

Prototypes and Depreciable Property: An Attempted Distinction

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The proposed section 174 regulations represent a significant step forward in the treatment of prototype-related expenditures. They clarify that a fully functional product or process can constitute a pilot model and that the subsequent sale or use of a prototype does not override the section 174 eligibility of the costs incurred to develop and fabricate the prototype. However, the proposed amendments do not resolve all questions concerning the treatment of prototype costs. Enduring issues include determining when experimentation ends and production begins, the scope of the pilot model when a component or components are modified, and the treatment of first-in-class sales. Moeller, Sadler, and Norton suggest a way in which these questions can be addressed based on the principles that underlie the proposed regulations.

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I. Introduction

On September 6, 2013, Treasury and the IRS proposed new regulations to amend the definition of research and experimental expenditures under section 174 (the 2013 proposed amendments).¹ The 2013 proposed amendments focus particularly on the treatment of amounts paid or incurred by a taxpayer in connection with the development of tangible property, including pilot models and prototypes used to test the concepts developed through the taxpayer's research and experimentation. Although the 2013 proposed amendments will not become effective until final regulations are published in the *Federal Register*, the IRS will not challenge return positions consistent with the proposed regulations, and thus taxpayers may rely on the proposed regulations until the date that the final regulations are published in the *Federal Register*.²

This report analyzes the 2013 proposed amendments with a focus on how they would affect the eligibility of prototype-related expenditures for treatment under section 174. To provide necessary context, the report first gives an overview of section 174, including the statute's basic rules and legislative purpose, the general definition of the term "research or experimental expenditures" in reg. section 1.174-2(a), and the so-called depreciable property rule of section 174(c) and reg. section 1.174-2(b). The report next discusses the debate that has arisen in recent years between taxpayers and the IRS over prototype-related expenditures. It summarizes the respective positions and how courts have addressed prototype costs in recent cases. The report then provides a detailed explanation of the revisions to the definition of research or experimental expenditures suggested by the 2013 proposed amendments, and it reviews the examples intended to illustrate those revisions.

The report then analyzes the 2013 proposed amendments. It concludes that the amendments provide a helpful and taxpayer-favorable clarification of the depreciable property rule by explicitly

¹REG-124148-05.

²Prop. reg. section 1.174-2(d).

providing that (1) an experimental but fully functional product or process qualifies as a pilot model for section 174 purposes and (2) the ultimate sale or use of a prototype does not render the costs of fabricating the prototype ineligible under section 174. However, the amendments would not eliminate all questions regarding the treatment of prototype-related expenses. Unresolved issues include pinpointing when R&E ends and commercial production begins, ascertaining the scope of the pilot model eligible for section 174 treatment when a new component is integrated into a larger product or system, and determining the proper treatment of first-in-class sales to customers. The report suggests a framework for resolving these uncertainties based on the principles and policies of section 174. Unless such a framework is adopted or other revisions and examples are included in the final amendments, questions regarding prototype-related expenditures will continue to cause controversies between taxpayers and the IRS.

II. Overview of Section 174

A. Basic Rules and Legislative Purpose

Section 174 provides alternative methods of tax accounting for research or experimental expenditures.³ A taxpayer may treat research or experimental expenditures as expenses not chargeable to capital account and deduct them in the tax year in which they are paid or incurred.⁴ Alternatively, a taxpayer may elect to defer and amortize research or experimental expenditures over a period of not less than 60 months, beginning with the month in which the taxpayer first realizes benefits from those expenditures.⁵ Research or experimental expenditures that are neither expensed nor deferred and amortized must be capitalized.⁶ The expenditures to which section 174 applies may concern either a general research program or a particular project.⁷

Congress enacted section 174 in the Internal Revenue Code of 1954 “in order to eliminate the need to distinguish research from business expenses for deduction purposes, and to encourage

taxpayers to carry on research and experimentation activities.”⁸ The legislative history to the 1954 code elaborated:

No specific treatment is authorized by present law for research and experimental expenditures. To the extent that they are ordinary and necessary they are deductible; to the extent that they are capital in nature they are to be capitalized and amortized over useful life. Losses are permitted where amounts have been capitalized in connection with abandoned projects, and recovery through amortization is provided where the useful life of these capital items is determinable, as in the case of a patent. However, where projects are not abandoned and where a useful life cannot be definitely determined, taxpayers have had no means of amortizing research expenditures.

To eliminate uncertainty and to encourage taxpayers to carry on research and experimentation the House and your committee’s bill provide that these expenditures, incurred subsequent to December 31, 1953, may, at the option of the taxpayer, be treated as deductible expenses. It also provides that a taxpayer may elect to capitalize such expenditures and if no other means of amortization is provided, may write them off over a period of not less than 60 months, beginning with the month in which benefits are first realized.⁹

The ability to currently deduct research or experimental expenditures under section 174 is valuable to taxpayers because, as explained in the above legislative history, those expenditures might otherwise be deemed to create a capital asset and thus have to be capitalized and amortized over the determinable useful life of the developed asset or, if the asset does not have an ascertainable useful life, only upon the eventual sale or abandonment of the asset.¹⁰ While those expenditures, instead of being capitalized, might be deductible under section 162 if they could be properly classified as ordinary and necessary business expenses, section 174 allows

³Reg. section 1.174-1. The titles of section 174 and its underlying regulations refer to the term “research and experimental expenditures,” whereas the text of the statute and regulations uses the term “research or experimental expenditures” (emphasis added). Neither Congress nor Treasury has ever suggested that this difference in nomenclature was intended to have any significance. This report uses the disjunctive phrasing found in the text of the statute and regulations.

⁴Section 174(a); reg. section 1.174-1, -3.

⁵Section 174(b); reg. section 1.174-1, -4.

⁶Reg. section 1.174-1.

⁷*Id.*

⁸S. Rep. No. 99-313, at 693 (1986).

⁹S. Rep. No. 83-1622, at 33 (1954); see also H.R. Rep. No. 83-1337, at 28 (1954) (providing an identical explanation).

¹⁰See, e.g., H.R. Rep. No. 97-201, at 109 (1981) (“As a general rule, business expenditures to develop or create an asset which has a useful life that extends beyond the taxable year, such as expenditures to develop a new consumer product or improve a production process, must be capitalized and cannot be deducted in the year paid or incurred. These costs usually may be recovered on a disposition or abandonment of the asset, or through depreciation or amortization deductions over the useful life of the asset.”); S. Rep. No. 97-144, at 175 (1981) (same).

taxpayers to avoid these factually intensive and potentially difficult tax accounting questions.¹¹

Section 174 is also important for taxpayers because the qualification of an expense under section 174 is a prerequisite to be treated as a qualified research expense (QRE) for purposes of the section 41 research credit.¹² As the Tax Court recently stated in *TG Missouri Corp. v. Commissioner*, an expense “must be a section 174 expense to constitute ‘qualified research’ under section 41.”¹³

B. Regulatory Definition of R&E Expenditures

1. General definition. Section 174 does not define the term “research or experimental expenditures” except to exclude specified categories of costs. Congress also did not provide a definition in the legislative history but instead left it to Treasury and the IRS to define the term in regulations.

Treasury and the IRS provided that definition in reg. section 1.174-2. The current regulations define research or experimental expenditures to mean “expenditures incurred in connection with the taxpayer’s trade or business which represent research and development costs in the experimental or laboratory sense.”¹⁴ Other types of research or development costs — that is, research or development costs that are not “in the experimental or laboratory sense” — do not qualify.

An activity constitutes research or development in the experimental or laboratory sense if two conditions are satisfied:

1. “the information available to the taxpayer does not establish the capability or method for developing or improving the product or the appropriate design of the product (*i.e.*, an uncertainty exists)”¹⁵; and
2. the activity is intended to discover information that would eliminate that uncertainty.¹⁶

For purposes of this definition, the term “product” includes “any pilot model, process, formula,

invention, technique, patent, or similar property, and includes products to be used by the taxpayer in its trade or business as well as products to be held for sale, lease, or license.”¹⁷ Research for new products or processes is not required to be for the taxpayer’s current product lines for it to be considered R&E under section 174.¹⁸

The regulations provide that a taxpayer need only be uncertain about “the capability or method for developing or improving the product or the appropriate design of the product.”¹⁹ The preamble to the 1994 amendments to the section 174 regulations emphasized that point: “The Treasury Department and the IRS agree that a taxpayer’s knowledge that a product development project will be successful does not preclude the process of determining the appropriate design of the product from qualifying as research.”²⁰ A section 174 uncertainty may thus exist even if a taxpayer knows that it is possible to develop or improve a product or process and possesses the method to accomplish the intended objective but is unsure about the appropriate design of the product or process sought to be developed or improved. The concept of uncertainty for section 174 purposes is quite broad.

Treasury regulations make clear that “whether expenditures qualify as research or experimental expenditures depends on the nature of the activity to which the expenditures relate, not on the nature of the product or improvement being developed or the level of technological advancement the product or improvement represents.”²¹ In *Union Carbide v. Commissioner*, the Tax Court explained: “Section 174 does not require that the technology be in the very beginning stages of development, only that the taxpayer be uncertain as to whether the technology will improve its product or process.”²² The Tax Court elaborated that the existence of a section 174 uncertainty is an objective test (that is, whether a

¹¹See H.R. Rep. No. 99-426, at 176 (1985) (“This provision [section 174] was enacted in the 1954 Code in order to eliminate the need to distinguish research from business expenses for deduction purposes, and to encourage taxpayers to carry on research and experimentation activities.”).

¹²Section 41(d)(1)(A).

¹³133 T.C. 278, 286 (2009); see also *Norwest Corp. v. Commissioner*, 110 T.C. 454, 489-490 (1998) (“We believe that the phrase ‘the research expenditures may be treated as expenses under section 174’ [as it appears in section 41(d)(1)(A)] is meant to require the taxpayer to satisfy all the elements for a deduction under section 174.”); *Union Carbide Corp. v. Commissioner*, T.C. Memo. 2009-50 at *194, *aff’d*, 697 F.3d 104 (2d Cir. 2012).

¹⁴Reg. section 1.174-2(a)(1).

¹⁵*Id.*

¹⁶*Id.*

¹⁷Reg. section 1.174-2(a)(2).

¹⁸*Best Universal Lock Co. v. Commissioner*, 45 T.C. 1, 10 (1965) (“We find nothing in the legislative history of section 174 to support respondent’s contention that the section was not meant to cover research and development expenses where a corporation was seeking to develop a new product unrelated to its past line of products.”), *acq.*, 1966-2 C.B. 3; see also Rev. Rul. 71-162, 1971-1 C.B. 97.

¹⁹Reg. section 1.174-2(a)(1) (emphasis added).

²⁰T.D. 8562, 59 F.R. 50159.

²¹Reg. section 1.174-2(a)(1); see also *Union Carbide*, T.C. Memo. 2009-50, at *196 (These regulatory guidelines “apply to the nature of the activity examined, not the nature of or the level of technological advancement represented by the product or process.”).

²²T.C. Memo. 2009-50, at *209.

reasonable person would believe the fact to be uncertain) based on the information available to the taxpayer.²³

2. Excluded expenditures. The section 174 regulations specifically exclude expenditures for the following types of activities from the definition of research or experimental expenditures:

- the ordinary testing or inspection of materials or products for quality control (quality control testing);
- efficiency surveys;
- management studies;
- consumer surveys;
- advertising or promotions;
- the acquisition of another's patent, model, production, or process; or
- research in connection with literary, historical, or similar projects.²⁴

Testing to determine if the design of the product is appropriate is not considered quality control testing and thus is not excluded from the definition of research or experimental expenditures.²⁵ Rather, quality control testing is "testing or inspection to determine whether particular units of materials or products conform to specified parameters."²⁶

In FSA 200125019, the IRS National Office observed the following regarding the above exclusions: "Significantly, these exclusions are related to activities that generally occur after the research is completed in that the purpose of such activities is to evaluate and disseminate the results of the research."

Section 174 also does not apply to "any expenditure paid or incurred for the purpose of ascertaining the existence, location, or quality of any deposit of ore or other mineral (including oil and gas)."²⁷ However, the development of prototype mining equipment and a new metallurgical process, including the cost of shipping mineral samples to a research laboratory, are research or experimental expenditures under section 174.²⁸

3. Reasonableness of the expenditures. Section 174(e) provides that a deduction is available only to

²³*Id.* at *195-196 ("Whether an uncertainty exists is an objective test that depends on the information available to the taxpayer.").

²⁴Reg. section 1.174-2(a)(3)(i)-(vii).

²⁵Reg. section 1.174-2(a)(4).

²⁶*Id.*

²⁷Section 174(d); reg. section 1.174-2(c).

²⁸Rev. Rul. 75-122, 1975-1 C.B. 87 (concluding that laboratory expenditures "directly related to the development of prototype mining equipment and the perfecting of new metallurgical processes are research or experimental expenditures"); Rev. Rul. 74-67, 1974-1 C.B. 63 (concluding that the costs of developing a new and innovative method of extracting ores or minerals were research or experimental expenditures).

the extent that the amount of the research or experimental expenditure is "reasonable under the circumstances."²⁹ Congress enacted section 174(e) in response to *Driggs v. United States*, in which the court held that section 174 as then written did not contain a reasonableness standard.³⁰

The section 174 regulations provide an arm's-length standard for determining whether a research or experimental expense is reasonable. In general, the amount of a research or experimental expenditure is reasonable if "the amount would ordinarily be paid for like activities by like enterprises under similar circumstances."³¹ The regulations explicitly provide that the reasonableness requirement does not apply to the reasonableness of the type or nature of the taxpayer's research or experimental activities. The IRS may recharacterize amounts supposedly paid for research that are unreasonable under the circumstances as disguised dividends, gifts, loans, or similar payments.³²

4. Payments to third parties. Section 174 treatment is not limited to costs paid or incurred for research or experimentation directly undertaken by the taxpayer. It also applies to expenditures paid or incurred for research or experimentation carried on for the taxpayer by another person or organization (such as a research institute, foundation, engineering company, or similar contractor).³³ Accordingly, if costs would qualify as research or experimental expenditures under section 174 if they were paid or incurred for activities undertaken directly by the taxpayer, the taxpayer also can deduct the costs if it contracts with a third party to perform the research or experimentation on its behalf. This principle applies even if the taxpayer is not a direct beneficiary of the research undertaken by the third party.³⁴

²⁹Section 174(e); reg. section 1.174-2(a)(6).

³⁰706 F. Supp. 20, 20-22 (N.D. Tex. 1989).

³¹Reg. section 1.174-2(a)(6). A recent field attorney advice memorandum concluded that voluntary separation payments made by a taxpayer to terminated employees were unreasonable for section 174 purposes because similarly situated taxpayers would not make those termination payments to employees for performing research in addition to the employees' regular salaries. FAA 20131102F.

³²Reg. section 1.174-2(a)(6).

³³Reg. section 1.174-2(a)(8).

³⁴*See, e.g.*, Rev. Rul. 73-324, 1973-2 C.B. 72 (concluding that payments by a natural gas company to an industry trade association to fund the development of a coal gasification program for the production of synthetic gas were deductible under section 174 even though the gas company benefited only indirectly from the research); Rev. Rul. 73-20, 1973-1 C.B. 133 (concluding that "payments made directly or indirectly by a utility corporation to a non-profit research and development organization formed to develop a model that will benefit the

(Footnote continued on next page.)

However, any expenditures for research or experimentation carried on for the taxpayer by a third party are ineligible for section 174 treatment to the extent that (1) they represent expenditures for the acquisition or improvement of land or depreciable property used in connection with the research or experimentation, and (2) the taxpayer acquires rights of ownership to that land or depreciable property.³⁵ If the taxpayer does not acquire ownership rights in land or depreciable property, it is entitled to treat its payments to the third party as section 174 expenditures even if the improved or acquired property is depreciable in the hands of the third party performing the research.

The section 174 regulations provide the following two examples to illustrate these principles:

Example 1. A engages B to undertake research and experimental work in order to create a particular product. B will be paid annually a fixed sum plus an amount equivalent to his actual expenditures. In 1957 A pays B in respect of the project the sum of \$150,000 of which \$25,000 represents an addition to B's laboratory and the balance represents charges for research and experimentation on the project. It is agreed between the parties that A will absorb the entire cost of this addition to B's laboratory which will be retained by B. A may treat the entire \$150,000 as expenditures under section 174.

Example 2. X Corp., a manufacturer of explosives, contracts with the Y research organization to attempt through research and experimentation the creation of a new process for making certain explosives. Because of the danger involved in such an undertaking, Y is compelled to acquire an isolated tract of land on which to conduct the research and experimentation. It is agreed that on the completion of the project Y will transfer this tract, including any improvements thereon, to X. Section 174 does not apply to the amount paid to Y representing the costs of the tract of land and improvements.³⁶

utility field are deductible as research or experimental expenditures"); Rev. Rul. 69-484, 1969-2 C.B. 38 (concluding that payments made by an airline to an airline manufacturer to defray the cost of the design, development, fabrication, and testing of a prototype supersonic aircraft were deductible under section 174 even though the airline was not the direct beneficiary of the research).

³⁵Reg. section 1.174-2(a)(8).

³⁶Reg. section 1.174-2(a)(9).

5. The depreciable property rule.

a. Section 174(c). Since its enactment in 1954, section 174(c) has provided that section 174 will not apply to an expenditure for the acquisition or improvement of land, or for the acquisition or improvement of property that is to be used in connection with the research or experimentation and is of a character subject to the depreciation allowance under section 167³⁷ or the depletion allowance under section 611,³⁸ except that allowances under sections 167 and 611 can be considered section 174 expenditures.

For example, the full cost of a research building or laboratory equipment used for research endeavors cannot be deducted in one year, even though the taxpayer uses the property in connection with research or experimental activities. However, a taxpayer may treat the annual allowance for depreciation on the building and equipment as a section 174 expense.

The depreciable property principle provided in section 174(c) is designed to prevent taxpayers from circumventing the gradual cost recovery mandated by the depreciation and depletion rules of sections 167 and 611 by using the depreciable property in a research or experimental activity.³⁹

b. Regulatory provisions. The rules implementing section 174(c) and governing a taxpayer's expenditures for land and depreciable tangible property are set forth in reg. section 1.174-2(b).

i. General rules — reg. section 1.174-2(b)(1). Reg. section 1.174-2(b)(1) restates the general rule of section 174(c) that expenditures for the acquisition or improvement of land, or for the acquisition or improvement of property that is subject to an allowance for depreciation under section 167 or depletion under section 611, are not deductible under section 174, even though the property or improvements may be used by the taxpayer in

³⁷Section 167 generally provides that tangible property is subject to an allowance for depreciation if it is subject to wear and tear, exhaustion, or obsolescence; has a finite period of usefulness that can be estimated with some confidence and is longer than one year; and is used in the taxpayer's trade or business or held for the production of income. Examples of depreciable property are buildings, computers, vehicles, machines, laboratory equipment, and office furniture. The allowance for depreciation does not apply to inventories or stock in trade, or to land apart from the improvements or physical development added to it. Section 167(a); reg. section 1.167(a)-2.

³⁸Section 611 allows as a deduction in computing taxable income a reasonable allowance for depletion and for depreciation of improvements, according to the peculiar conditions in each case, for mines, oil and gas wells, other natural deposits, and timber. Section 611(a); reg. section 1.611-1.

³⁹See *TG Missouri*, 133 T.C. at 291-292 (explaining the intent of section 174(c)).

connection with R&E. However, allowances for depreciation or depletion of property are considered research or experimental expenditures for purposes of section 174 to the extent that the property to which the allowances relate is used in connection with research or experimentation. Thus, for example, the annual allowance for depreciation on laboratory equipment used in a taxpayer's research and development department is deductible under section 174.

Reg. section 1.174-2(b)(1) further provides that if any part of the cost of acquisition or improvement of depreciable property is attributable to research or experimentation (whether made by the taxpayer or another), the treatment of that cost is determined by reference to subparagraphs (2), (3), and (4) of the regulation.

ii. Applicable rules when the end product of the taxpayer's R&E is depreciable property — reg. section 1.174-2(b)(2) and -2(b)(4). Reg. section 1.174-2(b)(2) provides that "expenditures for research or experimentation which result, as an end product of the research or experimentation, in depreciable property to be used in the taxpayer's trade or business may, subject to the limitations of subparagraph (4), be allowable as a current expense deduction under section 174(a)."

Reg. section 1.174-2(b)(4), in turn, provides that the deductions for "expenditures in connection with the acquisition or production of depreciable property to be used in the taxpayer's trade or business are limited to amounts expended for research or experimentation." These amounts "do not include the costs of the component materials of the depreciable property, the costs of labor or other elements involved in its construction and installation, or costs attributable to the acquisition or improvement of the property."

The regulation provides an example of a taxpayer who spends \$30,000 on a project to develop a new machine for use in his business. The cost of the labor, materials, and other items used to construct the machine is \$10,000, and the taxpayer incurs \$20,000 of research costs not attributable to the machine itself. In this example, the taxpayer may deduct the \$20,000 in research costs, but the \$10,000 in labor, material, and other items must be charged to the cost of the machine.⁴⁰

Accordingly, when a taxpayer's activities involve both (1) R&E necessary to develop or improve an item of depreciable property; and (2) the acquisition or construction of depreciable property, the taxpayer must allocate its costs between those for R&E (for example, research, design, and testing) and the

costs of the acquisition or construction of the depreciable property (for example, labor and component parts). Neither section 174 nor its underlying regulations provide specific guidance on how a taxpayer should make those cost allocations. This determination can be particularly difficult when a taxpayer develops new machinery and equipment, because the distinction between engineering development and construction often is unclear. Consider an electrical engineer who wires a new circuit board. Is he designing the board or constructing it? The ultimate burden rests with the taxpayer to provide a credible factual basis for segregating the R&E expenditures from the costs of the labor, materials, and other items associated with the acquisition or construction of the depreciable property.⁴¹

The 2013 proposed amendments refer to the provisions of reg. section 1.174-2(b)(1) and -2(b)(4) as the "depreciable property rule."⁴² The preamble explains the intent of the depreciable property rule as follows:

The IRS and the Treasury Department believe that the Depreciable Property Rule accomplishes two things. First, to the extent that land or depreciable property is used in connection with research or experimentation, the rule limits the amount that a taxpayer can treat as an eligible section 174 expense to depletion or depreciation deductions. Second, the Depreciable Property Rule in Sec. 1.174-2(b)(4) reiterates that the only expenditures related to the production of depreciable property that are deductible section 174 expenditures are amounts expended for research or experimentation. Thus, for example, where a \$30,000 total cost expended on a machine includes \$20,000 of research-related labor and materials and, after all uncertainties related to the machine are resolved, \$10,000 of construction-related labor and materials, the \$10,000 of construction-related labor and materials is not a section 174 expenditure because that cost was not a research or experimental cost within the meaning of Sec. 1.174-2(a).

As discussed below, the preamble's interpretation of the existing regulatory example as regards the timing of the expenditures (that is, whether incurred before or after uncertainty was resolved) highlights some of the difficulties in distinguishing

⁴¹See, e.g., *Coors Porcelain Co. v. Commissioner*, 52 T.C. 682, 697-698 (1969) (holding that the taxpayer had failed to segregate research costs from the costs of the component materials, construction, and installation of a depreciable item of equipment), *aff'd*, 429 F.2d 1 (10th Cir. 1970).

⁴²78 F.R. 54797.

⁴⁰Reg. section 1.174-2(b)(4).

research or experimental costs from construction costs in the development or improvement of property.

The preamble further explains that the depreciable property rule is *not* intended to create an override to eligibility under section 174 of costs otherwise satisfying the regulatory definition of research and experimental expenditures based on the ultimate use of the property, such as a sale of a resulting product or its use in the taxpayer's trade or business.⁴³ The implications of this explanation are discussed below.

iii. Applicable rules when the taxpayer pays for depreciable property constructed or manufactured by a third party — reg. section 1.174-2(b)(3). Closely related to the depreciable property rule is reg. section 1.174-2(b)(3), which governs expenditures by a taxpayer for research or experimentation in connection with the construction or manufacture of depreciable property by a third party. Those expenditures are deductible under section 174(a) only if made on the taxpayer's order and at the taxpayer's risk.⁴⁴ No deduction is allowed "if the taxpayer purchases another's product under a performance guarantee (whether express, implied, or imposed by local law) unless the guarantee is limited, to engineering specifications or otherwise, in such a way that economic utility to the taxpayer is not taken into account."⁴⁵

When the taxpayer does not assume the financial risk of research failures by the third party, the taxpayer is treated as purchasing a product as opposed to paying the third party for performing research and experimental activities. For example, no deductible expense is incurred if a taxpayer enters into a contract for the construction of a new type of chemical processing plant under a turnkey contract guaranteeing a given annual production and a given consumption of raw material and fuel per unit. However, if the contract contained no guarantee of production quality and of quantity of units in relation to consumption of raw material and fuel, and if real doubt existed as to the capabilities of the process, expenses for research or experimentation under the contract are at the taxpayer's risk and are deductible under section 174(a).⁴⁶

As with depreciable assets that are acquired or constructed directly by the taxpayer and governed by reg. section 1.174-2(b)(4), the amount that is deductible in connection with depreciable property

acquired or constructed by a third party is limited to the amount that is paid or incurred by the third party for R&E activities, as opposed to the costs of acquisition or improvement of the property. Thus, the amount of the allowable section 174(a) deduction does not include the third party's costs of component materials, labor, and other items used in construction, or other costs of acquiring or improving the property, and the difficulties in making those allocations are the same as in property constructed by the taxpayer.

C. The Debate Over Prototype Expenditures

Controversies between taxpayers and the IRS have frequently arisen over whether costs paid or incurred by a taxpayer to develop, construct, and test property used as a prototype qualify as deductible research or experimental expenditures under section 174 and as QREs for purposes of the section 41 research credit.

The current section 174 regulations define research or experimental expenditures to include costs incident to the development or improvement of a pilot model — that is, a prototype.⁴⁷ Similarly, the example provided in reg. section 1.174-4(c) indicates that the costs of models built during a research project qualify as section 174 expenses. Thus, the costs paid or incurred by a taxpayer in connection with the design, development, fabrication, and testing of a prototype appear to satisfy the regulatory definition of a research or experimental expenditure for section 174 purposes.

A prototype is generally defined as an original model of a potential new product or process that is used for research and testing purposes. However, the line between prototypes and non-prototypes can be murky for property that is tested to prove a design concept and then used for another business purpose, and when there are multiple prototypes, each of which is closer to a production model, as well as in other situations. It is also unclear under the current section 174 regulations how the apparent acceptance of prototype costs as research or experimental expenses interacts with the depreciable property rule when the resulting prototype will remain in existence for more than one year and thus arguably is property of a character subject to depreciation despite its prototypical nature.

Accordingly, the IRS has frequently challenged the eligibility of prototype-related costs as section 174 expenses. While the details of the IRS's arguments have varied depending on each case's facts

⁴³*Id.*

⁴⁴Reg. section 1.174-2(b)(3); TAM 9449003.

⁴⁵Reg. section 1.174-2(b)(3).

⁴⁶*Id.*

⁴⁷Reg. section 1.174-2(a)(2).

and circumstances, the IRS's objections to the eligibility of prototype-related costs under section 174 generally involve three fact patterns.

The first fact pattern is one in which the taxpayer ultimately sells the prototype to a customer. In those circumstances, the IRS has sometimes maintained that the taxpayer should not be allowed to treat the prototype costs as section 174 expenses because the prototype was tangible property of a character such that it could be depreciated by some taxpayer — such as the ultimate purchaser of the prototype. The IRS has also sometimes contended when a prototype is sold that the prototype-related costs are more properly classified as inventory costs than research or experimental expenditures.

For example, the IRS has expressed the following positions regarding the classification of prototype-related costs if the prototype is ultimately sold:

- In FSA 200013017, the IRS determined that prototype semiconductor integrated circuit wafers containing integrated circuit designs were property of a character subject to the allowance for depreciation when the wafers were ultimately sold to customers. The field service advice concluded that it was irrelevant that the taxpayer did not depreciate the wafers since they were of a character that they could be depreciated by another taxpayer. However, the IRS found that any prototype wafers that the taxpayer had not sold, but rather had used in testing and then discarded, were “consistent with Congress’ purposes and thus may be considered a supply [QRE] regardless of their character as a depreciable asset.” The IRS’s audit techniques guide for the section 41 research credit advises that examining agents “should carefully scrutinize ‘prototype’ expenditures to determine whether the ‘prototype’ is (or contains) property of a character subject to an allowance for depreciation.”⁴⁸
- The IRS’s research credit audit techniques guide for the aerospace industry also states that the costs of prototypes or components thereof are excluded from section 174 to the extent the prototype or components are depreciable in nature, such as when one or more of the prototypes are pre-sold while the item undergoes further testing.⁴⁹
- In *TG Missouri*,⁵⁰ a case involving the costs of prototype automotive part production molds,

the IRS maintained that the molds were ineligible under sections 174 and 41 because, although the molds were not depreciable by the taxpayer, they were a type of property that is generally depreciable in character. Although the taxpayer could not depreciate the prototype molds because they were held in an inventory account and then conveyed to customers, the customers could depreciate the molds after the sale because they were used in the buyers’ trades or businesses.⁵¹

- A 2009 Government Accountability Office report on the section 41 research credit noted the following IRS position: “IRS says that some taxpayers have labeled custom-designed property intended to be held for sale in their ordinary course of business as prototypes, solely for the purpose of claiming the research credit. Consequently, IRS considers the costs associated with the manufacture of such products to be ‘inventory costs’ and not QREs.”⁵²
- The preamble to the 2013 proposed regulations characterizes the IRS’s historical position regarding sold prototypes as follows: “It has been argued that section 174(c) precludes section 174 treatment in the case of a subsequent sale of a resulting product to a customer, because the sale gives rise to depreciable property in the hands of the customer. See *T.G. Missouri Company v. Commissioner*, 133 T.C. 278 (2009) (rejecting the commissioner’s argument that research or experimental expenditures were disqualified under section 174 because the product resulting from research was sold to customers and was subject to depreciation in the customers’ hands).”⁵³

The second two prototype fact patterns that the IRS has found objectionable are related, and it often has not distinguished between them. The IRS has sometimes found it objectionable (1) when the taxpayer ultimately uses the prototype in another way in its trade or business, such as in another research project, as a demonstration model, or even in some sort of salvage use; or (2) when the property merely exists for more than one year, even though it is used only for one research project over multiple years. In both cases, the IRS has argued that the property is ultimately depreciable in the hands of the taxpayer. For example, in FSA

⁴⁸“Credit for Increasing Research Activities (*i.e.*, Research Tax Credit),” at 17 (June 2005).

⁴⁹“Aerospace Industry Research Credit Audit Technique Guide,” at 26 (Jan. 28, 2005).

⁵⁰133 T.C. at 286.

⁵¹As discussed below, the Tax Court rejected the IRS’s position in *TG Missouri* and held that property of a character subject to depreciation means subject to depreciation in the hands of the taxpayer.

⁵²GAO, “The Research Tax Credit’s Design and Administration Can Be Improved,” GAO-10-136, at 79 (2009).

⁵³78 F.R. 54797.

200125019, the IRS stated that the taxpayer's costs of constructing prototype pairs of footwear would not be deductible under section 174 "if the facts of this case suggest that the rough prototypes produced by Taxpayer's design department for use in Taxpayer's trade or business are property of a character subject to the allowance for depreciation." The field service advice does not indicate which of the two fact patterns it thought might have applied.

Within these two general fact patterns, controversies also have arisen regarding "special test equipment," which is equipment made specifically to test one or more prototypes and is often incorporated into the prototype itself. For instance, a prototype missile may be built with a network of wires, sensors, computer circuits, and transmission devices. The special test equipment may remain in existence for more than one year, and if not consumed in testing, the parts may be put to use in another research project. The IRS has argued for capitalization in these cases.

In response to those arguments, taxpayers generally argued that a prototype or special test equipment developed and built for research concept testing purposes does not lose its character as a research or experimental expense merely because the prototype is later sold to an end customer or put to some other use in the taxpayer's trade or business. Put another way, events occurring after the R&E involving the prototype or special test equipment should not alter the purpose or character of the expenditure when it was originally paid or incurred. Likewise, if the prototype or special test equipment is required for testing in the same research project for more than one year, its fundamental nature as a section 174 expense should not be overridden by the depreciable property rule, even though it is unclear how the two rules work together in this instance.

Taxpayers have observed that there is no requirement in sections 174 or 41 that a supply be consumed, destroyed, discarded, or not made part of a saleable or useable product, in order for the supply to qualify as a research or experimental expense. Taxpayers also pointed to section 174 regulations proposed in 1989 that specifically excluded costs from the definition of research or experimental expenditures to the extent incurred in the construction of duplicate prototypes used for market testing purposes or held for sale.⁵⁴ The final section 174 regulations issued in 1994 did not incorporate this exclusion, which suggested that the costs of building multiple prototypes used for market testing or held for sale are not excluded from section 174 as

long as they satisfy the general definition of research or experimental expenditures.

Taxpayers have fared well in court cases involving prototypes. For example, in *TG Missouri*, the Tax Court held that the costs of the prototype production molds at issue were section 174 expenses and QREs under section 41 even though the molds were ultimately sold to customers and presumably were depreciable in the hands of those customers.⁵⁵ Also, in *Trinity Industries Inc. v. United States*,⁵⁶ the district court concluded that the costs of wages, supplies, and contract research costs incurred by the taxpayer in developing, constructing, and testing two first-in-class prototype ships were QREs under section 41 (and thus, by definition, research or experimental expenditures under section 174) even though the ships were tangible property designed and built under contracts with customers and depreciable in the hands of those customers.

Despite the taxpayers' successes in *TG Missouri* and *Trinity Industries*, taxpayers remained concerned that the IRS would entrench or even expand its position on prototype costs through regulations. That concern appears to have been unfounded, because the 2013 proposed amendments clarify that the ultimate sale or use of a prototype product or process does not cause expenditures to lose their qualification as research or experimental expenditures under section 174. Rather, the preamble to the proposed amendments explains that the depreciable property rule of reg. section 1.174-2(b)(1) and -2(b)(4) is *not* intended to create an override to section 174 eligibility if a prototype is subsequently sold or used in the taxpayer's trade or business. As discussed next, the 2013 proposed amendments recommend several additions to the current section 174 regulations in an attempt to clarify this principle.

III. Explanation of Proposed Amendments

The 2013 proposed amendments propose five revisions to the current section 174 regulations.

Three of the revisions primarily concern the treatment of costs paid or incurred by taxpayers to develop and fabricate prototype products and processes and prototype components of products and processes. First, to counter the interpretation, previously advocated by the IRS, that section 174 eligibility can be reversed by a subsequent event (see the discussion on prototype costs immediately above), the 2013 proposed regulations amend reg. section 1.174-2(a)(1) to provide that the ultimate success, failure, sale, or other use of the research or

⁵⁴Former prop. reg. section 1.174-2(a)(3).

⁵⁵*TG Missouri*, 133 T.C. at 297.

⁵⁶691 F. Supp.2d 688 (N.D. Tex. 2010).

property resulting from research or experimentation is irrelevant to a determination of eligibility under section 174.⁵⁷ Second, the proposed regulations define the term “pilot model” as any representation or model of a product that is produced to evaluate and resolve uncertainty concerning the product during the development or improvement of the product. The term includes a fully functional representation or model of the product or a component of a product (to the extent the shrinking-back provision described below applies).⁵⁸ Third, the proposed regulations clarify the general rule that the costs of producing a product after uncertainty concerning the development or improvement of a product is eliminated are ineligible under section 174 because these costs are not for research or experimentation.⁵⁹

The 2013 proposed amendments provide the following examples to illustrate the application of the foregoing principles:

Example 3.⁶⁰ U is engaged in the manufacture and sale of custom machines. U contracts to design and produce a machine to meet a customer’s specifications. Because U has never designed a machine with these specifications, U is uncertain regarding the appropriate design of the machine, and particularly whether features desired by the customer can be designed and integrated into a functional machine. U incurs a total of \$31,000 on the project. Of the \$31,000, U incurs \$10,000 of costs on materials and labor to produce a model that is used to evaluate and resolve the uncertainty concerning the appropriate design. U also incurs \$1,000 of costs using the model to test whether certain features can be integrated into the design of the machine. This \$11,000 of costs represents research and development costs in the experimental or laboratory sense. After uncertainty is eliminated, U incurs \$20,000 to produce the machine for sale to the customer based on the appropriate design. The model produced and used to evaluate and resolve uncertainty is a pilot model within the meaning of paragraph (a)(4) of this section. Therefore, the \$10,000 incurred to produce the model and the \$1,000 incurred on design testing activities qualifies as research or experimental expenditures under section 174.

⁵⁷Prop. reg. section 1.174-2(a)(1).

⁵⁸Prop. reg. section 1.174-2(a)(4).

⁵⁹Prop. reg. section 1.174-2(a)(2).

⁶⁰The examples begin with Example 3 because the current section 174 regulations already include examples 1 and 2. See reg. section 1.174-2(a)(9).

However, section 174 does not apply to the \$20,000 that U incurred to produce the machine for sale to the customer based on the appropriate design. See paragraph (a)(2) of this section (relating to production costs).

Example 4. Assume the same facts as Example 3 (set forth above), except that during a quality control test of the machine, a component of the machine fails to function due to the component’s inappropriate design. U incurs an additional \$8,000 (including design retesting) to reconfigure the component’s design. The \$8,000 of costs represents research and development costs in the experimental or laboratory sense. After the elimination of uncertainty regarding the appropriate design of the component, U incurs an additional \$2,000 on its production. The reconfigured component produced and used to evaluate and resolve uncertainty with respect to the component is a pilot model within the meaning of paragraph (a)(4) of this section. Therefore, in addition to the \$11,000 of research and experimental expenditures previously incurred, the \$8,000 incurred on design activities to establish the appropriate design of the component qualifies as research or experimental expenditures under section 174. However, section 174 does not apply to the additional \$2,000 that U incurred for the production after the elimination of uncertainty of the redesigned component based on the appropriate design or to the \$20,000 previously incurred to produce the machine. See paragraph (a)(2) of this section (relating to production costs).

Example 5. V is a manufacturer that designs a new product. V incurs \$5,000 to produce several models of the product that are to be used in testing the appropriate design before the product is mass-produced for sale. The \$5,000 of costs represents research and development costs in the experimental or laboratory sense. Multiple models are necessary to test the design in a variety of different environments (exposure to extreme heat, exposure to extreme cold, submersion, and vibration). Upon completion of several years of testing, V enters into a contract to sell one of the models to a customer, and uses another model in its trade or business. The remaining models were rendered inoperable as a result of the testing process. Because V produced the models to resolve uncertainty regarding the appropriate design of the product, the models are pilot models under paragraph (a)(4) of this section. Therefore, the \$5,000 that V incurred in producing the models qualifies as research or

experimental expenditures under section 174. See also paragraph (a)(1) of this section (ultimate use is not relevant).

Example 6. W wants to improve a machine for use in its trade or business and incurs \$20,000 to develop a new component for the machine. The \$20,000 is incurred for engineering labor and materials to produce a model of the new component that is used to eliminate uncertainty regarding the development of the new component for the machine. The \$20,000 of costs represents research and experimental costs in the experimental or laboratory sense. After W completes its research and experimentation on the new component, W incurs \$10,000 for materials and labor to produce the component and incorporate it into the machine. The model produced and used to evaluate and resolve uncertainty with respect to the new component is a pilot model within the meaning of paragraph (a)(4) of this section. Therefore, the \$20,000 incurred to produce the model and eliminate uncertainty regarding the development of the new component qualifies as research or experimental expenditures under section 174. However, section 174 does not apply to the \$10,000 of production costs of the component because those costs were not incurred for research or experimentation. See paragraph (a)(2) of this section (relating to production costs).

Example 7. X is a manufacturer of aircraft. X is researching and developing a new, experimental aircraft that can take off and land vertically. To evaluate and resolve uncertainty during the development or improvement of the product and test the appropriate design of the experimental aircraft, X produces a working aircraft at a cost of \$5 million. The \$5 million of costs represents research and development costs in the experimental or laboratory sense. In a later year, X sells the aircraft. Because X produced the aircraft to resolve uncertainty regarding the appropriate design of the product during the development of the experimental aircraft, the aircraft is a pilot model under paragraph (a)(4) of this section. Therefore, the \$5 million of costs that X incurred in producing the aircraft qualifies as research or experimental expenditures under section 174. Further, it would not matter if X sold the pilot model or incorporated it in its own business as a dem-

onstration model. See paragraph (a)(1) of this section (ultimate use is not relevant).⁶¹

The fourth revision introduced by the 2013 proposed amendments is a new shrinking-back provision, similar to the rule provided in reg. section 1.41-4(b)(2),⁶² to address situations in which the requirements of reg. section 1.174-2(a)(1) are met for only a component part of a larger product and are not met for the overall product itself.⁶³ The proposed section 174 shrinking-back rule provides as follows:

Shrinking-back rule. If the requirements of paragraph (a)(1) of this section are not met at the level of a product (as defined in paragraph (a)(3) of this section), then whether expenditures represent research and development costs is determined at the level of the component or subcomponent of the product. The presence of uncertainty concerning the development or improvement of certain components of a product does not necessarily indicate the presence of uncertainty concerning the development or improvement of other components of the product or the product as a whole. The rule in this paragraph (a)(5) is not itself applied as a reason to exclude research or experimental expenditures from section 174 eligibility. The rule in this paragraph (a)(5) is to be applied and administered in a manner that is consistent with the principles underlying the shrinking-back rule in Sec. 1.41-4(b)(2).

The preamble to the 2013 proposed amendments explains that the purpose of the shrinking-back rule is to address situations in which a taxpayer has established basic design specifications for a product but then redesigns components of the product after production has begun, particularly in the case of a large tangible asset made up of many individual components (such as an airplane or automobile).⁶⁴ For example, when the design of an automobile may be certain except for the appropriateness of the design of its braking system, “the IRS and the Treasury Department believe that it is inappropriate to deny section 174 eligibility with respect to the development and design of the braking system

⁶¹Prop. reg. section 1.174-2(a)(11), examples 3-7.

⁶²The shrinking-back rule of reg. section 1.41-4(b)(2) applies to the determination of qualified research activities for purposes of the section 41 research credit. This rule generally provides that if the qualified research determination tests are not satisfied at the level of the overall business component (*i.e.*, the product, process, or other business item addressed by the research), the tests are to be applied to the most significant subset of the business component.

⁶³Prop. reg. section 1.174-2(a)(5).

⁶⁴78 F.R. 54798.

simply because there is not uncertainty with respect to the automobile's general design."⁶⁵

The 2013 proposed amendments provide the following examples to illustrate the application of the new shrinking-back rule:

Example 8. Y is a manufacturer of aircraft engines. Y is researching and developing a new type of compressor blade, a component of an aircraft engine, to improve its existing aircraft engine design's performance. To test the appropriate design of the new compressor blade and evaluate the impact of fatigue on the design, Y produces and installs the compressor blade on an aircraft engine produced by Y. The costs of producing and installing the compressor blade component that Y incurred represent research and development costs in the experimental or laboratory sense. Because Y produced the compressor blade component to resolve uncertainty regarding the appropriate design of the component, the component is a pilot model under paragraph (a)(4) of this section. Therefore, the costs that Y incurred to produce and install the component qualify as research or experimental expenditures under section 174. See paragraph (a)(5) of this section (shrinking-back rule). However, section 174 does not apply to Y's costs of producing the aircraft engine on which the component was installed. See paragraph (a)(2) of this section (relating to production costs).

Example 9. Z is a wine producer. Z is researching and developing a new wine production process that involves the use of a different method of crushing the wine grapes. In order to test the effectiveness of the new method of crushing wine grapes, Z incurs \$2,000 in labor and materials to conduct the test on this part of the new manufacturing process. The \$2,000 of costs represents research and development costs in the experimental or laboratory sense. Therefore, the \$2,000 incurred qualifies as research or experimental expenditures under section 174 because it is a cost incident to the development or improvement of a component of a process.⁶⁶

The final proposed revision is an amendment of reg. section 1.174-2(b)(4) to provide that the depreciable property rule is an application of the general definition of research or experimental expenditures provided for in reg. section 1.174-2(a)(1) and should not be applied to exclude otherwise eligible expen-

ditures.⁶⁷ The proposed regulations add the following sentence to the current version of reg. section 1.174-2(b)(4): "The deductions referred to in paragraphs (b)(2) [relating to the taxpayer's construction of a depreciable asset] and (3) of this section [relating to the taxpayer's purchase of a depreciable asset constructed by a third party] for expenditures in connection with the acquisition or production of depreciable property to be used in the taxpayer's trade or business are limited to amounts expended for research or experimentation within the meaning of section 174 and paragraph (a) of this section."

The 2013 proposed amendments provide the following examples to illustrate the application of the foregoing principle:

Example 1. X is a tool manufacturer. X has developed a new tool design, and orders a specially-built machine from Y to produce X's new tool. The machine is built upon X's order and at X's risk, and Y does not provide a guarantee of economic utility. There is uncertainty regarding the appropriate design of the machine. Under X's contract with Y, X pays \$15,000 for Y's engineering and design labor, \$5,000 for materials and supplies used to develop the appropriate design of the machine, and \$10,000 for Y's machine production materials and labor. The \$15,000 of engineering and design labor costs and the \$5,000 of materials and supplies costs represent research and development costs in the experimental or laboratory sense. Therefore, the \$15,000 X pays Y for Y's engineering and design labor and the \$5,000 for materials and supplies used to develop the appropriate design of the machine are for research or experimentation under section 174. However, section 174 does not apply to the \$10,000 of production costs of the machine because those costs were not incurred for research or experimentation. See paragraph (a)(2) of this section (relating to production costs) and paragraph (b)(4) of this section (limiting deduction to amounts expended for research or experimentation).

Example 2. Z is an aircraft manufacturer. Z incurs \$5 million to construct a new test bed that will be used in the development and improvement of Z's aircraft. No portion of Z's \$5 million of costs to construct the new test bed represent research and development costs in the experimental or laboratory sense to develop or improve the test bed. Because no portion of the costs to construct the new test

⁶⁵*Id.*

⁶⁶Prop. reg. section 1.174-2(a)(11).

⁶⁷Prop. reg. section 1.174-2(b)(4).

bed were incurred for research or experimentation, the \$5 million will be considered an amount paid or incurred in the production of depreciable property to be used in the taxpayer's trade or business that are not allowable under section 174. However, the allowances for depreciation of the test bed are considered research and experimental expenditures of other products, for purposes of section 174, to the extent the test bed is used in connection with research or experimentation of other products. See paragraph (b)(1) of this section (depreciation allowances may be considered research or experimental expenditures).

Example 3. Assume the same facts as Example 2, except that \$50,000 of the costs of the test bed relates to costs to resolve uncertainties regarding the new test bed design. The \$50,000 of costs represents research and development costs in the experimental or laboratory sense. Because \$50,000 of Z's costs to construct the new test bed was incurred for research and experimentation, the costs qualify as research or experimental expenditures under section 174. Paragraph (b)(2) of this section applies to \$50,000 of Z's costs for the test bed because they are expenditures for research or experimentation that result in depreciable property to be used in the taxpayer's trade or business. Z's remaining \$4,950,000 of costs is not allowable under section 174 because these costs were not incurred for research or experimentation.⁶⁸

A public hearing on the 2013 proposed amendments was held January 8. It is unknown whether or when the proposed regulations will be adopted as final regulations.

IV. Analysis of the 2013 Proposed Amendments

A. Clarifying the Depreciable Property Rule

The 2013 proposed amendments represent a major step forward in eliminating ambiguities concerning the treatment of research and experimental costs that result in tangible property such as prototypes, but significant questions remain.

The 2013 proposed amendments appear designed to eliminate two long-standing issues regarding the deductibility under section 174 of costs incurred in R&E that results in a tangible product. The first is whether an experimental but fully functional prototype product constitutes a pilot model for section 174 purposes even if the prototype is commercially saleable if the research ulti-

mately succeeds. Subject to some ambiguity, discussed below, the 2013 proposed amendments answer this question in the affirmative. Prop. reg. section 1.174-2(a)(4) defines a pilot model to include a fully functional representation or model of the product. Further, Example 7 in prop. reg. section 1.174-2(a)(11), involving the prototype aircraft that takes off and lands vertically, provides a clear illustration of the principle that a fully functional but experimental product qualifies for section 174 treatment even if the prototype is sold after the experimentation proves successful.⁶⁹

The second long-standing question addressed by the 2013 proposed amendments is whether the ultimate sale or use of a prototype renders the costs of developing and fabricating the prototype ineligible for section 174 treatment because those events make the prototype depreciable in the hands of either the customer (in the case of a sale) or the taxpayer (in the case of use in the taxpayer's trade or business). Again subject to some ambiguity, discussed below, the 2013 proposed regulations answer this question in the negative. Prop. reg. section 1.174-2(a)(1) states: "The ultimate success, failure, sale, or use of the product is not relevant to

⁶⁹It is unclear from the wording of Example 7 whether it matters if there is an agreement to sell the prototype before the successful testing. The example provides: "In a later year, X sells the aircraft." In the past, the IRS has argued that a prototype may be entitled to section 174 treatment only if an agreement to sell the prototype is reached *after* the testing. In Example 5, for example, the models are determined to be section 174 pilot models even though "upon completion of several years of testing, V enters into a contract to sell one of the models to a customer." Prop. reg. section 1.174-2(a)(11), Example 5. It is again unclear whether an agreement to sell the prototype before successful testing would alter this example's conclusion. Often, manufacturers agree to sell prototypes to customers from the beginning of the project, if they successfully pass design tests or can be retrofitted to do so. Further, agreements to sell prototypes early are always present in first-in-class sales and so-called onesies, discussed below. Assuming the contractor remains at risk (*i.e.*, the product must meet specifications as a condition of the sale and there is genuine uncertainty at the time of agreement whether the prototype will be able to satisfy them), these should be considered pilot models eligible for section 174 treatment. This is consistent with the general principle that bearing the risk of whether the research succeeds or fails is the key determinant of section 174 treatment, even in a setting in which success and failure are tied to contractual conditions of sale, rather than more general commercial and technical feasibility. Another, related ambiguity in the wording of the example concerns the fact that in many cases it is more efficient, practically necessary, or even legally required that the customer rather than the contractor perform specific tests (*e.g.*, test firing a new missile). The fact that the customer is performing the test also should not change the above result, if the contractor remains at risk for a failed test. The wording of Example 7, which assumes the sale occurs after the testing, does not make that clear.

⁶⁸Prop. reg. section 1.174-2(b)(5).

determination of eligibility under section 174.” Further, Example 5 in prop. reg. section 1.174-2(a)(11) provides an illustration of this principle, concluding that the taxpayer was entitled to treat the costs of multiple prototypes as section 174 expenses even though it sold one of the prototypes and used another in its business. The experimental aircraft in Example 7, discussed above, is another illustration of this principle. By extension, these regulatory clarifications also appear to foreclose the separate argument sometimes made by the IRS that the mere existence of a prototype for more than one year, because it required multiple years of testing, alters its qualification as a section 174 pilot model. If that argument were still considered valid, the general rule allowing continued use of the prototype in the taxpayer’s trade or business would have to be limited to continued use not beyond one year. It would be helpful, however, for the definition or an example to confirm this.

By helping to eliminate these two long-standing issues, the 2013 proposed amendments provide some much-needed clarity to taxpayers regarding the section 174 eligibility of costs paid or incurred in R&E that produces tangible property. Taxpayers should welcome these regulatory changes.⁷⁰

⁷⁰However, the 2013 proposed amendments create an ambiguity unrelated to the depreciable property rule or prototypes: the section 174 eligibility of costs incurred in connection with process-related experimental production runs. It has been suggested to us that Example 9 in prop. reg. section 1.174-2(a)(11), involving testing to evaluate a new grape-crushing component of a winemaking process, is inconsistent with the Tax Court’s opinion in *Union Carbide*. Example 9 concludes that the costs of supplies used by the taxpayer to test the new grape-crushing component are research and experimental expenditures under section 174. However, the Tax Court in *Union Carbide* concluded that the costs of supplies used in process-related experimental production runs were not QREs for section 41 purposes. T.C. Memo. 2009-50, at *282-*283. We believe Example 9 and *Union Carbide* are reconcilable. While Example 9 could be clearer, it appears that the materials were produced or purchased explicitly for the test of the grape-crushing component. In contrast, in *Union Carbide*, the Tax Court found that the taxpayer had purchased the raw materials at issue primarily for commercial production. The two situations are distinct. Further, the 2013 proposed amendments do not appear designed to address issues concerning the eligibility of supply costs incurred for experimental production runs. For example, the regulations do not address variations of the *Union Carbide* facts that might affect the eligibility of supply costs, such as when (1) there was some risk of off-specification product; (2) the product was expected to be inferior but saleable at a lower price; and (3) an on-specification product would be produced but in a lesser quantity than would have been produced in a nonexperimental run (e.g., because of the need to run the process more slowly). These are interesting questions that appear to be outside the scope of the 2013 proposed amendments.

B. Enduring Uncertainties

The 2013 proposed amendments do not address all issues concerning the section 174 eligibility of costs that result in the production of saleable or useable tangible property. These lingering questions will likely continue to generate disputes between taxpayers and the IRS.

1. When is uncertainty resolved in a fluid development process? One enduring problem is determining the point in a research project when all uncertainties have been eliminated and commercial production begins. Prop. reg. section 1.174-2(a)(2) states that “costs paid or incurred in the production of a product after the elimination of uncertainty concerning the development or improvement of a product are not eligible under section 174.” This principle is straightforward enough in the abstract, but in practice it can be very difficult to apply. A widespread complaint by both taxpayers and IRS officials regarding the “research after commercial production” research credit exclusion (section 41(d)(4)(A) and reg. section 1.41-4(c)(2)) is that it is challenging to determine with precision when experimentation ends and production begins. For example, a 2009 GAO report quoted IRS officials as saying “that they have disagreements with taxpayers over when commercial production begins and suggested that this is one area where some further clarifications in regulations might help.”⁷¹ The relevant examples in the 2013 proposed regulations (examples 3, 4, and 6 in prop. reg. section 1.174-2(a)(11)) do not address this problem because they simply assume that the moment when production begins is readily ascertainable. But in reality, this determination is highly fact-intensive, and the continued existence of this ambiguity likely will generate disagreements over the section 174 eligibility of costs paid or incurred in research projects that ultimately produce tangible property.

This issue is highlighted but not resolved in the examples to the 2013 proposed amendments. In Example 3, the taxpayer designs a custom machine by building and testing a model. As of the conclusion of this process, the example simply declares that all uncertainty has been resolved and concludes that the remaining costs of constructing a machine for sale are ineligible for section 174 treatment. But Example 4 assumes the same facts as in Example 3 except that “during a quality control test of the machine, a component of the machine fails to function due to the component’s inappropriate design.” The taxpayer then incurs an additional amount that is nearly as much as the taxpayer

⁷¹GAO, *supra* note 52, at 28.

incurred in the original design in order to reconfigure the design of the component. Example 4 concludes that the additional cost of redesign qualifies as a research or experimental expenditure under section 174. However, Example 4 does not explain how all uncertainty could possibly have been resolved during Example 3 in light of the subsequent major design failure. It instead appears that the taxpayer's initial testing of its model did not resolve uncertainty and that the subsequent construction of what the example assumes to be a production model should have been treated as further prototype development, at least to some extent.

This is not to say that the determination of section 174 eligibility should be retrospective. It is simply that the impracticality of the example's assumption makes it unhelpful in resolving a key problem. Even if the Example 3 researchers were unaware of particular problems, they must have understood there were risks and difficult-to-specify uncertainties. This is very common in practice. Developers of complex machines are almost never certain that they have resolved all potential issues before the final testing of what they hope will be the production model. Given the major design failure that occurred in Example 4, the assumption in Example 3 that uncertainty had been resolved is highly improbable in practice. Considering that the taxpayer easily could have been unsuccessful in a redesign effort that ended up costing almost as much as the original design, it would be hard to argue the first "production" unit was not actually a prototype for which the taxpayer remained at risk due to uncertainty.

Another interesting facet of Example 4 is that while it allows section 174 treatment for costs to "reconfigure the component's design," it disallows section 174 treatment for the costs of production of the redesigned component, declaring again that uncertainty has been resolved. Nevertheless, the example states: "The reconfigured component *produced and used to evaluate and resolve uncertainty* with respect to the component is a pilot model within the meaning of paragraph [1.174-2](a)(4)."⁷² It would seem again that uncertainty was not resolved until after the "production" of the redesigned component.

So, were the taxpayer's activities in examples 3 and 4 part of one large experiment in which all uncertainty was not resolved until the final testing of the finished product? This characterization is more persuasive if the problem turned out to be not the operation of one isolated component of the

product but rather the integration of more than one component, each of which had tested well in isolation but failed to work together when put into the same product. Example 4 does not state whether the design failure involving the one component was a failure of the component itself or instead a failure of the entire machine because the component did not work with the other components. However, because successful tests were completed on models, it seems likely the latter type of failure would have occurred. This highlights the next ambiguity unresolved by the 2013 proposed amendments.

2. What is the pilot model when a new component is integrated into a larger product? Another remaining problem, which is perhaps even intensified by the 2013 proposed amendments, concerns instances in which a taxpayer redesigns a component of a larger product, process, or system. In many industries, such as the aerospace and automotive industries, a taxpayer might reasonably maintain that the redesign of a component of a product, process, or system creates uncertainties not only about the particular component, but also for the larger product, process, or system. For example, electrical components for an aircraft may work fine in isolation in bench models but interfere with other electrical components on the actual aircraft. It is impossible to test that kind of integration uncertainty without producing the entire aircraft, including many components that are not themselves the subject of isolated uncertainty. Often the primary focus of prototype testing in such a case will be on how the component integrates with other already-developed components rather than whether the component works well independently, the latter having been already established by bench tests. If the introduction of a new component or the redesign of an existing component creates uncertainties concerning the capability or appropriate design of the entire product (or process or system), the entire product should constitute a pilot model and eligibility under section 174 would not be limited to component-specific costs.

On the basis of the 2013 proposed amendments, the IRS might take a contrary position. The new shrinking-back rule of prop. reg. section 1.174-2(a)(5) states: "The presence of uncertainty concerning the development of certain components of a product does not necessarily indicate the presence of uncertainty concerning the development or improvement of other components of the product or the product as a whole." While the word "necessarily" suggests that Treasury and the IRS acknowledge that there might be situations in which a new component creates uncertainties beyond the component, the general tenor of this sentence is that eligibility under section 174 should be limited to the

⁷²Prop. reg. section 1.174-2(a)(11), Example 4 (emphasis added).

costs associated with the new or redesigned component. Further, Example 4, as noted above, as well as examples 8 and 9, in prop. reg. section 1.174-2(a)(11), simply assume that the uncertainties addressed by the R&E are exclusively for the component and that the introduction of the new or redesigned component does not also create uncertainties for the entire product, process, or system.

Example 8 also highlights the related issue of stock parts. In the example, an aircraft manufacturer is developing a new compressor blade. To test the blade's resistance to fatigue, the taxpayer installs the blade in one of the manufacturer's existing aircraft engines, presumably off the production floor or from inventory. The example applies the shrinking-back rule to conclude that the compression blade is the pilot model and that section 174 does not apply to the costs of producing the otherwise-standard engine. But this does not seem like the right answer in all cases. What if the fatigue test must be conducted until the engine fails? In that case, would not the engine cost clearly be a cost of the experiment? Does it matter if the engine is not destroyed but can be sold later only at a reduced price? What if the manufacturer produced only compression blades and purchased an engine from a third party with no intent to use it afterward? These questions might not matter for deduction purposes, because presumably section 165 would allow a loss for the destroyed engine, but the characterization does matter for the section 41 research credit because qualified supply costs for purposes of section 41 must first be section 174 expenses. The manufacturer is risking the cost not only of the compressor blade model but also of the engine, and risk should be the touchstone of section 174 distinctions. Although the engine perhaps is not a pilot model in the strict sense, is it not still a supply exhausted in the research, akin to chemicals and other laboratory supplies? It really is like special test equipment, discussed above.

In sum, the new shrinking-back provision and the above regulatory examples will provide IRS examiners additional ammunition to argue that only costs associated with specific components should be treated as research or experimental expenditures. This likely will continue to be an area of disagreement between taxpayers and the IRS, and the 2013 proposed amendments might even drive the parties further apart on this particular issue.

3. What is the appropriate treatment of first-in-class sales, onesies, and multiple prototypes? Many of the above questions become particularly important in cases involving first-in-class sales and "onesies" (pronounced "w-n-zies"), that is, custom-designed products in which the "prototype" is also an end product or perhaps the only end product (in

the case of a onesie) intended to be sold from the outset of the project. Similar issues arise when multiple prototypes are intended to be sold to a customer. In the 2013 proposed amendments, Example 7 (the aircraft manufacturer designing an entirely new experimental aircraft) and Example 8 (the aircraft manufacturer testing a discrete new compressor blade in an existing engine) address the section 174 treatment of projects at opposite ends of the development spectrum but fail to address projects falling within the middle. The examples thus create a large conceptual void into which many if not most actual product development projects are likely to fall.

The two issues discussed above — when is uncertainty resolved in light of system-wide interaction of individual components, and what is the scope of the prototype in an integrated unit — are central to the cases that fall between the extremes of examples 7 and 8. This conceptual space is illustrated by the projects addressed in *Trinity Industries*,⁷³ in which the taxpayer produced first-in-class ships and claimed that the entire cost of each ship qualified for the section 41 research credit, a conclusion that necessarily requires that every such cost is an eligible section 174 expense.⁷⁴ The court in *Trinity Industries* described the taxpayer's ship development activities as follows:

Much of the design work at issue involved integrating extant subassemblies into a ship design. The government suggest[s] that this is nothing more than ordering off a menu: pick a hull from column A, a propulsion system from column B, an HVAC from column C, etc. The Court finds this greatly oversimplifies the process.

First, many of the systems at issue are not monolithic entities, but rather families of products with considerable flexibility in their configuration. Determining which configuration out of the universe available can itself, in particular cases, involve a significant research effort.

Second, the systems do not exist in a vacuum. They interact with each other, sometimes in complex and nonintuitive ways. A change in electronics may require a change in power generation and distribution, which may require a change in the engine plant, any one of

⁷³691 F. Supp.2d at 688.

⁷⁴Section 41(d)(1)(A) (defining qualified research as research "with respect to which expenditures may be treated as expenses under section 174"). Additional requirements must be satisfied for research to constitute qualified research under section 41.

which may affect the weight distribution and performance of the vessel as a whole.

Thus, the simple fact that a new vessel incorporates existing systems does not resolve the QRE issue against Trinity. Determining the degree of QRE involved requires an examination of the overall scope of the effort required to specify the components and integrate them into the overall design of the ship.

Conversely, the simple fact that a ship was first in class does not necessarily mean that use of a well-known component, such as an engine, constitutes a process of experimentation.⁷⁵

The *Trinity Industries* court dismissed the government's complaint that the taxpayer, by claiming the cost of the entire ship, had overreached by claiming expenses that the government considered clearly nonexperimental, such as the cost of painting the ship. The court stated: "If a first in class ship is sufficiently experimental, the risk of failure attaches to the entire project. The potential loss includes not just the experimental aspects, but also the paint."⁷⁶ The court's focus on system interaction and on the scope of the potential loss, and thus the extent of risk to the taxpayer, seems to us to be the appropriate touchstone for determining whether the entire product or only one or more subcomponents are pilot models.

The court then addressed the six development projects at issue, which collectively illustrate the spectrum of factual possibilities in this area. The first project was a stealthy special operations deployment vessel similar to the experimental aircraft described in Example 7 in the 2013 proposed amendments. This vessel was new and innovative in every significant way and had to be designed mostly from the ground up. The court had no trouble concluding that all the expenses incurred to construct the first two prototypes of this vessel were credit-eligible QREs.⁷⁷

The next project was to produce a double-hull oil barge that the taxpayer had never built before. The double hull altered the weight distribution and stability of the entire ship and required redesign of piping and heating systems. The court held that all the costs incurred to design and fabricate this first-in-class ship were also QREs.⁷⁸

The next two projects involved a patrol boat and an oceanographic research ship referred to as the T-AGS. Although each of these vessels incorporated

new and clearly experimental features, the court could not find that "substantially all" of the costs incurred were part of a process of experimentation.⁷⁹ The innovative aspects of these vessels included new high-speed requirements and special noise suppression and handling precision. However, the court found that most of the other components of these ships were not experimental. Curiously, despite its discussion of system interaction, the court did not expressly analyze the extent of interaction between the experimental components and the rest of the ships.⁸⁰

The court concluded that the final two projects, a rescue boat and a dredge, likely involved some QREs but were essentially minor design revisions of existing ships.⁸¹

Because a cost must satisfy more requirements to be a QRE for section 41 research credit purposes than for section 174 treatment purposes, the court's analysis in *Trinity Industries* is not directly relevant to the underlying question of whether and to what extent the construction costs of the first-in-class ships constituted section 174 expenditures. Nevertheless, it is instructive to observe how the court in *Trinity Industries* focused on the interactive nature of new design features with other parts of the ships'

⁷⁹*Id.* at 695-696. For a taxpayer's research to qualify for the section 41 research credit, substantially all of the research activities must constitute elements of a process of experimentation that relates to a qualified purpose. Section 41(d)(1)(C); reg. section 1.41-4(a)(6). "Substantially all" means that 80 percent or more of the taxpayer's research activities for each business component, measured on a cost or other consistently applied reasonable basis, must constitute a process of experimentation for a qualified purpose. Reg. section 1.41-4(a)(6). If the qualified research tests are not satisfied at the level of the overall business component, they are to be applied to the most significant subset of the business component. Reg. section 1.41-4(b)(2). However, the taxpayer in *Trinity Industries* did not present evidence to support the qualification of subcomponents of its ships, thus taking an all-or-nothing approach. *Trinity Industries*, 691 F. Supp.2d at 692-694. The court indicated that it believed various subcomponents of the four projects would have qualified, but it did not have the evidence necessary to determine what portion of the claimed costs were involved. *Id.* at 695-697.

⁸⁰*Trinity Industries*, 691 F. Supp.2d at 695-696. Because of the taxpayer's all-or-nothing approach, it appears there was insufficient evidence of interaction among experimental and nonexperimental components. The taxpayer seems to have emphasized the overall experimental nature of the ship and did not persuade the court that it was at least 80 percent experimental. Would the result have been different if, consistent with the court's language on system interaction, the taxpayer had demonstrated that the entire ship would fail if, for instance, the sound suppression system could not be made to work with the existing hull design, and that this could not be tested until the entire ship was constructed?

⁸¹*Id.* at 696-697.

⁷⁵*Trinity Industries*, 691 F. Supp.2d at 692.

⁷⁶*Id.*

⁷⁷*Id.* at 694.

⁷⁸*Id.* at 694-695.

systems. In contrast, Example 8 in the 2013 proposed amendments⁸² assumes that there is no such interaction — that is, nothing about the new compressor blade requires a design change in the engine. Under these assumed facts, it is reasonable to conclude that the engine is not part of the pilot model or prototype.⁸³

But is that the correct result when there is interaction between the experimental components and the rest of the product, process, or system? This is the question left unanswered by examples 3 and 4 of the 2013 proposed amendments, which do not discuss the seemingly central issue of system interaction. Several of the *Trinity Industries* projects fall between the facts of examples 5 and 7. For instance, the T-AGS oceanographic research ship required “internal airborne noise levels (including engine exhaust routing), sonar self noise issues, oceanographic handling (specifically the winches and cranes), and the ship handling requirements (including bow shape and retractable bow thrusters). However, most of the balance of the T-AGS was not new or different.”⁸⁴ Although the *Trinity Industries* court held that the entirety of the costs of building the T-AGS did not qualify as section 41 QREs, it nevertheless appears the entire ship was a prototype for testing system interaction and thus those costs should qualify under section 174. How would it be possible to test and evaluate the new noise suppression and ship handling features absent a working model of the entire ship? The assertion in Example 7 that the entire aircraft in question was experimental calls into question the correct treatment of a prototype that is not *completely* experimental but has important experimental components with extensive system-wide interaction.

Should the existence and extent of system-wide interaction or the importance of the experimental components to the overall system matter? The double-hull oil barge in *Trinity Industries* is a relatively easy example, because the court determined that the new hull required redesign of most of the ship’s other systems. Similarly, a new aircraft engine affecting the entire aerodynamic design of the aircraft strikes us as an easy case. But what about a new aircraft coolant system that can be tested only in a full prototype of the aircraft but might not be expected to interact significantly with the basic design of the aircraft? In the former situation (new engine), the aircraft is not likely to be saleable

without significant redesign if the engine fails. In the latter, the coolant system may be able to be retrofitted without sacrificing the ability to sell the aircraft. That distinction seems important from a risk perspective. Yet facts such as these appear nowhere in the 2013 proposed amendments, having been assumed away by examples 3 and 4, thus leaving the conceptual void between the extremes of examples 7 and 8.

V. A Suggested Framework

We suggest the following framework for addressing the types of questions described above:

1. *Destroyed or diminished property.* All costs (design and production) of constructed units (prototypes, products, special test equipment, etc.) that will likely be destroyed or have their value and utility significantly diminished by testing should be treated as pilot models and thus entirely as section 174 expenses. This would be the case even if only one component of the unit were experimental and would include the cost of any stock parts (for example, the engine of Example 8) if those stock parts will likely be destroyed or have their value and utility significantly diminished. In this situation, there is never a shift from uncertainty to commercial production.
2. *Property to be sold or used.* All costs (design and production) of constructed units intended to be sold or further used in the taxpayer’s business (other than as property with significantly diminished value and utility, which would be governed by rule 1) should be treated as pilot models, and thus entirely as section 174 expenses, if either (a) the entire unit is experimental (that is, ground-up development in Example 7); or (b) one or more experimental components have significant system-wide interaction. The most relevant factor in this assessment is whether, at the time of the unit’s construction, the entire unit was at risk or merely the experimental component or components. In other words, could a failure of one component make the whole unit unsaleable or require redesign of other components?
3. *Shrinking-back rule.* In other cases, the shrinking-back principle would apply and only the costs of the experimental component or components would be eligible for pilot model treatment under section 174, applying each of the above rules to those components (in which case the interaction of experimental subcomponents within a component made up of experimental and nonexperimental subcomponents would be relevant under the second rule).

⁸²Prop. reg. section 1.174-2(a)(11), Example 8.

⁸³As discussed above, this assumed lack of interaction might not prevent the engine from being considered eligible under section 174 if the engine was destroyed in the testing and thus should qualify as special test equipment.

⁸⁴*Trinity Industries*, 691 F. Supp.2d at 696.

4. *Resolution of uncertainties.* Under all the rules above, determinations of when the uncertainty was resolved and commercial production began should be made while taking into consideration system-wide uncertainties. Thus, production of a component that already tested successfully in isolation should be considered a prototype if it must still be tested for significant system-wide interaction.

In our judgment, this framework provides an analytical basis for resolving the types of prototype-related questions described above that is consistent with the rules and policies of section 174.

VI. Conclusion

The proposed section 174 amendments represent a significant step forward in the treatment of prototype-related expenditures. They clarify that a fully functional product or process can constitute a pilot model and that the subsequent sale or use of a prototype does not override the section 174 eligibility of the costs incurred to develop and fabricate the prototype. However, the proposed amendments do not resolve all issues concerning the treatment of prototype costs. Enduring issues include determining when experimentation ends and production ends, the scope of the pilot model when a component or components are modified, and the treatment of first-in-class sales. This report suggests a way in which these open questions can be addressed based on the principles that underlie the proposed regulations. However, absent additional revisions in the final amendments to section 174, these issues likely will continue to be the source of controversies between taxpayers and the IRS over prototype expenditures.

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