs and Special Industries), IRS. However, personnel from other offices of the IRS and the Treasury Department participated in their development.

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Adoption of Amendments to the Regulations

Accordingly, 26 CFR parts 1 and 602 are amended as follows:

PART I—INCOME TAXES

Paragraph 1. The authority for part 1 continues to read in part as follows:

Authority: 26 U.S.C. 7805 * * *

Par. 2. Section 1.41–0 is amended by revising the entries for §1.41–4 to read as follows:

The revisions and additions read as follows:

§1.41–0 Table of contents.

* * * * *

§1.41–4 Qualified research for expenditures paid or incurred in taxable years ending on or after December 31, 2003.

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(5) Surveys, studies, research relating to management functions, etc.
(6) Internal use software for taxable years beginning on or after December 31, 1985. **[Reserved]**.
(7) Activities outside the United States, Puerto Rico, and other possessions.
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(iii) Apportionment of contract research expenses.
(8) Research in the social sciences, etc.
(9) Research funded by any grant, contract, or otherwise.
(10) Illustrations.
(d) Recordkeeping for the research credit.
(e) Effective dates.

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Par. 3. Section 1.41–4 is amended as follows:

1. The section heading and paragraphs (a)(2)(iii), (a)(3), (a)(4), (a)(5), (a)(6), (a)(8), (b)(2), (b)(3), (c)(2)(iv), (c)(4), (c)(7)(ii), (c)(10), (d), and (e) are revised.

2. The heading of paragraph (c)(6) is revised and the text is removed and reserved.

The revisions read as follows:

§1.41–4 Qualified research for expenditures paid or incurred in taxable years ending on or after December 31, 2003.

(a) * * *

(2) * * *

(iii) Substantially all of the activities of which constitute elements of a process of experimentation that relates to a qualified purpose.

(3) *Undertaken for the purpose of discovering information*—(i) *In general.* For purposes of section 41(d) and this section, research must be undertaken for the purpose of discovering information that is technological in nature. Research is undertaken for the purpose of discovering information if it is intended to eliminate uncertainty concerning the development or improvement of a business component. Uncertainty exists if the information available to the taxpayer does not establish the capability or method for developing or improving the business component, or the appropriate design of the business component.

(ii) *Application of the discovering information requirement*. A determination that research is undertaken for the purpose of discovering information that is technological in nature does not require the taxpayer be seeking to obtain information that exceeds, expands or refines the common knowledge of skilled professionals in the particular field of science or engineering in which the taxpayer is performing the research. In addition, a determination that research is undertaken for the purpose of discovering information that is technological in nature does not require that the taxpayer succeed in developing a new or improved business component.

(iii) *Patent safe harbor*. For purposes of section 41(d) and paragraph (a)(3)(i) of this section, the issuance of a patent by the Patent and Trademark Office under the provisions of 35 U.S.C. 151 (other than a patent for design issued under the provisions of 35 U.S.C. 171) is conclusive evidence that a taxpayer has discovered information that is technological in nature that is intended to eliminate uncertainty concerning the development or improvement of a business component. However, the issuance of such a patent is not a precondition for credit availability.

(4) *Technological in nature*. For purposes of section 41(d) and this section, information is technological in nature if the process of experimentation used to discover such information fundamentally relies on principles of the physical or biological sciences, engineering, or computer science. A taxpayer may employ existing technologies and may rely on existing principles of the physical or biological sciences, engineering, or computer science to satisfy this requirement.

(5) *Process of experimentation*—(i) *In general*. For purposes of section 41(d) and this section, a process of experimentation is a process designed to evaluate one or more alternatives to achieve a result where the capability or the method of achieving that result, or the appropriate design of that result, is uncertain as of the beginning of the taxpayer's research activities. A process of experimentation must fundamentally rely on the principles of the physical or biological sciences, engineering, or computer science and involves the identification of uncertainty concerning the development or improvement of a business component, the identification of one or more alternatives intended to eliminate that uncertainty, and the identification and the conduct of a process of evaluating the alternatives (through, for example, modeling, simulation, or a systematic trial and error methodology). A process of experimentation must be an evaluative process and generally should be capable of evaluating more than one alternative. A taxpayer may undertake a process of experimentation if there is no uncertainty concerning the taxpayer's capability or method of achieving the desired result so long as the appropriate design of the desired result is uncertain as of the beginning of the taxpayer's research activities. Uncertainty concerning the development or improvement of the business component (*e.g.*, its appropriate design) does not establish that all activities undertaken to achieve that new or improved business component constitute a process of experimentation.

(ii) *Qualified purpose*. For purposes of section 41(d) and this section, a process of experimentation is undertaken for a qualified purpose if it relates to a new or improved function, performance, reliability or quality of the business component. Research will not be treated as conducted for a qualified purpose if it relates to style, taste, cosmetic, or seasonal design factors.

(6) *Substantially all requirement*. In order for activities to constitute qualified research under section 41(d)(1), substantially all of the activities must constitute elements of a process of experimentation that relates to a qualified purpose. The substantially all requirement of section 41(d)(1)(C) and paragraph (a)(2)(iii) of this section is satisfied only if 80 percent or more of a taxpayer's research activities, measured on a cost or other consistently applied reasonable basis (and without regard to §1.41–2(d)(2)), constitute elements of a process of experimentation for a purpose described in section 41(d)(3). Accordingly, if 80 percent (or more) of a taxpayer's research activities with respect to a business component constitute elements of a process of experimentation for a purpose described in section 41(d)(3), the substantially all requirement is satisfied even if the remaining 20 percent (or less) of a taxpayer's research activities with respect to the business component do not constitute elements of a process of experimentation for a purpose described in section 41(d)(3), so long as these remaining research activities satisfy the requirements of section 41(d)(1)(A) and are not otherwise excluded under section 41(d)(4). The substantially all requirement is applied separately to each business component.

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(8) *Illustrations*. The following examples illustrate the application of paragraph (a)(5) of this section:

Example 1. (i) *Facts*. X is engaged in the business of developing and manufacturing widgets. X wants to change the color of its blue widget to green. X obtains from various suppliers several different shades of green paint. X paints several sample widgets, and surveys X's customers to determine which shade of green X's customers prefer.

(ii) *Conclusion*. X's activities to change the color of its blue widget to green are not qualified research under section 41(d)(1) and paragraph (a)(5) of this section because substantially all of X's activities are not undertaken for a qualified purpose. All of X's research activities are related to style, taste, cosmetic, or seasonal design factors.

Example 2. (i) *Facts*. The facts are the same as in *Example 1*, except that X chooses one of the green paints. X obtains samples of the green paint from a supplier and determines that X must modify its painting process to accommodate the green paint because the green paint has different characteristics from other paints X has used. X obtains detailed data on the green paint from X's paint supplier. X also consults with the manufacturer of X's paint spraying machines. The manufacturer informs X that X must acquire a new nozzle that operates with the green paint X wants to use. X tests the nozzles to ensure that they work as specified by the manufacturer of the paint spraying machines.

(ii) *Conclusion*. X's activities to modify its painting process are a separate business component under section 41(d)(2)(A). X's activities to modify its painting process to change the color of its blue widget to green are not qualified research under section 41(d)(1) and paragraph (a)(5) of this section. X did not conduct a process of evaluating alternatives in order to eliminate uncertainty regarding the modification of its painting process. Rather, the manufacturer of the paint machines eliminated X's uncertainty regarding the modification of its painting process. X's activities to test the nozzles to determine if the nozzles work as specified by the manufacturer of the paint spraying machines are in the nature of routine or ordinary testing or inspection for quality control.

Example 3. (i) *Facts*. X is engaged in the business of manufacturing food products and currently manufactures a large-shred version of a product. X seeks to modify its current production line to permit it to manufacture both a large-shred version and a fine-shred version of one of its food products. A smaller, thinner shredding blade capable of producing a fine-shred version of the food product, however, is not commercially available. Thus, X must develop a new shredding blade that can be fitted onto its current production line. X is uncertain concerning the design of the new shredding blade, because the material used in its existing blade breaks when ma-

chined into smaller, thinner blades. X engages in a systematic trial and error process of analyzing various blade designs and materials to determine whether the new shredding blade must be constructed of a different material from that of its existing shredding blade and, if so, what material will best meet X's functional requirements.

(ii) *Conclusion*. X's activities to modify its current production line by developing the new shredding blade meet the requirements of qualified research as set forth in paragraph (a)(2) of this section. Substantially all of X's activities constitute elements of a process of experimentation because X evaluated alternatives to achieve a result where the method of achieving that result, and the appropriate design of that result, were uncertain as of the beginning of the taxpayer's research activities. X identified uncertainties related to the development of a business component, and identified alternatives intended to eliminate these uncertainties. Furthermore, X's process of evaluating identified alternatives was technological in nature, and was undertaken to eliminate the uncertainties.

Example 4. (i) *Facts*. X is in the business of designing, developing and manufacturing automobiles. In response to government-mandated fuel economy requirements, X seeks to update its current model vehicle and undertakes to improve aerodynamics by lowering the hood of its current model vehicle. X determines, however, that lowering the hood changes the air flow under the hood, which changes the rate at which air enters the engine through the air intake system, and which reduces the functionality of the cooling system. X's engineers are uncertain how to design a lower hood to obtain the increased fuel economy, while maintaining the necessary air flow under the hood. X designs, models, simulates, tests, refines, and re-tests several alternative designs for the hood and associated proposed modifications to both the air intake system and cooling system. This process enables X to eliminate the uncertainties related to the integrated design of the hood, air intake system, and cooling system, and such activities constitute eighty-five percent of X's total activities to update its current model vehicle. X then engages in additional activities that do not involve a process of evaluating alternatives in order to eliminate uncertainties. The additional activities constitute only fifteen percent of X's total activities to update its current model vehicle.

(ii) *Conclusion*. In general, if eighty percent or more of a taxpayer's research activities measured on a cost or other consistently applied reasonable basis constitute elements of a process of experimentation for a qualified purpose under section 41(d)(3)(A) and paragraph (a)(5)(ii) of this section, then the substantially all requirement of section 41(d)(1)(C) and paragraph (a)(2)(iii) of this section is satisfied. Substantially all of X's activities constitute elements of a process of experimentation because X evaluated alternatives to achieve a result where the method of achieving that result, and the appropriate design of that result, were uncertain as of the beginning of X's research activities. X identified uncertainties related to the improvement of a business component and identified alternatives intended to eliminate these uncertainties. Furthermore, X's process of evaluating the identified alternatives was technological in nature and was undertaken to eliminate the uncertainties. Because substantially all (in this example, eighty-five percent) of X's activities to update its current model vehicle constitute elements of a process of experimentation for a qualified purpose described in section 41(d)(3)(A), all of X's activities to update its current model vehicle meet the requirements of qualified research as set forth in paragraph (a)(2) of this section, provided that X's remaining activities (in this example, fifteen percent of X's total activities) satisfy the requirements of section 41(d)(1)(A) and are not otherwise excluded under section 41(d)(4).

(b)* * *

(2) *Shrinking-back rule*. The requirements of section 41(d) and paragraph (a) of this section are to be applied first at the level of the discrete business component, that is, the product, process, computer software, technique, formula, or invention to be held for sale, lease, or license, or used by the taxpayer in a trade or business of the taxpayer. If these requirements are not met at that level, then they apply at the most significant subset of elements of the product, process, computer software, technique, formula, or invention to be held for sale, lease, or license. This shrinking back of the product is to continue until either a subset of elements of the product that satisfies the requirements is reached, or the most basic element of the product is reached and such element fails to satisfy the test. This shrinking-back rule is applied only if a taxpayer does not satisfy the requirements of section 41(d)(1) and paragraph (a)(2) of this section with respect to the overall business component. The shrinking-back rule is not itself applied as a reason to exclude research activities from credit eligibility.

(3) *Illustration*. The following example illustrates the application of this paragraph (b):

Example. X, a motorcycle engine builder, develops a new carburetor for use in a motorcycle engine. X also modifies an existing engine design for use with the new carburetor. Under the shrinking-back rule, the requirements of section 41(d)(1) and paragraph (a) of this section are applied first to the engine. If the modifications to the engine when viewed as a whole, including the development of the new carburetor, do not satisfy the requirements of section 41(d)(1) and paragraph (a) of this section, those requirements are applied to the next most significant subset of elements of the business component. Assuming that the next most significant subset of elements of the engine is the carburetor, the research activities in developing the new carburetor may constitute qualified research within the meaning of section 41(d)(1) and paragraph (a) of this section.

(c) * * *

(2) * * *

(iv) *Clinical testing*. Clinical testing of a pharmaceutical product prior to its commercial production in the United States is not treated as occurring after the beginning of commercial production even if the product is commercially available in other countries. Additional clinical testing of a pharmaceutical product after a product has been approved for a specific therapeutic use by the Food and Drug Administration and is ready for commercial production and sale is not treated as occurring after the beginning of commercial production if such clinical testing is undertaken to establish new functional uses, characteristics, indications, combinations, dosages, or delivery forms for the product. A functional use, characteristic, indication, combination, dosage, or delivery form shall be considered new only if such functional use, characteristic, indication, combination, dosage, or delivery form must be approved by the Food and Drug Administration.

* * * * *

(4) *Duplication of existing business component*. Activities relating to reproducing an existing business component (in whole or in part) from a physical examination of the business component itself or from plans, blueprints, detailed specifications, or publicly available information about the business component are not qualified research. This exclusion does not apply merely because the taxpayer examines an existing business component in the course of developing its own business component.

* * * * *

(6) *Internal use software for taxable years beginning on or after December 31, 1985.* **[Reserved]**.

(7) * * *

(ii) *Apportionment of in-house research expenses*. In-house research expenses paid or incurred for qualified services performed both in the United States, the Commonwealth of Puerto Rico and other possessions of the United States and outside the United States, the Commonwealth of Puerto Rico and other possessions of the United States must be apportioned between the services performed in the United States, the Commonwealth of Puerto Rico and other possessions of the United States and the services performed outside the United States, the Commonwealth of

Puerto Rico and other possessions of the United States. Only those in-house research expenses apportioned to the services performed within the United States, the Commonwealth of Puerto Rico and other possessions of the United States are eligible to be treated as qualified research expenses, unless the in-house research expenses are wages and the 80 percent rule of §1.41–2(d)(2) applies.

* * * * *

(10) *Illustrations*. The following examples illustrate provisions contained in paragraphs (c)(1) through (9) (excepting paragraphs (c)(6) of this section) of this section. No inference should be drawn from these examples concerning the application of section 41(d)(1) and paragraph (a) of this section to these facts. The examples are as follows:

Example 1. (i) *Facts*. X, a tire manufacturer, develops a new material to use in its tires. X conducts research to determine the changes that will be necessary for X to modify its existing manufacturing processes to manufacture the new tire. X determines that the new tire material retains heat for a longer period of time than the materials X currently uses for tires, and, as a result, the new tire material adheres to the manufacturing equipment during tread cooling. X evaluates several alternatives for processing the treads at cooler temperatures to address this problem, including a new type of belt for its manufacturing equipment to be used in tread cooling. Such a belt is not commercially available. Because X is uncertain of the belt design, X develops and conducts sophisticated engineering tests on several alternative designs for a new type of belt to be used in tread cooling until X successfully achieves a design that meets X's requirements. X then manufactures a set of belts for its production equipment, installs the belts, and tests the belts to make sure they were manufactured correctly.

(ii) *Conclusion*. X's research with respect to the design of the new belts to be used in its manufacturing of the new tire may be qualified research under section 41(d)(1) and paragraph (a) of this section. However, X's expenses to implement the new belts, including the costs to manufacture, install, and test the belts were incurred after the belts met the taxpayer's functional and economic requirements and are excluded as research after commercial production under section 41(d)(4)(A) and paragraph (c)(2) of this section.

Example 2. (i) *Facts*. For several years, X has manufactured and sold a particular kind of widget. X initiates a new research project to develop a new or improved widget.

(ii) *Conclusion*. X's activities to develop a new or improved widget are not excluded from the definition of qualified research under section 41(d)(4)(A) and paragraph (c)(2) of this section. X's activities relating to the development of a new or improved widget constitute a new research project to develop a new business component. X's research activities relating to the development of the new or improved widget, a new business component, are not considered to be activities conducted after the beginning of commercial production under section 41(d)(4)(A) and paragraph (c)(2) of this section.

Example 3. (i) *Facts*. X, a computer software development firm, owns all substantial rights in a general ledger accounting software core program that X markets and licenses to customers. X incurs expenditures in adapting the core software program to the requirements of C, one of X's customers.

(ii) *Conclusion*. Because X's activities represent activities to adapt an existing software program to a particular customer's requirement or need, X's activities are excluded from the definition of qualified research under section 41(d)(4)(B) and paragraph (c)(3) of this section.

Example 4. (i) *Facts*. The facts are the same as in *Example 3*, except that C pays X to adapt the core software program to C's requirements.

(ii) *Conclusion*. Because X's activities are excluded from the definition of qualified research under section 41(d)(4)(B) and paragraph (c)(3) of this section, C's payments to X are not for qualified research and are not considered to be contract research expenses under section 41(b)(3)(A).

Example 5. (i) *Facts*. The facts are the same as in *Example 3*, except that C's own employees adapt the core software program to C's requirements.

(ii) *Conclusion*. Because C's employees' activities to adapt the core software program to C's requirements are excluded from the definition of qualified research under section 41(d)(4)(B) and paragraph (c)(3) of this section, the wages C paid to its employees do not constitute in-house research expenses under section 41(b)(2)(A).

Example 6. (i) *Facts*. X manufacturers and sells rail cars. Because rail cars have numerous specifications related to performance, reliability and quality, rail car designs are subject to extensive, complex testing in the scientific or laboratory sense. B orders passenger rail cars from X. B's rail car requirements differ from those of X's other existing customers only in that B wants fewer seats in its passenger cars and a higher quality seating material and carpet that are commercially available. X manufactures rail cars meeting B's requirements.

(ii) *Conclusion*. X's activities to manufacture rail cars for B are excluded from the definition of qualified research. The rail car sold to B was not a new business component, but merely an adaptation of an existing business component that did not require a process of experimentation. Thus, X's activities to manufacture rail cars for B are excluded from the definition of qualified research under section 41(d)(4)(B) and paragraph (c)(3) of this section because X's activities represent activities to adapt an existing business component to a particular customer's requirement or need.

Example 7. (i) *Facts*. X, a manufacturer, undertakes to create a manufacturing process for a new valve design. X determines that it requires a specialized type of robotic equipment to use in the manufacturing process for its new valves. Such robotic equipment is not commercially available, and X, therefore, purchases the existing robotic equipment for the purpose of modifying it to meet its needs. X's engineers identify uncertainty that is technological in nature concerning how to modify the existing robotic equipment to meet its needs. X's engineers develop several alternative designs, and conduct experiments using modeling and simulation in modifying the robotic equipment and conduct extensive scientific and laboratory testing of design alternatives. As a result of this process, X's engineers develop a design for the robotic equipment that meets X's needs. X constructs and installs the modified robotic equipment on its manufacturing process.

(ii) *Conclusion*. X's research activities to determine how to modify X's robotic equipment for its manufacturing process are not excluded from the definition of qualified research under section 41(d)(4)(B) and paragraph (c)(3) of this section, provided that X's research activities satisfy the requirements of section 41(d)(1).

Example 8. (i) *Facts*. An existing gasoline additive is manufactured by Y using three ingredients, A, B, and C. X seeks to develop and manufacture its own gasoline additive that appears and functions in a manner similar to Y's additive. To develop its own additive, X first inspects the composition of Y's additive, and uses knowledge gained from the inspection to reproduce A and B in the laboratory. Any differences between ingredients A and B that are used in Y's additive and those reproduced by X are insignificant and are not material to the viability, effectiveness, or cost of A and B. X desires to use with A and B an ingredient that has a materially lower cost than ingredient C. Accordingly, X engages in a process of experimentation to develop, analyze and test potential alternative formulations of the additive.

(ii) *Conclusion*. X's activities in analyzing and reproducing ingredients A and B involve duplication of existing business components and are excluded from the definition of qualified research under section 41(d)(4)(C) and paragraph (c)(4) of this section. X's experimentation activities to develop potential alternative formulations of the additive do not involve duplication of an existing business component and are not excluded from the definition of qualified research under section 41(d)(4)(C) and paragraph (c)(4) of this section.

Example 9. (i) *Facts*. X, a manufacturing corporation, undertakes to restructure its manufacturing organization. X organizes a team to design an organizational structure that will improve X's business operations. The team includes X's employees as well as outside management consultants. The team studies current operations, interviews X's employees, and studies the structure of other manufacturing facilities to determine appropriate modifications to X's current business operations. The team develops a recommendation of proposed modifications which it presents to X's management. X's management approves the team's recommendation and begins to implement the proposed modifications.

(ii) *Conclusion*. X's activities in developing and implementing the new management structure are excluded from the definition of qualified research under section 41(d)(4)(D) and paragraph (c)(5) of this section. Qualified research does not include activities relating to management functions or techniques including management organization plans and management-based changes in production processes.

Example 10. (i) *Facts*. X, an insurance company, develops a new life insurance product. In the course of developing the product, X engages in research with respect to the effect of pricing and tax consequences on demand for the product, the expected volatility of

interest rates, and the expected mortality rates (based on published data and prior insurance claims).

(ii) *Conclusion.* X's activities related to the new product represent research in the social sciences (including economics and business management) and are thus excluded from the definition of qualified research under section 41(d)(4)(G) and paragraph (c)(8) of this section.

(d) *Recordkeeping for the research credit.* A taxpayer claiming a credit under section 41 must retain records in sufficiently usable form and detail to substantiate that the expenditures claimed are eligible for the credit. For the rules governing record retention, see §1.6001–1. To facilitate compliance and administration, the IRS and taxpayers may agree to guidelines for the keeping of specific records for purposes of substantiating research credits.

(e) *Effective dates.* This section is applicable for taxable years ending on or after December 31, 2003.

PART 602—OMB CONTROL NUMBERS UNDER THE PAPERWORK REDUCTION ACT

Par. 4. The authority citation for part 602 continues to read in part as follows:

Authority: 26 U.S.C. 7805 * * *

Par. 5. In §602.101, paragraph (b) is amended by removing the entry from the table for §1.41–4(d).

Mark E. Matthews,
Deputy Commissioner for Services and Enforcement.

Approved December 18, 2003.

Pamela F. Olson,
Assistant Secretary of the Treasury.

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