

No. 11-2552

BRIEF FOR THE APPELLANT,
UNION CARBIDE CORPORATION AND SUBSIDIARIES,

IN THE UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT

UNION CARBIDE CORPORATION AND SUBSIDIARIES,

Petitioner-Appellant

v.

COMMISSIONER OF INTERNAL REVENUE,

Respondent-Appellee

Appeal from the United States Tax Court
Docket No. 11119-99,
Judge Joseph Robert Goeke

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CORPORATE DISCLOSURE STATEMENT

Pursuant to FRAP 26.1(a), Appellant Union Carbide Corporation and Subsidiaries states that it is a wholly owned subsidiary of The Dow Chemical Company.

s/ Harold J. Heltzer

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JURISDICTIONAL STATEMENT

On March 22, 1999, the U.S. Internal Revenue Service ("IRS") issued a notice of deficiency to Appellant Union Carbide Corporation and Subsidiaries ("UCC") for its 1994 and 1995 tax years. UCC filed a timely Petition with the U.S. Tax Court on June 17, 1999, in which it sought a redetermination of its tax liabilities for 1994 and 1995. Among other claims, the Petition alleged as an affirmative claim that UCC was entitled to additional research credits under § 41 of the Internal Revenue Code ("IRC") (26 U.S.C.). The Tax Court had jurisdiction over UCC's research credit claim pursuant to IRC § 6512(b).

After conducting a bifurcated trial, the Tax Court issued an opinion addressing UCC's research credit claim. Union Carbide Corporation and Subsidiaries v. Commissioner, T.C. Memo 2009-50, 97 T.C.M. (CCH) 1207 (March 10, 2009) ("Opinion" or "Op.").¹ SPA1-72. All other issues have been resolved by agreement of the parties and a separate Tax Court opinion. By Stipulation filed January 12, 2010 (A250-56), the parties stipulated that, under the Opinion, UCC will not receive any additional research credits for either 1994 or 1995 pursuant to its affirmative research credit claim. Upon receipt of the

¹ All citations to the Opinion are to the published version in 97 T.C.M. (CCH).

parties' agreed computations, the Tax Court entered its Decision on April 1, 2011. SPA73-75. The Decision is a final decision resolving all of UCC's claims in this action, and is appealable under IRC § 7482(a)(1). Pursuant to IRC § 7483 and FRAP 13(a)(1), UCC timely filed its Notice of Appeal on June 23, 2011. A130-31.

STATEMENT OF THE ISSUES

IRC § 41 allows taxpayers an income tax credit for qualified research expenses over a "base amount." This case involves UCC's entitlement to such research credits for qualified research that UCC conducted at its U.S. chemical and plastics plants during 1994 and 1995 to improve its manufacturing processes ("process research"). Two issues of statutory interpretation are raised by this appeal.

First, although the Tax Court found that UCC had conducted qualified process research at its plants, it nonetheless denied UCC its entire claimed supply costs for that research based on a distinction the Tax Court read into IRC § 41 between plant-based research conducted to develop or improve a manufacturing process and plant-based research conducted to develop or improve a manufactured product. This distinction, which effectively deprives manufacturers of the research credit for much of the cost of conducting plant-based process research, had never previously (or since) been recognized by any other court or even by the IRS. The Tax Court's novel interpretation of the statute raises the following two related legal issues:

1. Whether supplies without which a manufacturer could not have conducted qualified research to improve its manufacturing processes are "supplies used in the conduct of qualified research" under IRC § 41(b)(2)(A)(ii)?

2. Whether the Tax Court erred in interpreting IRC § 41(d)(2)(C) to mean that supplies essential to the manufacturer's ability to conduct such qualified research nevertheless are not "supplies used in the conduct of qualified research" because the research activities also result in the production of product?

Second, in order for an activity to constitute "qualified research" under IRC § 41(d), substantially all of the activity must constitute "elements of a process of experimentation." IRC § 41(d)(1)(C). The governing regulation, Treas. Reg. § 1.41-4(a)(5), defines a "process of experimentation" as a process whereby a taxpayer systematically evaluates one or more alternatives to eliminate an identified uncertainty. With respect to one of the plant tests for which UCC sought the research credit, the sodium borohydride project, the Tax Court found that the test was designed to and did in fact eliminate manufacturing process uncertainties. Nevertheless, the Court held that the project did not involve elements of a process of experimentation because UCC did not engage in additional post-test analyses after it had determined that the new process technology worked. This ruling raises the following legal question:

Was the Tax Court correct in interpreting the "process of experimentation" requirement to deprive UCC of the

research credit for the successful test of new process technology solely because UCC failed to engage in additional post-test analyses after it had determined that the new process technology worked?

STATEMENT OF THE CASE

Congress enacted the IRC § 41 research credit to incentivize businesses to initiate or expand research and development ("R&D") programs. On its original 1994 and 1995 Federal income tax returns, UCC claimed the research credit for costs associated with its R&D laboratories and pilot plants, but not for the costs of experiments conducted at its manufacturing plants. In late 1994, Treasury issued regulations that expanded the definition of "research or experimental expenditures" for purposes of IRC § 174 and, by extension, IRC § 41. T.D. 8562, 1994-2 C.B. 30 (SPA124-26). UCC subsequently concluded that 106 R&D projects it had conducted at its manufacturing plants in 1994 and 1995 satisfied this expanded definition, and accordingly claimed additional § 41 research credits for those years in its Tax Court Petition. A22-129.

For purposes of resolving this claim, UCC and the IRS agreed to try five of the largest projects, including three that are relevant to this appeal: the Amoco anticoking, the sodium borohydride, and the UCAT-J projects. These five sample projects were tried to the Tax Court, along with several other issues not on appeal.

On March 10, 2009, the Tax Court (Goeke, J.) issued its Opinion setting forth its findings and conclusions of law. SPA1-72. The Tax Court held that three of the five sample

projects, including the sodium borohydride project, did not constitute "qualified research" within the meaning of IRC § 41(d)(1). With respect to the Amoco anticoking and the UCAT-J projects, which the Tax Court found constituted qualified research, the Tax Court denied UCC virtually its entire claimed qualified research expenses on the basis of a distinction the Tax Court read into IRC § 41 between product research and process research.

The parties subsequently stipulated that, under the Opinion, UCC will not receive any additional research credits for either 1994 or 1995 pursuant to its affirmative § 41 research credit claim. A250-56. On April 1, 2011, the Tax Court entered its Decision from which UCC here appeals. SPA73-75.

STATEMENT OF THE FACTS

A. The Statutory and Regulatory Context

Under the statutory framework of IRC § 41, in order for a taxpayer to claim a tax credit for the cost of conducting R&D activities, the R&D activities must constitute "qualified research" as that term is defined in IRC § 41(d) and Treas. Reg. § 1.41-4(a). Once a taxpayer has identified such qualified research, it must determine the qualified research expenses ("QREs") incurred in connection with the research. The type of expenses that the taxpayer can include as QREs for this purpose are set forth in IRC § 41(b) and Treas. Reg. § 1.41-2.

IRC § 41(b)(1) provides that QREs include "in-house research expenses" and "contract research expenses." See also Treas. Reg. § 1.41-2(a). IRC § 41(b)(2)(A) further provides that, in general, "in-house research expenses" include, among other things, "any amount paid or incurred for supplies used in the conduct of qualified research." IRC § 41(b)(2)(A)(ii); see also Treas. Reg. § 1.41-2(b). The term "supplies" is defined by IRC § 41(b)(2)(C) as "any tangible property" other than land and improvements to land and property subject to depreciation.

B. Chemical Plant Experimentation

For a chemical company like UCC, R&D encompasses a range of experimental activities conducted in bench-scale laboratories, mid-scale pilot plants, and full-scale commercial manufacturing

plants. A765-69; A783; Op. at 1227, 1257, 1264. Plant-based experiments are conducted to evaluate a new technology in a manufacturing facility while that facility is in normal commercial operation processing supplies into finished products. A765-69; A783; Op. at 1257. The size and dimensions of chemical plant equipment, the inherent unpredictability of chemical reactions, and numerous operating uncertainties make it impossible to simply extrapolate laboratory or pilot plant results to the commercial plant setting. Rather, plant-based experiments are necessary to determine whether a new product or process technology is in fact viable in commercial operation. A765-69; A783; A632-33; A672; A705; A710; Op. at 1227, 1257, 1264.

The nature of plant-based process research is such that the experiments necessary to resolve the uncertainties regarding the manufacturing process are performed by having the plant use essentially the same supplies (including the raw materials and feedstock) that would be consumed when the plant is operating under normal conditions. A632-33; A672; Op. at 1216-17, 1229-34, 1273. Correspondingly, the evaluation of the experimental manufacturing process cannot be performed without simultaneously using those supplies to produce output. Sometimes that output will meet commercial standards and can be sold as finished product; other times, particularly if the process research fails

or is only partially successful, the output is off-grade scrap. A749; Op. at 1225, 1228-29 (chart), 1230. And, because process research is meant to resolve uncertainties, such experimentation inevitably creates risks that the supplies used in the research will not result in a product that meets commercial standards. A692-708; Op. at 1228-34.

Although the Amoco anticoking, sodium borohydride, and UCAT-J projects were very different experiments, each project was designed to evaluate whether an experimental technology would improve UCC's manufacturing processes while the plant was running under actual operating conditions.

C. The Amoco Anticoking Project

The Amoco anticoking project was conducted at UCC's Taft plant in Hahnville, Louisiana. The plant made ethylene by "cracking" raw petroleum feeds such as ethane, propane, and naphtha in large industrial furnaces. Op. at 1214-15. Cracking is accomplished by applying very high temperatures as the feed is injected at the top of the furnaces into metal "cracking coils." Id. A major problem in the operation of such furnaces is the formation of coke, a heavy coal-like substance that accumulates inside the cracking coils. Id. at 1215. Such coke formation requires the furnaces to be "decoked" every one to two months, diminishes ethylene yields, accumulates in downstream equipment, and damages the cracking coils. Id.

Because coke formation was a significant problem, UCC R&D scientists investigated several coke mitigation technologies in 1994 and 1995. Id. at 1215-16. One such technology was a compound developed by Amoco Chemical Company as a furnace cracking coil pretreatment. Id. at 1216. UCC considered the Amoco pretreatment as promising but unproven, and decided to test the Amoco pretreatment on a Taft plant furnace. Id.

Dr. David Milks, an R&D scientist and UCC's foremost furnace expert, developed a test plan under which a furnace using ethane feedstock would have four of its cracking coils pretreated with the Amoco compound. Id. The pretreatment was applied in November 1994, after which the test furnace was brought on-line and data collection and analysis commenced. Id. at 1216-17. Dr. Milks and a colleague prepared a report in February 1995 (A305-28) reviewing the preliminary test results, which were inconclusive. Op. at 1217. They suspected that the test furnace had not been adequately cleaned before the test and recommended that the test furnace be retreated. Id.

A second pretreatment was applied in April 1995, but the test data continued to be inconclusive regarding whether the Amoco pretreatment was effective. Id. UCC suspended the test in August 1995 after it discovered excessive coke deposits on furnace equipment downstream of the treated coils. Id. UCC never resumed the test. Id. at 1217-18.

UCC's fact witnesses testified that, to determine whether the Amoco technology was effective, a test had to be performed in an operating ethylene plant under normal conditions with feed running through the test furnace. A1229, Tr. 184; A1304, Tr. 480-81. UCC employees also testified that the Amoco pretreatment had to be tested on an operating furnace to ensure it did not cause process upsets or other problems. A1276-77, Tr. 371-72; A1279-80, Tr. 383-84; A1304, Tr. 480-81. The potential impact of the Amoco compound on the product and co-products was also a concern. A1328, Tr. 568-69.

There was no dispute that the Amoco pretreatment had to be tested on an operating plant furnace using the usual feedstock. UCC's expert, Dr. Gilbert Froment, stated: "The [Amoco] agent had to be tested in an operating furnace to evaluate its efficacy. This could only be done under the specific Taft industrial conditions, meaning the usual feed rates of ethane and steam and the usual furnace operating conditions." A632-33. Even the IRS's expert, Mr. Roy Halle, agreed that, in order to conduct the plant-based experiments in question, UCC had to use the feedstock.²

² Mr. Halle testified as follows when questioned about UCC's need to use the feedstock in conducting the sodium borohydride project:

(continued...)

D. The Sodium Borohydride Project

The sodium borohydride project also was conducted at UCC's Taft plant, and involved testing the injection of a sodium borohydride solution into a caustic scrubber for the purpose of reducing the contamination of the plant's crude butadiene product by a chemical compound known as acetaldehyde. Op. at 1219-20. The test was designed to determine whether the sodium borohydride solution would reduce the presence of acetaldehyde in crude butadiene to levels below the specification required by UCC's customers, who had previously rejected shipments of crude butadiene with such contamination. Id.

While acetaldehyde was typically removed by a gas removal system known as a regenerative monoethanolamine (MEA) system, that system had to be periodically shut down for cleaning, during which time the crude butadiene would be contaminated by

(...continued)

- Q. They had to use the feedstock to do this experiment, right?
- A. If you're going to do it in a plant, you have to use the feedstock.
- Q. Yes. It's an essential part of this experiment, you have to have the feedstock?
- A. Sure.
- Q. There's no dispute about that, right?
- A. There's no dispute.

A1865, Tr. 2681 (emphasis added); see also A1871, Tr. 2704 (Halle: "You cannot do this test [UOP GA-155 project] without the feedstock, not on a commercial unit.")

acetaldehyde. Id. UCC accordingly sought to identify a way to reduce acetaldehyde contamination during those cleaning periods, and decided to test the injection of a sodium borohydride solution into the caustic scrubber during the production process. Id. at 1220.

The test was designed by Dr. Robert Manyik, a chemist in UCC's Hydrocarbons R&D Group. Dr. Manyik prepared a memorandum in early 1995 (A397-541), in which he proposed a plant test to evaluate whether the addition of a sodium borohydride solution to the caustic scrubber during MEA system shutdown periods would remove acetaldehyde contamination to customer specification levels. Op. at 1220. The memorandum discussed the chemical reaction in question, addressed whether such a test was feasible, identified hazards that could arise during the test, set forth how such a test should be conducted, and summarized technical information for the plant personnel conducting the test. Id. Dr. Manyik testified that he did not know at the time whether the test would reduce the level of acetaldehyde contamination to customer specification levels given the conditions within the caustic scrubber and the speed with which the contaminated furnace gases flowed through the scrubber. A1398-400, Tr. 841-50.

The two-week test was conducted by plant personnel in June 1995. A336-92. During the test plant personnel tested the

furnace gases and the crude butadiene product for acetaldehyde contamination. Op. at 1221. The results of the tests were collected and reported to a plant engineer assigned to the project. Id. These results indicated that the injection of the sodium borohydride solution had in fact reduced the acetaldehyde contamination in the crude butadiene product to less than customer specification levels. Id. The test was deemed to have been successful, and the plant determined that it would use the injection of sodium borohydride solution into the caustic scrubber during future shutdowns of the MEA system to remove acetaldehyde. Id.

E. The UCAT-J Project

The UCAT-J project was conducted at UCC's Star Plant, which was a separate facility on the Taft Plant site. The Star Plant made polyethylene using the UNIPOL™ fluidized bed reaction technology. Id. at 1224. The UCAT-J project involved the introduction of a new catalyst, UCAT-J, into the Star Plant's polyethylene production process. Through the UCAT-J project, UCC hoped to determine whether high-grade polyethylene products could be produced successfully on a commercial scale at the Star Plant using UCAT-J. Id. at 1227. If so, this would both reduce costs in UCC's own polyethylene production process and augment its polyethylene technology licensing business. Id.

The UCAT-J catalyst was used to produce a series of base resins from which various finished polyethylene products could be manufactured. Id. at 1224-28. UCC intended to replace its M-1 catalyst (also known as UCAT-A) with UCAT-J; the two catalysts were similar in terms of chemical composition, but differed significantly in properties and behavior. Id. at 1224. To test the new catalyst, UCC began to conduct experimental runs using UCAT-J, first at its South Charleston pilot plant, and then at a small development reactor at its Seadrift Plant. Id. at 1227. The reactors at the Star Plant, however, are significantly larger than those at either the pilot plant or the Seadrift Plant. Id. Given this size disparity, significant plant design differences, and the fact that UCC was still learning about the UCAT-J catalyst, it was uncertain whether UCC would be able to achieve satisfactory results on Star's large-scale reactors, notwithstanding any prior successes (and many failures) during earlier testing. Id. at 1224.

UCC began to conduct experimental runs using UCAT-J at the Star Plant in May 1992, and it eventually conducted 19 experimental UCAT-J runs during 1994 and the first half of 1995. Id. at 1228-29. The uncertainties surrounding UCC's ability to achieve satisfactory results using the new UCAT-J catalyst were manifested in a number of problems that arose during the experimental runs conducted at the Star Plant. Id. at 1230.

These problems fell into three primary categories: (1) alkyl and catalyst issues; (2) reaction chemistry and kinetics issues; and (3) powder quality control issues. A697-706. UCC could not anticipate which specific problems might arise during a particular experimental run, only that such problems might occur. Op. at 1263-64. Moreover, UCC could not know beforehand whether any experimental run would be successful, or whether any adjustments that it had made in response to problems observed during prior runs would be successful in avoiding such problems during subsequent runs. Id. at 1230. These uncertainties could be resolved only through conducting and observing full-scale runs at the Star Plant for each resin. Id. at 1263-64.

The UCAT-J project was necessary to evaluate the UCAT-J catalyst at an operating commercial plant with supplies running through the UNIPOL™ reactor. Of the 19 UCAT-J experimental runs, several had to be aborted or were failures because of operational problems, others were only partially successful, and almost one-fifth of the polyethylene resin produced was off-grade and had to be sold for scrap. Id. at 1228-34 (including chart). There was significant risk to both production and the equipment in conducting the UCAT-J experiments. A1676, Tr. 1935-36; A1688-89, Tr. 1984-88; Op. at 1227 (unpredictable reactor operability and continuity issues required R&D representatives to remain on site for duration of runs). One

set of experimental runs required the reactor to be shut down to have polyethylene sheets removed with suction trucks and chain saws, thereby potentially causing problems for subsequent runs and making it "too risky" to continue testing UCAT-J in that reactor. Op. at 1233-34. These many failed UCAT-J project runs also illustrate the inherent risk that the supplies used in process research will not result in product meeting commercial standards.

F. The Tax Court's Opinion

For purposes of resolving the case, the parties agreed to try five of the largest projects identified in UCC's research credit claim. Id. at 1214. The Tax Court bifurcated the trial. A first trial held in June of 2006 focused on the five sample projects; of these, only the Amoco anticoking, sodium borohydride, and UCAT-J projects are relevant to this appeal. The second trial held in late 2007 and April of 2008 focused on whether UCC's base amount calculation satisfied the "consistency requirement" of IRC § 41(c)(4) by including the costs of all plant-based experiments conducted by UCC during the statutory 1984-1988 base period.

1. The Amoco anticoking and UCAT-J projects

The Tax Court concluded that both the Amoco anticoking project and the UCAT-J project were qualified research as defined in IRC § 41(d)(1). Op. at 1258-60, 1265-66. It

rejected the IRS's arguments that the experiments were not sufficiently substantiated and constituted "research after commercial production" excluded from the definition of qualified research under IRC § 41(d)(4)(A). Op. at 1259-60, 1265.

Although the Tax Court concluded that the Amoco anticoking and UCAT-J experiments could not have occurred without the supplies claimed by UCC, it held that those supplies were not "used in the conduct of" the two experiments within the meaning of IRC § 41(b)(2)(A)(ii). Op. at 1272-75. It based that ruling on an unprecedented interpretation of IRC § 41(d)(2)(C), which it construed to require that the cost of supplies be assigned either to the "product" or "process" business component,³ and that supplies that are used in the manufacturing process are necessarily assigned to the product business component even if used for a process experiment. Op. at 1257-58, 1273. Since both the Amoco anticoking project and the UCAT-J projects were claimed by UCC as process research projects, the Tax Court used this interpretation of IRC § 41(d)(2)(C) as the basis for denying UCC all of its claimed supply costs. Id. at 1274.

³ To constitute "qualified research," the research must be undertaken to discover information "the application of which is intended to be useful in the development of a new or improved business component." IRC § 41(d)(1)(B)(ii). The term "business component" can include a product, process, computer software, technique, formula or invention. IRC § 41(d)(2)(B).

2. The sodium borohydride project

The Tax Court found that the sodium borohydride project was designed to and did in fact resolve various uncertainties that had been identified by UCC personnel, including the research chemist who designed the test. Op. at 1261-62. Despite UCC's identification of those uncertainties, preparation of a test plan, conduct of the plant test, monitoring of the test results, determination that sodium borohydride was effective, and resulting implementation of a new plant process, the Tax Court concluded that the project did not meet the "process of experimentation" test set forth at IRC § 41(d)(1)(C) solely because of the lack of additional post-test analyses once UCC had determined that the test had been successful. Op. at 1262.

SUMMARY OF ARGUMENT

The central issue raised by this appeal is whether the costs of the supplies used by a manufacturer to conduct research at an operating production facility to improve its manufacturing process constitute QREs under IRC § 41(b). This legal issue - which the Tax Court decided against UCC and, effectively, against all similarly situated manufacturers - is raised in the context of two research projects which the Tax Court found constituted "qualified research" within the meaning of IRC § 41(d).

Despite the fact that IRC § 41(b)(2)(A) permits taxpayers to include "any amount paid or incurred for supplies used in the conduct of qualified research" (other than land, improvements to land and depreciable property), the Tax Court disallowed UCC the costs of the supplies it used to conduct manufacturing process research at its operating production facilities. The Tax Court arrived at its conclusion based on an unprecedented interpretation of IRC § 41(d)(2)(C)⁴ that was never urged by the IRS during the proceeding.

⁴ IRC § 41(d)(2)(C) provides as follows:
Special rule for production processes. Any plant process, machinery, or technique for commercial production of a business component shall be treated as a separate business component (and not as part of the business component being produced).

Using subsection 41(d)(2)(C) as the springboard for its analysis, The Tax Court disallowed such process research supply costs by inserting a two-part test into IRC § 41. First, it added a new requirement to IRC § 41 that supplies used for process research can only be treated as QREs if they relate "primarily" to the process business component (as distinct from the product business component). But see In re Coltex Loop Cent. Three Partners, L.P., 138 F.3d 39, 43 (2d Cir. 1998) (for a court to add modifying language such as "primarily" to a statute, "would work a significant and unwarranted change in the meaning and consequences of the statute"). Second, the Tax Court, as a matter of judicial fiat, simply declared that supplies also used in manufacturing are assigned primarily to the product business component, meaning that those supplies can never be treated as QREs to the extent they are used for process research.

Although IRC § 41(b)(2)(A) expressly provides that the costs of supplies used in the conduct of qualified research are QREs, these two rules, applied together, effectively mean that no manufacturer can claim the research credit for supplies used for plant-based research if those supplies were used to conduct process research rather than product research. There is no justification, however, for the Tax Court's decision to overrule the plain and ordinary meaning of the language of IRC § 41 by

imposing additional requirements that are not found in the statute and that result in an interpretation directly contrary to what the statute actually says.

The Tax Court's decision to disallow across-the-board such supply costs as QREs for manufacturing process research appears based in part on its view that such supply costs should not be treated as QREs because the supplies in question were originally purchased for production. But plant research, by its very nature, requires the use of supplies similar if not identical to those used for normal commercial operations. Moreover, the Tax Court's view disregards the fact that, by subsequently deciding to use those supplies to conduct process research, the manufacturer places those supplies at risk - that is, the manufacturer assumes risks that do not exist in normal commercial operation. Indeed, as the facts of the very experiments tried to the Tax Court demonstrate, many plant experiments fail, causing production downtime, off-grade products, and damage to the plant and the supplies. The Tax Court's denial of QRE treatment to the supplies used by manufacturers to conduct process research is inconsistent with Congress's objective in enacting the credit to incentivize manufacturers to take the often substantial risks inherent in undertaking plant-based research.

No other court addressing the issue of whether supplies can be treated as QREs under IRC § 41 has ever suggested that such treatment is inappropriate because the supplies were also used in manufacturing. See Trinity Indus., Inc. v. United States, 691 F. Supp. 2d 688 (N.D. Tex. 2010); TG Missouri Corp. v. Commissioner, 133 T.C. 278 (2009); Fudim v. Commissioner, 67 T.C.M. (CCH) 3011 (1994); Lockheed Martin Corp. v. United States, 49 Fed. Cl. 241 (2001). For example, in TG Missouri, decided eight months after the Opinion here, the Tax Court allowed the manufacturer to treat the cost of manufacturing supplies (in the form of production molds that were ultimately sold to its customers) as QREs without any analysis of whether those supplies were used for product research, process research, or both.

The Tax Court in TG Missouri properly regarded subsection (d)(2)(C), which plays such a prominent role in Judge Goeke's analysis here, as immaterial. Judge Goeke's use of IRC § 41(d)(2)(C) to deny QRE treatment to supplies used for process research distorts the purpose of that subsection. The subsection does not address what type of expenses can be included as QREs in calculating the credit. Rather, it addresses what types of activities constitute qualified research. Specifically, IRC § 41(d)(2)(C) provides that process research must be evaluated independently from the product

business component to determine whether that process research constitutes qualified research. In other words, under subsection (d)(2)(C), a process will not be treated as qualified research simply because it is used to create an experimental product; in order to be qualified research, the process must independently meet the applicable experimental criteria.

Even the placement of subsection (d)(2)(C) within IRC § 41 demonstrates the incorrectness of the Tax Court's analysis. The subsection is not found in IRC § 41(b), which defines QREs, but in IRC § 41(d), which defines "qualified research." The subsection says nothing about QREs, and the Tax Court's use of the subsection for the purpose of denying QRE treatment to a substantial category of supplies used for qualified research is inconsistent with both the express language and structure of IRC § 41.

The legislative history also demonstrates that subsection (d)(2)(C) was not meant to limit QREs for supplies used to conduct process research. The subsection was adopted by Congress to address a specific situation where taxpayers were treating non-experimental process activities as qualified research because those activities were being used to produce experimental products. In enacting the subsection, Congress was only addressing that specific issue, and there is no suggestion in the legislative history that the provision was meant to deny

QRE treatment to the supplies used to conduct experimental process activities.

The distinction the Tax Court drew in this case between product research and process research, and the very different treatment accorded the cost of the supplies used to conduct such research, is illogical and undermines the purpose of IRC § 41. Under the Tax Court's analysis, if a manufacturer uses supplies to conduct qualified process research, the manufacturer cannot claim the cost of those supplies as QREs. But, if the same manufacturer uses the same supplies and the same manufacturing process to conduct product research, the cost of the supplies can be treated as QREs.

The Tax Court's analysis skews IRC § 41 heavily in favor of product research as distinct from process research. There is no indication, however, that Congress ever intended such a distortion of the incentives IRC § 41 was designed to create. Moreover, the Tax Court's analysis places inordinate importance on the label that a manufacturer gives its plant-based research. As the experiments tried in this case and the academic literature show, many types of plant-based research involve both product and process research. Indeed, product and process research are typically closely intertwined, and the distinction between these two types of commercial research is often ambiguous.

Moreover, there is no policy justification for skewing IRC § 41 toward product research and away from process research. Highly beneficial and desirable research - such as research to reduce the environmental impact of manufacturing, or to reduce the amount of energy or natural resources used in manufacturing, or to reduce the risks of industrial accidents - is inherently process research. There is no conceivable benefit to eliminating, as the Tax Court has done here, significant incentives within the Tax Code that will likely result in manufacturers conducting less process research.

The Tax Court is also incorrect in suggesting that the supplies claimed by UCC are "indirect research expenditures," a statement the Tax Court does not explain. To the contrary, the supplies claimed by UCC were the type of necessary research costs that Congress has indicated are direct and creditable.

Finally, with regard to the claimed supply costs, contrary to the Tax Court's views, there was nothing inappropriate in UCC seeking a research credit for such costs through a refund claim even though it had not taken that position on its original returns. UCC's decision to seek such a refund was based on its analysis of 1994 Treasury Regulations that expanded the definition of research and experimentation expenditures, and UCC was entirely within its rights to seek a credit for such expenses in accordance with that expanded definition.

The second issue raised in this appeal is whether the Tax Court erred in interpreting the phrase "elements of a process of experimentation" in IRC § 41(d)(1)(C) to require UCC to engage in additional analyses after it had successfully completed the planned experiment and eliminated the identified uncertainty. The Tax Court's holding that the sodium borohydride project did not constitute qualified research was based on an interpretation of the "process of experimentation" requirement that goes well beyond what IRC § 41(d) and the applicable regulation (Treas. Reg. § 1.41-4(a)(5)) require. There is no question in this regard that: (1) UCC, through a research scientist working in its Hydrocarbons R&D Group, planned a plant experiment to determine whether the use of sodium borohydride would reduce the presence of a contaminant (acetaldehyde) to customer specification levels; (2) UCC was uncertain regarding the outcome of the experiment; (3) the experiment was carried out and the results carefully monitored; (4) the experiment was successful and eliminated the uncertainty which had been identified; and, (5) UCC consequently changed its production process to include the use of sodium borohydride to remove acetaldehyde.

Nonetheless, the Tax Court found that the sodium borohydride project was not qualified research on the ground that, under the "process of experimentation" requirement, UCC

should have conducted additional analyses to obtain even more information regarding the optimal use of sodium borohydride. But there is nothing in IRC § 41 that supports an artificial requirement to undertake additional analyses once the uncertainty at issue has been eliminated. The manufacturer conducting the experiment must determine whether the experiment has eliminated the uncertainty that motivated the experiment in the first place. A court simply is not qualified to make the decision that the manufacturer should engage in additional analyses to address additional questions which the manufacturer did not believe required investigation. The sodium borohydride project met the requirements of qualified research, and the Tax Court erred in interpreting the "process of experimentation" test in such a way as to reach a contrary conclusion.

STANDARD OF REVIEW

The decision of the Tax Court with respect to whether supplies used to conduct process research at a manufacturing facility constitute QREs under IRC § 41(d) rests upon an erroneous and unprecedented construction of IRC § 41, and, in particular, IRC § 41(d)(2)(C). The Tax Court's interpretation of a Federal statute is reviewed de novo. See, e.g., Maier v. Commissioner, 360 F.3d 361, 363 (2d Cir. 2004); Nat'l Life Ins. Co. v. Commissioner, 103 F.3d 5, 7 (2d Cir. 1996). This Court "owe[s] no deference to the Tax Court's statutory interpretations, its relationship to us being that of a district court to a court of appeals, not that of an administrative agency to a court of appeals." Callaway v. Commissioner, 231 F.3d 106, 115 (2d Cir. 2000) (citations omitted).

The Tax Court's erroneous interpretation of the "process of experimentation" test set forth at IRC § 41(d)(1)(C) with respect to the sodium borohydride project is also subject to de novo review. However, to the extent that issue is viewed as a mixed question of law and fact, appellate review is also de novo. See Robinson Knife Mnf'g Co., Inc. v. Commissioner, 600 F.3d 121, 124 (2d Cir. 2010) (26 U.S.C. § 7482(a)(1) "commands us to review Tax Court decisions 'in the same manner and to the same extent as decisions of the district courts in civil actions tried without a jury'"; this Court's previous "application of

clear error review to mixed questions" is "in tension with the statute's text").

ARGUMENT

A. The Tax Court Erred In Concluding That UCC's Claimed Supply Costs For The Amoco Anticoking And UCAT-J Qualified Research Activities Are Not QREs.

1. **The claimed supplies which were necessary to conduct the Amoco anticoking and UCAT-J projects were "used in the conduct of" those experiments within the meaning of IRC § 41.**

As part of the research credit claim at issue here, UCC determined that the Amoco anticoking and UCAT-J projects constituted qualified research under IRC § 41(d). That determination was upheld by the Tax Court, and the Government has not appealed that ruling. With respect to the QREs incurred by UCC in conducting that qualified research, UCC treated - as it was entitled to - all the materials (other than land, improvements to land and depreciable property) used to conduct that research as "supplies" within the meaning of IRC § 41(b).

As noted above, IRC § 41(b)(2)(A)(ii) provides that "in-house research expenses" include, among other things, "any amount paid or incurred for supplies used in the conduct of qualified research." "Supplies" include "any tangible property" other than land, improvements to land and depreciable property. IRC § 41(b)(2)(C). There was no dispute in the underlying proceeding that the qualified research activities at issue could not have been conducted without the claimed supplies. Indeed, the IRS's own expert witness, Roy Halle, testified that the

claimed supplies were "used" in conducting UCC's plant tests. See footnote 2, supra. The Tax Court readily acknowledged that both the Amoco anticoking and UCAT-J projects could not have been conducted without the claimed supplies. Op. at 1273.

Consistent with IRC § 41(b)(2)(A)(ii), such supplies are QREs because they were "used in the conduct of qualified research;" namely, they were used to conduct the Amoco anticoking and UCAT-J projects. In this regard, the phrase "used in the conduct of" should be given its plain and ordinary meaning. See, e.g., Hanover Bank v. Commissioner, 369 U.S. 672, 687 (1962) ("[T]he words of statutes—including revenue acts—should be interpreted where possible in their ordinary, everyday senses.") (citations and internal quotations omitted); United States v. Mem'l Sloan-Kettering Cancer Ctr., 563 F.3d 19, 25-29 (2d Cir. 2009) (plain meaning of statute governs where statute consists of basic, easily understood words and is unambiguous); Lee v. Bankers Trust Co., 166 F.3d 540, 544 (2d Cir. 1999) ("It is axiomatic that the plain meaning of a statute controls its interpretation and that judicial review must end at the statute's unambiguous terms.") (citations omitted). Similarly, the plain and ordinary meaning of the term "use" is to "put into action or service," "employ," "carry out a purpose or action by means of," "make instrumental to an end or process," "utilize," "expend or consume by putting to use," "apply," and "any putting

to service of a thing." Webster's Third New Int'l Dictionary 2523-24 (2002). Under these definitions - which are no more than the plain and ordinary meaning of these common terms - the supplies claimed by UCC that were essential to the experiments were "used in the conduct of" the Amoco anticoking and UCAT-J qualified research projects.

In sum, applying the plain and ordinary meaning of the language found in IRC § 41, the costs of the claimed supplies at issue here that were necessary to conduct these two plant-based experiments were QREs because they were supplies used in the conduct of qualified research. The Tax Court's decision to deny those supplies that status, based on its unprecedented reading of a subsection in IRC § 41 meant to address an entirely different issue, contradicted the very language of IRC § 41, and, as such, should be reversed.

2. **The Tax Court erred in creating two new rules of law in IRC § 41 that effectively preclude any manufacturer from including as QREs the costs of supplies used to conduct manufacturing process research resulting in the production of product.**

Based on its unprecedented reading of IRC § 41(d)(2)(C), the Tax Court rejected the above described plain meaning of the statute, and created an entirely new standard under which the costs of supplies used in the conduct of process research can only be claimed if they were used "primarily" for the process research. The Court then held, without explanation, that, under

IRC § 41(d)(2)(C), supplies used for plant-based research primarily go the manufactured product (the product business component) rather than the manufacturing process (the process business component), and thus necessarily are not "used" to conduct manufacturing process research notwithstanding that the process research could not have been performed without those supplies.

The Tax Court thus created two new rules of law that no other court had previously (or since) recognized and that the IRS had not urged or adopted either in litigation or in its regulations. First, the Tax Court added the word "primarily" to modify the word "used" in IRC § 41, even though Congress never included such modifying language. And, second, by judicial fiat, the Tax Court, without citing any supporting authority, declared that supplies also used in manufacturing are assigned to the product business component and not the process business component. These two new rules, applied together, had the result of denying UCC all of the costs of the claimed supplies used to conduct the Amoco anticoking and UCAT-J projects since both experiments had been claimed as manufacturing process research projects.

Congress did not, however, include a "primarily" standard in IRC § 41. Section 41(b)(2)(A)(ii) simply states that a supply cost is a QRE if the supply is "used in the conduct of

qualified research." The subsection does not provide, as it easily could have had Congress intended to limit the definition in such a manner, that a supply cost is a QRE only if it is "used primarily in the conduct of qualified research." The subsection also does not provide - again, as Congress easily could have done - that a supply cost is not a QRE to the extent the supply ultimately becomes part of a finished product.

By inserting these two new rules into IRC § 41, the Tax Court significantly altered the meaning of IRC § 41(b)(2)(A)(ii). But such alteration is contrary to the teaching of the Supreme Court, which has cautioned that "courts must presume that a legislature says in a statute what it means and means in a statute what it says there." Connecticut Nat'l Bank v. Germain, 503 U.S. 249, 253-54 (1992). As this Court has stated, "If Congress had intended to modify those words with the addition of the words 'only,' 'solely,' or even 'primarily,' it would have done so. For the court to add such modifiers would work a significant and unwarranted change in the meaning and consequence of the statute." In re Coltex Loop Cent. Three Partners, L.P., 138 F.3d at 43 (emphasis added); see also Botswain v. Gonzales, 414 F.3d 413, 418 (2d Cir. 2005) (refusing to read limitation into statute where "such a limitation, had it been intended, would surely have warranted express pronouncement and could have been easily included").

Nor is there any support in the legislative history for the Tax Court's insertion of these two new restrictive rules into the statute. To the contrary, when Congress created the research credit in 1981, it defined "in-house research expenses" expansively to include "any amount paid or incurred for supplies used in the conduct of qualified research." Economic Recovery Act of 1981, Pub. L. No. 97-34 § 221, 95 Stat. 172, 241-47. The statute broadly defined "supplies" to mean "any tangible property other than (i) land or improvements to land, or (ii) property of a character subject to the allowance for depreciation." Id. Similarly, when Congress extended the research credit in 1986, it stated that in-house research expenditures included "supplies used in research" without any limitation. H.R. Rep. No. 99-426, at 177 (1985), reprinted in 1986-3 (v.2) C.B. 1, 177; S. Rep. No. 99-313 (1986), at 694, reprinted in 1986-3 (v.3) C.B. 1, 694. In sum, when it created and later extended the research credit, Congress defined eligible "supplies" in the most broad and inclusive of terms. Accordingly, the Tax Court's decision to add two new restrictions to the statute to limit its applicability is not only contrary to the language of the statute, but also to Congress's expressed intent.⁵

⁵ The Tax Court cited the "shrinking-back rule" of Treas. (continued...)

3. **The Tax Court's reading of IRC § 41(d)(2)(C) ignores the fact that manufacturers place their supplies at risk when they use those supplies in the conduct of plant experimentation.**

The Tax Court's conclusion appears driven in part by a belief that supplies purchased for production but used to conduct a plant experiment should not qualify for the research credit. Not only does this view lack any support in the language of the statute, but it also disregards the economic risks a manufacturer assumes when it decides to use supplies to conduct a plant experiment.

The Tax Court placed considerable weight on the fact that the claimed supplies were purchased by UCC for commercial production and thus would have been purchased even if UCC had not conducted the plant experiments in question. But plant-

(...continued)

Reg. § 1.41-4(b)(2) as an "expression" of "congressional intent" consistent with its ruling. Op. at 1273. But the shrinking-back rule is not designed to disqualify categories of costs incurred in qualified manufacturing process research. Indeed, the regulation is not directed at costs at all. Rather, the regulation addresses which activities satisfy the § 41(d)(1) qualified research tests by allowing taxpayers to continuously "shrink back" the product, process, or other business component addressed by the taxpayer's research until the qualified research tests are satisfied. Through such systematic narrowing of the qualified research analysis, the shrinking-back rule is intended to ensure that all of a taxpayer's qualified research activities are captured and included in its research credit computation. Accordingly, the Tax Court's reliance upon the shrinking-back rule is not supported by the language or intent of the regulation and is a clear misapplication of the rule.

based manufacturing process research, by its very nature, will involve the use of supplies similar if not identical to those used for normal commercial operations. The purpose of such research is to resolve uncertainties regarding new or improved manufacturing processes in an operating plant environment. In order to have such an operating plant environment, the manufacturer must use essentially the same supplies (including the raw materials and feedstock) that would be consumed when the plant is operating under normal conditions. If those supplies were not already in inventory, they would have to be purchased to be able to conduct the experiment. The fact that those supplies were originally purchased for normal commercial production should be neither surprising nor disqualifying.

Whatever the original reason for purchasing the supplies, the fact remains that their use to conduct an experiment in an operating manufacturing plant poses risks - often very significant risks - not present in normal commercial production. The very purpose of manufacturing process research is to resolve uncertainties regarding a new or improved process. Many plant experiments (including the Amoco anticoking project and a number of the UCAT-J project runs) fail, causing unexpected and premature production downtime, production of excessive off-grade material, or damage to plant equipment that would not have occurred in ordinary production. The Amoco anticoking

experiment was a failure; rather than inhibiting coke, it resulted in excessive coke formation in the test furnace. Op. at 1217-18. Many of the UCAT-J project runs were failures or only partially successful, and were marked by reactor shutdowns, operational problems, and substantial off-grade production. Id. at 1228-34. Indeed, the UCAT-J experimental runs involved such unpredictable reactor operability and continuity issues that the UCC process R&D personnel had to remain on site for the duration of each run. Id. at 1227

Accordingly, whatever its original reason for purchasing the supplies, when a manufacturer decides to use those supplies to conduct plant-based research, it inherently places those supplies at risk. Treating the costs of supplies used in qualified research as creditable QREs effectuates congressional intent by providing a tax incentive for manufacturers to place those supplies at risk. And, it is precisely such risk-taking that IRC § 41 is meant to encourage.

Nor should the fact that plant-based research results in the production of output disqualify the costs of such research from QRE treatment under IRC § 41. Because such research must be conducted on an operating commercial plant, by necessity the research will result in the production of output. Some of that output may meet commercial standards and can be sold as finished products. But other output, particularly if the research fails

or is only partially successful, will be scrap.⁶ To disqualify the costs of conducting plant-based process research because the research results in the production of output, or because of the use of already purchased supplies, effectively denies manufacturers the § 41 research credit for plant-based process research.⁷

Moreover, other courts have not denied QRE treatment to the cost of supplies used to conduct research on the ground that the research resulted in the production of product. For example, in Trinity Indus., supra, the court allowed as QREs the costs incurred by a shipbuilding company to construct two prototype ships and a barge that were then sold to customers.

⁶ Almost 20% of the polyethylene resin produced during the 19 UCAT-J runs was off-grade and had to be sold as scrap. Op. at 1225, 1228-29 (chart).

⁷ The Tax Court stated that, to the extent UCC was performing product research, such research "would be excluded from the definition of qualified research under section 41(d)(4)(A) as research after commercial production because all of the products UCC produced during the claim projects satisfied UCC's functional and economic requirements." Op. at 1274. But this statement is wrong with respect to the experimental UCAT-J project runs, which, as the Tax Court found, generated millions of pounds of off-grade "scrap" polyethylene resin. Id. at 1225, 1228-29 (chart). Such scrap output can hardly be said to have "satisfied UCC's functional and economic requirements." Moreover, with respect to the Amoco anticoking and UCAT-J projects, the Tax Court specifically found that the research-after-commercial-production exclusion is inapplicable because the tested process technologies - the Amoco compound and the UCAT-J catalyst - did not satisfy UCC's functional and economic requirements. Id. at 1259-60, 1265.

The court concluded that the costs incurred by the shipbuilder in conducting the research "are properly considered research expenditures in that the business component—the ship—could not have been developed without them." 691 F. Supp. 2d at 697. See also Fudim, supra (allowing research credit for supplies used to develop a "rapid modeling process" even though the modeling process generated products (models) that were sold and created income to the taxpayer); Lockheed Martin, supra (indicating that component parts obtained by a prime contractor from its subcontractors can be "supplies" for research credit purposes if the prime contractor can establish that its activities are qualified research, even though the supplies become part of the finished product to be sold to the customer).

Particularly worth noting in this regard is the Tax Court's decision in TG Missouri, supra, which - although decided only eight months later - cannot be reconciled with the Opinion here. TG Missouri involved a manufacturer's claim that the costs of production molds it purchased from third-party toolmakers and ultimately sold to its customers were creditable supply QREs. In allowing the claim, the Tax Court did not analyze whether the business component was an experimental product or an experimental process - even though the decision here had already been issued. Rather, applying IRC § 41 "as written and according to its terms," 133 T.C. at 288, the Tax Court

concluded that the taxpayer "properly included the costs of the production molds it purchased from third-party toolmakers as the cost of supplies in calculating its section 41 research credit." Id. at 297. Nor did the Tax Court consider the fact that the molds were sold as disqualifying the costs from QRE treatment.

It is unclear from TG Missouri whether the research to develop these production molds would be considered product research or process research, or possibly a combination of both. But, if the law is that supplies used for process research are not QREs because of IRC § 41(d)(2)(C), the Tax Court should at least have addressed the question of whether it was dealing with product or process research. The fact that the question was not even asked, much less answered, suggests that even the Tax Court does not find the IRC § 41(d)(2)(C) analysis conducted here to be compelling.⁸

Unlike the above cited cases, the Tax Court relied heavily on a 1964 decision, Mayrath v. Commissioner, 41 T.C. 582 (1964), aff'd, 357 F.2d 209 (5th Cir. 1966), which it held "limits deductions under section 174 'to those expenditures of an investigative nature expended in developing the *concept* of a

⁸ As a Memorandum Opinion, the Opinion here is not treated as controlling precedent by the Tax Court. See Dunaway v. Commissioner, 124 T.C. 80, 87 (2005); Nico v. Commissioner, 67 T.C. 647, 654 (1977), rev'd on other grounds, 565 F.2d 1234 (2d Cir. 1977).

model or product.'" Op. at 1274. Section 174 is relevant in that one of the criteria for an activity to constitute qualified research under IRC § 41(d) is that related expenditures may be treated as R&D expenses under § 174.⁹ See IRC § 41(d)(1)(A). The Tax Court's reliance on Mayrath is mistaken for several reasons.

First, the facts and issues of Mayrath, which was issued fifteen years before the § 41 research credit was even enacted, bear no resemblance to the facts and issues presented here. In Mayrath, the taxpayers attempted to treat the construction costs of their personal residence (which they called an "experimental house") as § 174 R&D expenditures - a result the court stated would "plainly violate the spirit and intent of the statute and produce an absurd result." Id. at 589. Moreover, the primary and dispositive holding in Mayrath was that the construction costs were not connected to a trade or business, as required under IRC § 174; the "concept" language relied on by the Tax Court was dicta. Id. at 589-90.¹⁰

Second, the term "concept" does not appear in § 174 or the pertinent 1957 Treasury Regulations, but was simply added by the

⁹ IRC § 174 sets forth the circumstances under which a taxpayer may deduct R&D expenses.

¹⁰ In affirming Mayrath, the Fifth Circuit declined to address the "research and experimental" issue. 357 F.2d at 212 n.3.

court in Mayrath without any explanation of the source or meaning of that term. Significantly, the regulatory definition of § 174 "research and experimental expenditures" did not include the term "concept." See T.D. 6255, 1957-2 C.B. 180, Treas. Reg. § 1.174-2(a)(1) (SPA127-37) (defining "research or experimental expenditures" to include all research and development costs "incident to the development of an experimental or pilot model, a plant process, a product, a formula, an invention, or similar property"). The regulation does not state that only expenditures incurred "developing the concept of a model or product" constitute § 174 R&D expenditures.

Third, the Tax Court's statements that Mayrath should be read to limit all IRC § 41 QREs to the costs of developing a concept - as distinct from the costs of conducting an experiment to determine whether the concept works - simply cannot be correct in the context of the § 41 research credit. Such a reading of Mayrath is inconsistent with the interpretation and application of IRC § 41 in the decades since Mayrath was decided. For example, none of the four IRC § 41 cases cited above - Trinity Indus., TG Missouri, Fudim and Lockheed Martin - is correctly decided if a manufacturer can only obtain the costs of developing a concept since in each case the court recognized that the costs of supplies used to conduct an experiment could

be treated as QREs (Trinity Indus. - the costs of constructing prototype vessels; TG Missouri - the costs of production molds; Fudim - the costs of supplies used to manufacture models; and Lockheed Martin - the costs of component parts integrated into the final product).

Finally, the Tax Court's reading of Mayrath is inconsistent with the IRS's subsequent 1994 regulations regarding § 174. In those 1994 regulations (T.D. 8562, 1994-2 C.B. 30 (SPA124-26), the IRS amended its § 174 regulations to clarify that testing to determine whether the design of a product (or process) is appropriate (i.e., "validation testing") can constitute R&D under IRC § 174.¹¹ Many manufacturing process experiments constitute validation testing. Such validation testing by its nature occurs after the concept has been developed, in that the concept has been previously developed (often in a laboratory or pilot plant), and the plant experiment is designed to validate that the process will actually work in a plant setting. If the Mayrath "concept" language means what the Tax Court here

¹¹ See 1994-2 C.B. at 31 ("Several commentators on the proposed amendments asked for clarification that research includes validation testing to ensure that a product design meets its intended objectives. In response to these comments, the final amendments clarify that the existing exclusion for quality control testing does not apply to testing to determine if the design of a product is appropriate."). See also Treas. Reg. § 1.174-2(a)(2) (the term product includes any process).

suggests it means, such validation testing could not constitute qualified research - a result clearly inconsistent with IRC § 41 and the case law applying that provision, as well as with the § 174 regulations.

4. The Tax Court's interpretation and application of IRC § 41(d)(2)(C) is inconsistent with Congress's intent and has never been urged or adopted by the IRS.

The Tax Court's use of IRC § 41(d)(2)(C) to disallow QREs is a misapplication of the section. No other court has ever interpreted § 41(d)(2)(C) to exclude certain costs of supplies used in process-related qualified research. Significantly, the IRS did not advance this interpretation of the subsection during the underlying proceedings.¹² In fact, the subsection does not address QREs at all. Rather, it simply provides that, for purposes of determining what activities constitute qualified research, a production process must be evaluated independently of a product business component. Thus, where a manufacturer engages in qualified research to develop an experimental product, IRC § 41(d)(2)(C) clarifies that the process for manufacturing the product will not automatically constitute qualified research. Process research is qualified research only if such process-related activities independently satisfy IRC §

¹² Nor is UCC aware of any subsequent IRS statement adopting the Tax Court's interpretation of IRC § 41(d)(2)(C).

41(d)(1)'s definition of qualified research. Indeed, this is precisely what the pertinent regulation provides:

In cases involving development of both a product and a manufacturing or other commercial production process for the product, research activities relating to development of the process are not qualified research unless the requirements of section 41(d) and this section are met for the research activities relating to the process without taking into account the research activities relating to development of the product.

Treas. Reg. § 1.41-4(b)(1) (emphasis added).

It also is readily evident from the provision's placement within IRC § 41 that subsection 41(d)(2)(C) is meant to address what activities qualify for the research credit rather than to define what expenses qualify as QREs.¹³ See FDA v. Brown & Williamson Tobacco Corp., 529 U.S. 120, 133 (2000) ("It is a fundamental canon of statutory construction that the words of a statute must be read in their context and with a view to their place in the overall statutory scheme.") (quotation marks and citations omitted). IRC § 41(d)(2)(C) is part of IRC § 41(d), which addresses what activities qualify as creditable research. The provision is not part of IRC § 41(b), which addresses and defines eligible costs. Under the statutory framework adopted by Congress, the determination of whether a cost is a QRE is governed by IRC § 41(b) and Treas. Reg. § 1.41-2 (defining

¹³ IRC § 41(d)(2) explicitly sets forth the tests to be applied "[f]or purposes of this subsection."

QREs), not IRC § 41(d) and Treas. Reg. § 1.41-4 (defining qualified research). IRC § 41(d)(2)(C)'s placement within subsection 41(d) indicates that it was a special rule to be applied in determining whether an activity meets the definition of qualified research, not whether a specific cost meets the definition of a QRE.

Nor does the legislative history support the Tax Court's interpretation of the subsection to disqualify broad categories of costs incurred in connection with manufacturing process research. Rather, the history of the provision shows that the sole purpose of IRC § 41(d)(2)(C) is to require that a manufacturer's process-related activities be evaluated separately from its product-related activities in determining whether the process-related activities satisfy the definition of qualified research in IRC § 41(d)(1).

Specifically, soon after enacting the research credit, Congress became concerned that taxpayers were improperly treating non-experimental planning for commercial production of a newly developed experimental product as qualified research. In order to address that concern, in 1983 Congress began including provisions in research credit extender bills to clarify that a taxpayer's process-related activities qualify for the credit only if they satisfy the definition of qualified research independently of the taxpayer's product-related

research. See, e.g., S. 2165, 98th Cong. § 102 (1983) (excluding from the definition of qualified research "any development of plant processes, machinery, or techniques for commercial production of a new or significantly improved business item, except where such process, machinery, or technique itself constitutes a new or significantly improved business item"); S. 58, 99th Cong. § 102 (1985); H.R. 1188, 99th Cong. § 102 (1985).

With respect to the Tax Reform Act of 1985, H.R. 3838, 99th Cong. § 231, 100 Stat. 2085, 2173-74 (1986), the House explained its concern as follows: "The costs of any development of plant processes, machinery, or techniques for commercial production of a business item do not constitute qualified research. However, qualified research to develop a technologically new or improved manufacturing process, etc., may qualify for the credit." H.R. Rep. No. 99-426, at 179, reprinted in 1986-3 (v.2) C.B. at 179.

Ultimately, Congress enacted IRC § 41(d)(2)(C) in the Tax Reform Act of 1986, Pub. L. No. 99-514, § 231(b), 100 Stat. 2085, 2174 (1986), to clarify that process-related activities are not qualified research unless they independently satisfy IRC § 41(d)(1)'s definitional requirements. The Conference Report explained the purpose behind IRC § 41(d)(2)(C) as follows: "[R]esearch relating to the development of a new or improved production process is not eligible for the credit unless the

definition of qualified research is met separately with respect to such production process research." H.R. Rep. No. 99-841, at II-73 (1986) (Conf. Rep.), reprinted in 1986 U.S.C.C.A.N. 4075, 4161.

The Tax Court did not in its Opinion reference or even acknowledge the legislative history leading to IRC § 41(d)(2)(C), which shows that the purpose of the provision was to preclude taxpayers from treating non-experimental activities to produce a newly developed experimental product as qualified research, and not to disqualify categories of costs incurred in conducting process-related qualified research such as the Amoco anticoking and UCAT-J experiments.

5. The Tax Court's inconsistent treatment of the costs incurred in conducting product research versus process research is fundamentally illogical and undermines the purpose of IRC § 41.

- a. There is no justification for the disparate treatment the Tax Court has created under IRC § 41 between supplies used for product research versus supplies used for process research.**

Under the Tax Court's analysis, to the extent a manufacturer conducts qualified plant-based research to improve its manufacturing process, the cost of supplies necessary to conduct that research cannot be claimed as QREs. However, if the same manufacturer conducts qualified plant-based research to improve a manufactured product, the cost of the supplies

necessary to conduct that research can be claimed as QREs. That is, the same manufacturing process can be involved and the same supplies can be used, but the economic consequences for the manufacturer will be completely different if the qualified research is conducted to improve the product rather than to improve the manufacturing process used to make that product. There is no justification for such fundamentally inconsistent treatment among different types of manufacturing research under IRC § 41.

The Tax Court's process/product distinction, and the enormous economic consequences that then flow from that distinction, is artificial and unworkable. Indeed, it is often ambiguous whether a commercial research project is intended to improve a process, a product, or both. The Tax Court's process/product distinction places inordinate weight on the label a manufacturer attaches to its research. The UCAT-J project and many of UCC's other plant-based research activities involve changes to both a production process and a product. It is simply illogical for the "label" the manufacturer places on its qualified research activities to have such enormous consequences on how the costs of such research are treated under the Tax Code.

The UCAT-J project illustrates this point. The project involved a major change to the UNIPOL™ process (i.e., the

introduction of a developmental catalyst system), but it also resulted in new polyethylene resins that UCC had never made before and considered experimental. Op. at 1226-28; A1531-33, Tr. 1365-71. While UCC characterized the UCAT-J project as process-related, it could just as easily have characterized the project as relating to the development of new products. The label placed on the project was not of any importance until the Tax Court created a test which favored product research over process research.

In this regard, it should be noted that various studies of industrial R&D indicate that research on process and products is often very closely intertwined. Experts have pointed out that process innovations are "systematic in their impact," such that "their adoption is often" quite "disruptive," and "comple[x]," implicating many aspects of a business.¹⁴ When "processes" operate on "products" – as in this case – the line between research on one or the other can be very murky. "There is much subjectivity and variation in the opinion of firm personnel and experts as to whether an innovation" is "a process or a

¹⁴ See Fariborz Damanpour & Shanthi Gopalakrishnan, "The Dynamics of the Adoption of Product and Process Innovations in Organizations," 38 J. Mgmt. Stud. 45, 49 (Jan. 2001) (Addendum 1-21).

product."¹⁵ In fact, in a sample of 620 innovations, "96.9% of them could be classified as either product or process."¹⁶ The two "are hard to separate."¹⁷ Other studies document this "complementarity" as well.¹⁸

The Tax Court's "primarily" test thus is artificial and unworkable. Only by judicial fiat can a court determine whether the supplies used to conduct an experiment relate "primarily" to process research or to manufacturing a product when the supplies are essential to both. The Tax Court did not explain the basis for its conclusion that manufacturing supplies relate primarily

¹⁵ See Souresh Saha, "Consumer Preferences and Product and Process R&D," 38 Rand J. of Econ. 250, 264 (Spring 2007) (Addendum 22-40).

¹⁶ See id.

¹⁷ See John Ettlíe & Ernesto Reza, "Organizational Integration and Process Innovation," 35 Acad. Mgmt. J. 795, 795-96 (Oct. 1992) (Addendum 41-74).

¹⁸ See Toke Reichstein & Ammon Salter, "Investigating the Sources of Process Innovation among UK Manufacturing Firms," 15 Indus. & Corp. Change 653, 658 (Jul. 2006) (Addendum 75-102); see also Michael Fritsch & Monika Meschede, "Product Innovation, Process Innovation, and Size," 19 Rev. Indus. Org. 335, 345 (2001) (Addendum 103-118) ("[B]oth types of R&D" are "interrelated," such that "process innovation may enable a firm to considerably improve the quality of its products."); Peter Milling & Joachim Stumpfe, "Product and Process Innovation: A System Dynamics-Based Analysis of the Interdependencies," at 3, 9 (18th Int'l Conf. of Systems Dynamic Conference, Aug. 2000) (working paper) (Addendum 119-129) (in the chemical industry, there is "an extraordinary close relationship between products and production processes"; "[e]mpirical results indicate that integrated strategies" are "more successful").

to product and not to process research. There is no logical basis for concluding that such must always be the case.

While UCC took the position that both the Amoco anticoking and UCAT-J research activities related to the process business component, plant-based research activities often relate to more than one business component, and a manufacturer is not required to choose one and place all its research activities under that one component. The relevant business component (that is, process versus product) was not a significant issue at the trial of UCC's sample projects, and only became a significant issue because of the Tax Court's unprecedented reading of IRC § 41(d)(2)(C) to justify very different economic consequences based on which business component was identified by the manufacturer.

b. The Tax Court's analysis creates an economically unjustifiable distinction between product-related and process-related qualified research.

Despite the fact that there is no indication that Congress intended to favor product- over process-related research, the Tax Court's opinion discriminates against process-related research and undermines Congress's intent to incentivize manufacturers to undertake R&D activities. There is no economic or policy justification for creating such an unbalanced incentive structure favoring one type of qualified research over

another. Such inconsistent treatment simply creates economically unjustifiable and counterproductive incentives that promote one type of plant-based research over another. In fact, the Tax Court's analysis will likely have many unintended and untoward consequences that the Tax Court did not even consider.

Under the Tax Court's analysis, manufacturing product research will be subsidized by the Government to a far greater extent than manufacturing process research. But many types of highly desirable manufacturing research are inherently process-based research. For example, manufacturing research to reduce the plant's environmental impact (including air and water pollution) is inherently process research. Similarly, manufacturing research to reduce the consumption of energy or natural resources is inherently process-based research. Or, to give another example, manufacturing research to reduce the risk of industrial accidents is inherently process-based research. There is no conceivable policy justification for reading IRC § 41 in such a way to reduce the incentive for manufacturers to undertake such beneficial research.

The Tax Court did not consider these consequences of its analysis, which will manifest themselves over time as the unbalanced economic incentives the Tax Court has created ripple

through the U.S. economy.¹⁹ But these consequences flow from an unjustified distinction between two types of manufacturing research, one of which the Tax Court now encourages at the potential expense of the other.

c. The Tax Court's analysis will have the inevitable effect of decreasing manufacturing process research.

Finally, it bears emphasis that, by depriving manufacturers of the opportunity to obtain the research credit for the cost of supplies used to conduct process research, the U.S. economy will have less of such research. Congress enacted the research credit to "encourage business firms to perform the research necessary to increase the innovative qualities and efficiency of the U.S. economy." S. Rep. No. 99-313, at 694 (1986), reprinted in 1986-3 C.B. (v.3) 1, 694; H. Rep. 99-426, at 177 (1985), reprinted in 1986-3 C.B. (v.2), 1, 177. Nothing in the legislative history suggests that Congress intended for U.S. companies to achieve such innovation and efficiency only through

¹⁹ While technological progress come from many sources, including "incremental development efforts" and "improvement of manufacturing processes," "American firms . . . have been criticized for not devoting a greater share of their R&D to the improvement of manufacturing processes." See Wesley Cohen & Steven Klepper, "Firm Size and the Nature of Innovation within Industries: The Case of Process and Product R&D," 78 Rev. Econ. & Stat. 232, 232 (May 1996) (Addendum 130-142). In more "mature" industries (such as the chemical industry), progress tends to come from "incremental and process innovation." Id. at 242.

product-related research and not through process-related research. Nor is there any indication in the legislative history that Congress sought to favor one type of research over the other. A statute should not be interpreted so as to defeat its legislative purpose. See, e.g., Merrill Lynch, Pierce, Fenner & Smith Inc. v. Dabit, 547 U.S. 71, 86 (2006) (upholding broad interpretation of law where narrow interpretation would run contrary to the law's stated purpose); Frank G. v. Board of Educ. of Hyde Park, 459 F.3d 356, 372 (2d Cir. 2006) (declining to interpret provision in a way that would defeat purposes of statute).

The entire point of the research credit is to create incentives for manufacturers to engage in more qualified research, and to take the sometimes substantial risks inherent in undertaking such research. Manufacturers necessarily assume risk to their production equipment, supplies and end products when they engage in research to improve their manufacturing processes. The research credit is designed to incentivize them to take that risk. By effectively eliminating the credit, the Tax Court has eliminated that incentive.

The Tax Court has no mandate to make such judgments regarding research or to promote one type of plant-based

research over another.²⁰ Its mandate is to apply the Tax Code as written by Congress. The Tax Court should not assume a policy role that rightfully belongs to Congress.

6. The costs of the research supplies claimed by UCC are not "indirect research expenses."

Near the end of the Opinion, and as an additional purported justification for its ruling, the Tax Court states that UCC's claimed costs "are, at best, indirect research expenses excluded from the definition of QREs" under Treas. Reg. § 1.41-2(b)(2). See Op. at 1273. This statement, however, is not supported by any analysis or explanation, and is inconsistent with the pertinent legislative history.

The legislative history shows that Congress intended for the IRS to differentiate between supplies actually used in

²⁰ Process R&D is particularly important to the chemical industry and its ability to compete in the international marketplace. See David Aboody & Baruch Lev, "R&D Productivity in the Chemical Industry," at 26 (March 2001) (unpublished manuscript) (Addendum 143-178) (analyzing role of R&D in chemical industry productivity, and noting "heavy emphasis of chemical companies on process R&D"). The "competitive strength" of an industrial company in the face of "increasing global competition" depends on its ability to develop "innovative products, processes and services." Milling & Stumpfe, supra, at 2-3. "For industrial companies innovations of the product system and particularly innovations of the related processes are essential." Id. "Historical studies of technical change indicate that process innovation is responsible for a considerable proportion of productivity improvement and industrial change." Reichstein & Salter, supra, at 677.

experimentation (treated as direct and creditable) and general and administrative or overhead costs such as payroll, financial, and accounting services that are purely incidental to the experimentation (treated as indirect and non-creditable). See H.R. Rep. No. 97-201, at 118 (1981), reprinted in 1981-2 C.B. 352, 361-62. For example, while supplies used by a machinist in building part of an experimental model are creditable, the supplies used by a payroll clerk in preparing salary checks for research personnel are not. Id. See also Treas. Reg. § 1.41-2(c)(3) ("Direct support of research activities does not include general administrative services, or other services only indirectly of benefit to research activities.").

The costs of the research supplies claimed by UCC are similar in nature to the examples of direct research costs identified in the above noted legislative history because they were instrumental, and not incidental, to the conduct of the Amoco anticoking and UCAT-J experiments. That is, they were directly connected to an identifiable research endeavor. The claimed supplies also allowed UCC to evaluate the technologies under consideration while the plant was in normal operation, thereby directly benefiting the research. In sum, the claimed supplies at issue here are not similar to the types of general and administrative or overhead expenses identified in the

legislative history, all of which are unconnected and incidental to any specific research undertaking.

7. UCC's original return treatment of the claimed supply costs is not "strong evidence" that the costs are not QREs.

The Tax Court wrongly believed that "the fact that petitioner first sought the research credit for the claimed costs in its petition is strong evidence that petitioner did not view these costs as research costs." Op. at 1274.

There was nothing inappropriate in UCC's decision to claim the research credit for its plant-based research projects after filing its original 1994 and 1995 returns. UCC's tax department concluded that such costs were creditable after analyzing the expanded definition of research and experimentation expenditures in the 1994 Treasury Regulations and submitted a valid refund claim within the statutory period. See A1161-64; A1167.

Indeed, it is not unusual among corporate taxpayers to claim the research credit in a refund claim. More generally, many refund cases arise because a taxpayer decides to take a different position than it originally took on its return. That, of itself, cannot be a reason for denying the refund, or few such refund claims could ever succeed. See Treas. Reg. § 1.451-1(a) (taxpayer that ascertains that an item was improperly included in gross income in prior year should file claim for credit or refund of the overpayment).

B. With Respect To The Sodium Borohydride Project, The Tax Court Erred In Interpreting The Phrase "Elements Of A Process Of Experimentation" In IRC § 41(d)(1)(C) To Require UCC To Do More Than To Plan And Carry Out A Carefully Controlled Plant Test, Evaluate The Results, And Conclude That A Tested Technology Is Effective.

As the Tax Court found, the sodium borohydride project was devised to eliminate uncertainties regarding the capability of using sodium borohydride to remove acetaldehyde from the crude butadiene product and the appropriate design of injecting sodium borohydride into the process. Op. at 1261-62. To eliminate these uncertainties, UCC prepared a detailed pre-test report, carefully planned a plant test, monitored the test results, and concluded, based on those results, that the test was a success. Id. at 1220-21. UCC then began using sodium borohydride in a manner consistent with the test. Id.

Nevertheless, the Tax Court held that the project did not involve "elements of a process of experimentation" because UCC did not conduct additional analysis, and presumably additional experimentation, to determine "the optimal dosage and injection rate" of the sodium borohydride solution as well as further analyses and experimentation so "that UCC could compare [the results of the sodium borohydride project] with the results of tests of other alternatives." Id. at 1262.

The Tax Court erred in interpreting the "process of experimentation" provision to require additional analysis and

experimentation even after the manufacturer has eliminated the uncertainties that motivated the research activities in the first place. There is no legal basis in IRC § 41 or the applicable Treasury Regulation for such a requirement. Specifically, Treas. Reg. § 1.41-4(a)(5)(i), which defines a process of experimentation, provides in pertinent part:

[A] process of experimentation is a process designed to evaluate one or more alternatives to achieve a result where the capability or the method of achieving that result, or the appropriate design of that result, is uncertain as of the beginning of the taxpayer's research activities. A process of experimentation must fundamentally rely on the principles of the physical or biological sciences, engineering, or computer science and involves the identification of uncertainty concerning the development or improvement of a business component, the identification of one or more alternatives intended to eliminate that uncertainty, and the identification and the conduct of a process of evaluating the alternatives (through, for example, modeling, simulation, or a systematic trial and error methodology). A process of experimentation must be an evaluative process and generally should be capable of evaluating more than one alternative.

The sodium borohydride project employed a process of experimentation as defined in Treas. Reg. §1.41-4(a)(5)(i). The test was capable of evaluating more than one additive to remove acetaldehyde (even though that proved unnecessary), provided for the collection of data sufficient to allow UCC to evaluate whether sodium borohydride was effective in reducing acetaldehyde contamination, relied on physical sciences and engineering, and identified one or more alternatives for the

elimination of (and, in fact, eliminated) the identified uncertainties. The project thus satisfied any reasonable interpretation of the "evaluation" requirement set forth in the regulation.

The Tax Court was mistaken in holding that, under the "process of experimentation" requirement, a manufacturer must engage in additional analysis and experimentation of alternatives after it has eliminated the uncertainty that motivated the experiment. All Treas. Reg. § 1.41-4(a)(5)(i) requires is that the process of experimentation be generally capable of evaluating more than one alternative, which the process here clearly was. Once UCC had determined that the sodium borohydride test was successful, it was not required to conduct the same test on an operating plant - presumably at significant cost - using other additives simply to show that sodium borohydride was better. While such additional tests may not be a major undertaking in a laboratory setting, it is an entirely different matter to require that such additional analysis and experimentation be conducted in an operating chemical plant.

Finally, the Tax Court's criticism that the sodium borohydride project simply "validated" the result hoped for by UCC is true of all successful experiments. That an experiment validates a hypothesis does not mean that there was not a

process of experimentation or that the experiment should not qualify under IRC § 41.²¹ Under the Tax Court's reasoning, the sodium borohydride project would qualify if it had been a failure and a report had been prepared noting the failure and suggesting continued testing.²² Such a distinction - which rewards failure but not success - cannot be justified under IRC § 41 or from a policy standpoint.

²¹ Moreover, as discussed at pages 46-7, supra, the IRS's explanation to its 1994 amendments to its § 174 regulations specifically noted that "validation testing" can constitute R&D. See T.D. 8562, 1994-2 C.B. 30, 31 (SPA124-27).

²² Particularly where a plant test was successful and the test results were incorporated into the manufacturing process, it was not unusual for UCC staff to forego preparing an after-the-fact project report summarizing those results. See A1508, Tr. at 1272; see also Op. at 1224.

CONCLUSION

For the reasons set forth above, UCC respectfully requests that this Court reverse the holdings of the Tax Court that: (1) the supplies UCC used to conduct the Amoco anticoking and UCAT-J projects were not "supplies used in the conduct of qualified research" within the meaning of IRC § 41(b)(2)(A)(ii); and (2) the sodium borohydride project did not constitute "qualified research" within the meaning of IRC § 41(d).

Respectfully submitted,

Dated: October 5, 2011

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UNITED STATES COURT OF APPEALS FOR THE SECOND CIRCUIT

Union Carbide Corporation v.

CERTIFICATE OF SERVICE

Docket Number: 11-2552

Commissioner of Internal Revenue

I, Harold J. Heltzer, hereby certify under penalty of perjury that on October 5, 2011, I served a copy of Brief for the Appellant by

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