No. 11-2552

UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT

UNION CARBIDE CORPORATION AND SUBSIDIARIES,

Petitioners-Appellants,

v.

COMMISSIONER OF INTERNAL REVENUE,

Respondent-Appellee.

On Appeal from the United States Tax Court
No. 11119-99
Hon. Joseph Robert Goeke, Presiding

BRIEF OF *AMICI CURIAE* NATIONAL ASSOCIATION OF MANUFACTURERS, AMERICAN CHEMISTRY COUNCIL, AND CHAMBER OF COMMERCE OF THE UNITED STATES OF AMERICA

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CORPORATE DISCLOSURE STATEMENT

Pursuant to Federal Rule of Appellate Procedure 26.1(a), *amicus curiae* National Association of Manufacturers states that it has no parent company and that no publicly held company owns ten percent or more of its stock.

Amicus curiae American Chemistry Council states that it is a not-for-profit trade association, that it has no outstanding shares or debt securities in the hands of the public and has no parent company, and that no publicly held company has ten percent or greater ownership interest in it.

Amicus curiae Chamber of Commerce of the United States of America states that it is not a publicly held corporation and that no corporation or other publicly held entity owns more than ten percent of its stock.

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INTEREST OF THE *AMICI CURIAE*[1]

The National Association of Manufacturers ("NAM") is the nation's largest industrial trade association, representing small and large manufacturers in every industrial sector and in all fifty states. The NAM's mission is to enhance the competitiveness of manufacturers by shaping a legislative and regulatory environment conducive to economic growth and to increase understanding among policymakers, the media, and the general public about the vital role of manufacturing in America's economic future and living standards. The NAM regularly supports its membership through *amicus curiae* briefing.

The American Chemistry Council ("ACC") is a not-for-profit trade organization representing the companies that make the products that make modern life possible, while working to protect the environment, public health, and security of our nation. ACC represents the leading companies engaged in the business of chemistry. The business of chemistry is a $720-billion-a-year enterprise and a key element of the nation's economy. It is the nation's top exporting sector, accounting for ten cents out of every dollar in U.S. exports. ACC members are committed to improved environmental, health, and safety performance through Responsible

[1] All parties have consented to the filing of this amicus brief under Fed R. App. P. 29(a). No party or party's counsel authored this brief in whole or in part. No party or party's counsel, and no person other than *amici curiae* or their counsel, contributed money that was intended to fund preparing or submitting the brief.

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The Chamber of Commerce of the United States of America (the "Chamber") is the world's largest business federation, representing 300,000 direct members and indirectly representing the interests of more than three million companies, trade associations, and professional organizations of every size, in every sector, and from every region of the country. An important function of the Chamber is to represent the interests of its members by filing *amicus curiae* briefs in cases, such as this one, involving issues of national concern to American business.

Amici curiae submit this brief because the tax credit for research activities under section 41 of the Internal Revenue Code (the "Code") has been a keystone of federal policy for incentivizing large and small businesses alike to conduct the technological research that fosters innovation and furthers the strength and competitiveness of the American economy. Critical to the research credit is the establishment of fair, productive rules that reflect the real-world nature of research into both product and process innovations. *Amici curiae* believe that, as petitioner Union Carbide Corporation has explained in its brief, the holdings of the United States Tax Court below as to whether certain supply costs necessary for process research constitute "qualified research expenses" under section 41 lack any basis in

law or precedent. *See* UCC Br. 32-61. *Amici curiae* support this legal analysis by explaining how the Tax Court's rulings also fail to acknowledge the nature and importance of research into process innovations that is conducted on the full scale of an operational production plant ("plant-scale research"), and create a dichotomy between product and process research that is unworkable and counterproductive in the very business environment in which the research credit is intended to operate.

ARGUMENT

I. The Tax Court created an unjustified dichotomy between product research and process research.

The Tax Court erred in establishing a dichotomy between research into new products and research into new processes for making products, and then mechanically directing certain costs of process research into the "product" category, thereby denying companies the ability to claim a tax credit for them under section 41 of the Internal Revenue Code, 26 U.S.C. § 41. As Union Carbide's brief explains, neither the Internal Revenue Code nor Treasury regulations recognize such a dichotomy with respect to supplies as "qualified research costs" ("QREs") under section 41(b)(2)(A)(ii) and (C), much less any hierarchy that apparently favors product research over process research. To the contrary, both product and process research may advance the congressional purpose behind section 41's research credit and should be treated with an even

hand; whether one has equal or greater value will depend largely on the industry sector, firm, or technology at issue.

The Tax Court held in relevant part that Union Carbide's costs of supplies used in its experimental production runs did not constitute QREs under section 41(b) to the extent the supplies were materials that could also be used in ordinary production: "Raw materials used to make finished goods that would have been purchased regardless of whether a taxpayer was engaged in qualified research are not 'used in the conduct of qualified research.'" T.C. Memo. 2005-50, 2009 WL 605161, at *113 (U.S. Tax Ct. Mar. 10, 2009) (quoting section 41(b)(2)(A)(ii)). The court so held even though the production runs in which those supplies were used—in the Amoco anti-coking project and UCAT-J experiments—were a key part of the course of "qualified research" as defined in section 41(d), and even though it conceded that the production-process research could not have been conducted without buying those supplies. *Id.* at *112.

Underlying this holding was the Tax Court's conclusion that process research and product research deal with different business components and should be evaluated separately. *Id.* at **83, 85, 93, 112. The Tax Court then applied this dubious principle in an unduly mechanical manner, concluding that supply costs attributable to experimental production runs in the course of qualified research into a new process do not qualify as QREs for purposes of claiming a research credit

for process-oriented research because such supplies must be attributed to the product business component rather than the process business component. *Id.* at **112-13 ("Production activities are associated with the separate, nonexperimental, product business components."). In other words, since those supplies could produce a salable product, in the Tax Court's view they were product-oriented costs, even though they were essential to the process research being conducted. Then, because no product research was being done and those supplies were erroneously labeled as product costs, they could not qualify for the credit.

The Tax Court seemed to apply a "primary relationship" or "primary goal" approach to determine whether costs of a production run would be QREs, holding that even if the costs are essential for process research, they can never be process-research expenditures if they are primarily incurred for production of products. *Id.* at **83, 85, 95, 96. Such a rule, if upheld, would replace the statute's clear objective test of whether supplies were "used in the conduct of qualified research," 26 U.S.C. § 41(b)(2)(A)(ii), with a much more difficult inquiry into the subjective purposes for each expenditure. Neither the Code nor the Regulations contain such a purpose test, and instead permit the credit for costs, such as these, necessary for process or product research.

As explained below, process research is no less valuable than product research. *See infra* pp. 7-10. Moreover, the literature discussed in this brief makes

clear that due to the inherent risks in "scaling up" chemical processes to the scale of commercial operations, full-plant production runs are integral to the experimentation process. *See infra* pp. 14-18. The threshold tax-law question that must be answered is whether testing a new process through such full-scale production runs is part of the "qualified research." There is a four-part test under section 41 for determining whether production runs constitute "qualified research." *See* 26 U.S.C. § 41(d)(1)(A)-(C); Treas. Reg. 1.41-4(a)(2). If the production runs meet this four-part test, they constitute qualified research. If the supplies are necessary to and used in the course of this qualified research, such that the research activity could not be conducted without using such supplies, then their costs should be considered QREs, even if the production runs yield salable products. That is the only legal rule that is consistent with the Code, the Regulations, and the realities of the business world in which Congress sought to encourage valuable research.

II. The Tax Court's decision will stifle critical plant-scale process research.

The Tax Court's approach undervalues process research as a whole, and full-plant process research in particular, by conclusively assuming that supply costs necessary to conduct process research in a plant-production setting must be "primarily" intended to produce salable products, thereby rendering such supply costs ineligible for the research credit. The Tax Court's reasoning fails to

appreciate the value of process research and plant-scale research, as well as the need to apply the credit to them on an even footing with product research.

A. Process research is critical to innovation and economic competitiveness.

The research credit under section 41 should be applied in an even-handed fashion to both process and product research. When the research credit was first enacted in 1981, Congress recognized broadly that "a substantial tax credit for incremental research and experimental expenditures [would] overcome the resistance of many businesses to bear the significant costs of staffing, supplies, and certain computer charges which must be incurred in initiating or expanding research programs." H.R. Rep. No. 97-201, pt. 1, at 106 (1981). Congress has extended the research credit fourteen times since then, concluding in connection with the 1996 extension that "[a] research tax credit can help promote investment in research, so that research activities undertaken approach the optimal level for the overall economy." Staff of J. Comm. on Taxation, 104th Cong., General Explanation of Tax Legislation Enacted in the 104th Congress 105 (Comm. Print 1996). An interpretation of section 41 that denies the credit for a significant portion of the necessary costs of process research is antithetical to that congressional purpose. Without the credit, American industry would run the risk of falling behind foreign competitors in identifying and pursuing the process innovations that lead to economic growth and development. Congress has not created distinctions between

product and process research for purposes of which costs constitute QREs, and the courts should not insert them.

Process research is every bit as critical to technological innovation from both economic and non-economic perspectives. As to economics, "[t]here seems to be little doubt now that the introduction of process innovation, especially in manufacturing, can have a substantial impact on productivity." John E. Ettlie & Ernesto M. Reza, *Organizational Integration and Process Innovation*, 35 Acad. Mgmt. J. 795, 796 (1992). "Historical studies of technical change indicate that process innovation is responsible for a considerable proportion of productivity improvement and industrial change." Toke Reichstein & Ammon Salter, *Investigating the Sources of Process Innovation Among UK Manufacturing Firms*, 15 Indus. & Corp. Change 653, 677 (2006). Because "process innovations are an important source of increased productivity," they are "an important element in government innovation policy." *Id.* at 654. Indeed, "[e]very year, billions of dollars are spent on process innovation in manufacturing." Ettlie & Reza, *supra*, 35 Acad. Mgmt. J. at 795 (citation omitted).

But the importance of process innovation cannot be measuredly solely by reductions in the short-term financial costs of production. At a time when "green" is more than just a popular color, research into improved production processes may yield benefits in reducing energy consumption in processing; reducing use of

hazardous and non-hazardous materials as inputs in production; ameliorating toxic or "greenhouse" environmental emissions affecting air or water; and enhancing the safety and health of both production workers and the general public. Process research is often critical—and at times even more important than product research—to allowing manufacturers to comply with environmental, safety, and other regulations.

There is no hierarchy of product and process innovation and research, either in science or in the tax law, because "a firm's competitiveness over time depends on its ability to adopt both types of innovation [product and process]." Fariborz Damanpour & Shanthi Gopalakrishnan, *The Dynamics of the Adoption of Product and Process Innovations in Organizations*, 38 J. Mgmt. Stud. 45, 45-46 (Jan. 2001). The relative importance of one type of research may depend, for example, on the maturity of the industry. *See* Wesley M. 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) ("Breakdowns of R&D indicate that the percentage of total R&D dedicated to different types of innovative activity differs greatly across industries."). In industries like the chemical industry, where the products may be well established, process research may take on heightened importance. Commentators suggest that "process innovation becomes the dominant type of innovation in the later stages of the industry life cycle when the market is

highly concentrated and/or the returns to process R & D outweigh the returns to product R & D." Reichstein & Salter, *supra*, 15 Indus. & Corp. Change at 660 (citations omitted). "For example, in petroleum refining, almost three-quarters of total R&D is dedicated to process innovation, whereas less than one-quarter of pharmaceutical R&D is dedicated to process innovation." Cohen & Klepper, *supra*, 78 Rev. Econ. & Stat. at 232. If no credit is available for one of the most important cost components of process research, logic dictates that less process research will occur.

B. There is no basis for the Tax Court's determination that the cost of the supplies used in plant-scale process experimentation must be allocated to a product business component.

The Tax Court's first fundamental error comes in determining that the cost of supplies that lead to the production of output must be attributable to a product business component rather than a process business component.[2] This conclusion drives the court's erroneous determination that the supply costs at issue may not be eligible for the credit because no new products were being developed. This determination is at best problematic in the real world of technological innovation. To begin, analysts of industrial research have struggled even to define and distinguish product and process research. It has been noted that "the concept itself

[2] The Tax Court indicated that expenses must be primarily used for process research in order to qualify for the credit, and then determined that supply costs were not so used. The word "primarily" is not found in the statute, which requires only that the supplies be "used" for process research.

[of process innovation] is extremely diffuse and elastic," Reichstein & Salter, *supra*, 15 Indus. & Corp. Change at 655, and "[t]he difference between product and process R&D is a subtle conceptual question that has not been answered satisfactorily to date," Souresh Saha, *Consumer Preferences and Product and Process R&D*, 38 RAND J. Econ. 250, 250 (Spring 2007) (citation omitted).

In rough terms, "[a] 'product' is a good or service offered to the customer or client and a 'process' is the mode of production and delivery of the good or service. Thus, *product innovation* is defined as new products or services introduced to meet an external user or market need, and *process innovation* is defined as new elements introduced into an organization's production or service operations (e.g., input materials, task specifications, work and information flow mechanisms, and equipment) to produce a product or render a service." Damanpour & Gopalakrishnan, *supra*, 38 J. Mgmt. Stud. at 47-48 (internal citations omitted) (studying innovations introduced by commercial banks). Alternatively, "[p]rocess innovation is defined generally as changes in throughput technology for an organization or operating unit, such as a plant, that are new to an industry." Ettlie & Reza, *supra*, 35 Acad. Mgmt. J. at 796 (citation omitted).

Changes to the process can intentionally or inadvertently affect the product for better or worse, further blurring the distinction. Thus, "[p]rocess innovation can be defined as new elements introduced into an organization's production or service

operations … with the aim of achieving lower costs *and/or higher product quality*." Reichstein & Salter, *supra*, 15 Indus. & Corp. Change at 653 (citations omitted) (emphasis added). "[A]n organization's interest in *quality control* and re-engineering may motivate the organization to improve efficiencies and therefore emphasize the adoption of process innovations over product innovations at that point of time." Damanpour & Gopalakrishnan, *supra*, 38 J. Mgmt. Stud. at 48 (emphasis added). "In some ways, new products and processes, especially radical departures from existing practices, are hard to separate." Ettlie & Reza, *supra*, 35 Acad. Mgmt. J. at 795-96 (internal citation omitted).

Even more broadly, because the product is the fruit of the process, the end product often cannot be separated from the process with respect to either the product's inherent characteristics or cost efficiency, because both may bear directly on the product's usefulness, competitiveness, and exogenous effects. Even if the goal of the process innovation is economic—greater efficiency of operation or lower production cost, without any change in the physical nature of the end product—the cost of a product to its customer or its environmental or safety characteristics and regulatory compliance may be as critical to industrial and national competitiveness as its physical characteristics, particularly in the face of effective competition from substitute goods. In other words, in many respects, the process *is* the product.

Because of the difficulty of separating the process from the product, commentators have noted that "[i]t has been difficult to measure the R&D expenditure of firms in general, and product and process R&D expenditures or the share of process R&D in total R&D expenditure in particular." Saha, *supra*, 38 RAND J. Econ. at 264. "Several approaches have been taken to measure … the share of process R&D in total R&D expenditure," and this characterization effort has been hindered by that fact that "[t]here is much subjectivity and variation in the opinion of firm personnel and experts as to whether an innovation or patent is a process or a product." *Id.* For example, "from a sample of 620 innovations introduced in the United Kingdom, … 96.9% of them could be classified as either product or process, depending on the method used." *Id.* (citation omitted).

It is thus incorrect to conclude that the costs of supplies are necessarily related to a product business component. Where, as here, the supplies are plainly being used to conduct plant-scale tests of a new process, they relate to the production-process business component. Further, the Tax Court's rule would unduly favor product research at the expense of process research. Supplies to conduct plant-scale tests are frequently the most significant cost in research. *See infra* pp. 19-20. Under the court's holding, the cost of such supplies would be creditable if it is a product being tested, but not if it is a process being tested. The law suggests no such favoritism, and provides no indication whatsoever that

Congress intended to incentivize companies to perform product research to a greater extent than to perform process research. As the discussion above shows, process research and innovation are crucial elements of keeping American industry strong, and a ruling which takes away the incentives for such research provided for in the Code should be reversed.

C. Supplies are a critical element of plant-scale process research because new processes require those supplies in order to test the processes for efficacy, efficiency, safety, and environmental compliance.

The Tax Court's exclusion of supply costs from QREs for process research if they are for materials ordinarily used in commercial production fails to acknowledge the critical importance to process research of full-scale experimentation using plant production equipment. Bulk materials used to test improved production processes are no different in kind from beakers or lab notebooks used in bench testing in laboratories. The Tax Court correctly acknowledged that qualified research may be undertaken in production plants and as part of the process of producing goods for sale to customers. 2009 WL 605161, at **82-83. The court then failed to carry those principles through to its holding on supply costs as QREs for process research.

The Tax Court's error lay in its failure to acknowledge the uncertainties and risks associated with "scale-up" in the chemical engineering in which Union Carbide engaged. "Scaleup is the process or group of activities by which one

moves from the calculations, studies, and demonstrations to a successful commercial operating facility." Attilio Bisio & Robert L. Kabel, *Scaleup of Chemical Processes: Conversion from Laboratory Scale Tests to Successful Commercial Size Design* ix (1985). "Scaleup … involves answering the technical question, 'How will this play on a larger scale?" *Id.* It is a crucial element of process research without which the benefits of scientific experimentation cannot be realized.

Scale-up can have a significant effect on research answers, because chemicals can react differently based on the size of the equipment being used. A classic work on the problem explains, "When a new chemical process or a change in some part of a process moves from the laboratory to a commercial manufacturing operation, unexpected problems are often encountered. The problems may be of a physical nature, a chemical nature, or involve some aspects of both." Bisio & Kabel, *supra*, at 1-2. This is a universally acknowledged concern: "A chemical engineer is generally concerned with the industrial implementation of processes in which the chemical or microbiological conversion of material takes place in conjunction with the transfer of mass, heat, and momentum. These processes are *scale-dependent*, i.e., they behave differently on a small scale (in laboratories or pilot plants) than they do on a large scale (in production)." Marko Zlokarnik, *Scale-up in Chemical Engineering* 1 (2d ed. 2006).

For example, problems of scale-up may include "the presence of impurities that were not considered or studied in the smaller scale laboratory or pilot plant studies," which "can completely change the character of a catalytic process by deactivating the catalyst or by increasing the quantity of the by-products that are formed." Bisio & Kabel, *supra*, at 2. Such by-products may pose problems for the quality of final goods produced, as well as environmental and safety-and-health consequences for workers and the public. "The real challenge today, in scaleup, is to minimize total pollutant volume…. The process of addressing the environmental challenges and regulations in the scaleup process is complex." *Id.* at 596.

"The scaling up of equipment needed for dealing with … physical systems often presents serious hurdles …." Zlokarnik, *supra*, at xiii. The uncertainty of scale-up may be driven by the molecular complexity of the materials used (as in chemical, pharmaceutical, and food industries); physical phenomena related to unique processing parameters or equipment; or varying environmental factors, which are particularly relevant to plant, animal, and construction-product industries. In many cases, researchers will not know what the results will be until they compare the actual outputs of plant production equipment used in operation on a typical production scale. Thus, research and development in many industries follows a trail from discovery and "test tube" laboratory research to pilot plants and ultimately full-scale production tests. Technical uncertainly often plagues all

steps along this research trail, creating risks of process improvement for the output as well as the efficiency of the process itself.

Experimentation using production runs in plant facilities may be the critical step in the scale-up process. *See* Bisio & Kabel, *supra*, at 14 ("Tests in operating plants … are all part of the input for the design and operation of a commercial plant."). "When appropriate material systems are not available for model experiments, accurate simulation of the working conditions of an industrial plant on a laboratory or bench-scale may not be possible," Zlokarnik, *supra*, at 42, and pilot plants may be inadequate, unavailable, or expensive, *see* Bisio & Kabel, *supra*, at 9. "Full-scale tests are often carried out in existing plants. The total costs involved in such programs are not insignificant." Bisio & Kabel, *supra*, at 14. For example, full-scale testing "occurs where the cost of developing data for scaleup is high compared with the cost of a full scale test and where basic scaleup technology is minimal," which "occurs often in solids handling." *Id.* at 658 (citation omitted).

Thus, process research may entail modifying existing facilities. "Occasionally, [chemical engineers] are faced with … an industrial facility [that] already exists but does not function properly, if at all, and suitable measurements have to be carried out in order to discover the cause of these difficulties as well as to provide a solution." Zlokarnik, *supra*, at 1. Even where production equipment is largely in place and the usual equipment is used in the experiment, there may be

great uncertainty and risk associated with critical issues of how the equipment runs or can be maintained if the new process is used. As a result, "[p]rocess innovations are often associated with … the existence of 'learning-by-doing' and 'learning-by-using' …." Reichstein & Salter, *supra*, 15 Indus. & Corp. Change at 654-55.[3]

Because of these uncertainties and risks, scale-up batches run through full-plant processes can be critical to effective experimentation. "Much of the uncertainty that surrounds a process system can be swept away only after the system [has been] built and operated." Bisio & Kabel, *supra*, at 30. In such a setting, the qualified research activities could not be conducted without the use or consumption of the raw materials required for commercial production. For this reason, scale-up activities are often the final step in the research process and frequently require large dollar amounts of supplies, including raw materials. The cost of those supplies is thus a crucial expense of the research process.

D. The Tax Court's holding eliminates from consideration a large cost component of plant-scale process research and thereby stifles innovation.

The Tax Court's treatment of supply costs for process research excludes from the research credit a significant component of the cost of such research, and

[3] In part because of these difficulties, "[p]rocess innovations … tend to be more systemic in their impact and their adoption is often more disruptive than product innovations because they usually involve larger aggregate of tools, machines, people, and social systems." Damanpour & Gopalakrishnan, *supra*, 38 J. Mgmt. Stud. at 49 (citation omitted).

thereby limits the effectiveness of the tax credit in promoting innovation by companies of all sizes. Numerous large and small businesses take advantage of the research credit. In 2008, the last year for which the U.S. Internal Revenue Service has published data, 12,736 companies claimed the credit, for a total of over $8.3 billion.[4] Small businesses are major players: Of those claimants, more than 86% had gross receipts of less than $250 million.[5] More than half of all claimants had gross receipts between $1 million and $50 million.[6] The leading industry sectors claiming the credit were manufacturing, information, and professional, scientific, and technical services.[7] Of the $8.3 billion in total credits taken, over $5.75 billion was for the manufacturing sector.[8]

The IRS data breaks down the research costs by category, including wages for qualified services, cost of supplies, rental or lease costs of computers, and contract research expense. While the relative size of the "cost of supplies"

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[4] SOI Tax Stats, Corporation Research Credit, Figure A: Corporations Claiming a Credit for Increasing Research Activities, Annual Percentage Change for Tax Years 2001-2008. All of the cited IRS data is available at http://www.irs.gov/taxstats/article/0,,id=164402,00.html (last visited Oct. 11, 2011).

[5] *Id.*, Figure B: Corporations Claiming a Credit for Increasing Research Activities, Number of Credit Claimants by Size of Business Receipts, Tax Years 2001-2008.

[6] *Id.*

[7] *Id.*, Table 1: Corporations Claiming a Credit for Increasing Research Activities on Form 6765, Selected Items, by Sectors, Tax Year 2008.

[8] *Id.*

component varies from sector to sector, it constituted 20% of the total qualified research expenses for the manufacturing sector in 2008.[9] The IRS data does not distinguish between product research and process research—a distinction that, as explained above, is murky in practice. *See infra* pp. 10-13. Indeed, "[c]onventional R & D statistics do not make this distinction [between product- and process-related R & D expenditures]." Reichstein & Salter, *supra*, 15 Indus. & Corp. Change at 660. For these purposes, supply expenses for product research and supply expenses for process research are treated identically, as key elements of the research process.

Despite this need for supplies to test innovative processes on a full-plant scale, the Tax Court's decision arbitrarily denies the research credit for these necessary costs if they produce, or perhaps if they have the potential to produce, salable products, as it would classify those costs as falling outside of the process business component being tested. That denial will necessarily reduce the willingness of companies to engage in process research, because a key cost of the process research—the cost of supplies with which to test the process—is non-creditable. That undermines the congressional purpose for the credit. Congress made clear it believed that the credit was necessary to assure the continued ascendancy of American manufacturing ingenuity, yet the Tax Court's decision denies that credit for the crucial final piece of the process-research puzzle.

[9] *Id.*

The Tax Court's requirement that supplies "primarily relate" to process experimentation in order to qualify for the research credit, and its determination that the primary use of supplies that are consumed in runs that produce salable product is not process research, ignore the contingent nature of plant-scale process experimentation. That the materials used in experimental runs may produce products that are merchantable and are ultimately sold to customers is in many cases a fortuity—a positive result that is by no means guaranteed in any context of process research. That fortuity does not change the fact that the run was part of the research necessary to determine whether the new process works. The applicability of the research credit should not be contingent on the success, or lack of success, of an experiment in producing salable product. That would create an unadministrable test, often making it impossible to determine whether the costs even of admittedly qualified research are QREs, particularly if the results of the experiment are mixed.[10]

As explained above, experimental processes may pose foreseeable or unforeseeable risks to the product's quality, not just the efficiency or cost of

[10] That rule would make it almost impossible for companies to engage in the crucial process of budgeting for research, because they would have no way to know when entering into a research project whether the supply costs would or would not be eligible for the credit. That uncertainty would necessarily chill the willingness of companies to incur research costs. There is nothing in the Code or Regulations that suggests that a company embarking on process-oriented research should have to wait until it sees the outcome of that research to know which costs are creditable, and no policy reason to embrace such a bizarre result.

production, and whether or not supply costs constitute QREs should not turn on the actual outcome. For example, the manufacturer may be willing to sell any useful product, but problems with the experimental process may have rendered the product wholly unsalable for any purpose. Or the process may have resulted in *some* of the product being unsalable. Or the process may have resulted in some or all of the product being of an imperfect or lower grade or quality, and salable only at a lower price—as was the case with the "off-grade" product produced by Union Carbide in the experimental UCAT-J runs. The Tax Court's holding makes no allowance in the scope of QREs for these variables. Nor does the Tax Court address the situation of the manufacturer which, as a result of the experimentation, has to purchase a higher total amount of its ordinary raw materials because the experimental process yields a higher level of scrap or waste. Thus, the Tax Court's test replaces the practical, objective test in the Code with an uncertain, subjective standard, leaving the taxpayer to wonder whether the fact that the experimental run ultimately produced no salable output, or less salable output, or lower-quality output, means that all or some of the supply costs are now eligible for the credit.

It is frequently the case that companies engaged in process research may undertake such risks with the knowledge or anticipation that they will sell any useful products, but may not be able to do so. Those risks will vary from experiment to experiment, and may be difficult to quantify in advance or after the

fact. A company undertaking production runs necessary for process experimentation may hope, by validating the experimental process on a plant scale, that the experimental run ultimately produces a salable product, but that does not make such run any less crucial to the research process and does not turn the experiment into production. A test that disallows research costs if they are for supplies that may or actually do also produce salable output not only is difficult to predict or apply, but also ignores the fact that plant-scale research is required to validate a new process and is a crucial element of the research process. It disqualifies for the credit expenses that the scientific literature agrees are an integral part of the research process. Such a rule is nowhere provided for in the law, and nothing in section 41 indicates that supplies crucial to the process of experimentation lose their characterization as such if the experiment can, or actually does, succeed.

Indeed, the Tax Court's approach seemingly encourages economic waste, which would militate against Congress's goal of improving efficiency, productivity, and competitiveness. To claim the credit, the manufacturer would be forced to choose between forswearing any possibility of selling useful products of experimental processes and claiming the credit, and marketing any merchantable output and forgoing the credit. Requiring manufacturers to discard the results of production-process tests—to make them unproductive—in order to claim a tax

credit based on necessary costs of the experiment makes no sense at all. In particular, smaller businesses may not be able to afford to discard the results of experimental runs instead of trying to sell them. There is no indication that Congress intended to impose such hard choices on the companies pursuing qualified research.[11]

In repeatedly extending the research credit, Congress recognized that the financial support it was supplying through tax policy would help fuel the engine of technological innovation that drives the American economy. The research credit must be assumed to have the incentivizing effect Congress intended, and the Tax Court's distortion of the credit's application can only distort the research that results. This Court should restore the even-handed approach to process and product research that Congress intended.

CONCLUSION

This Court should reverse the Tax Court's order as to the application of the tax credit to supply costs and remand for further proceedings consistent with this Court's opinion.

[11] Moreover, as Union Carbide explains in its brief, the Code itself provides a credit for supplies "used in the conduct of qualified research." It contains no limitation which directs that the cost of supplies necessary to conduct research cease to qualify if the result of the research is salable product. Hence, the Tax Court's decision not only undermines the purpose of the credit, but also is inconsistent with the express language of the statute.

DATED this 12th day of October, 2011.

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CERTIFICATE OF COMPLIANCE

This brief complies with the type-volume limitation of Fed. R. App. P. 32(a)(7)(B) because it contains 5,797 words, excluding the parts of the brief exempted by Fed. R. App. P. 32(a)(7)(B)(iii).

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CERTIFICATE OF SERVICE

I hereby certify that on October 12, 2011, I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the Second Circuit by using the CM/ECF system. I further certify that the parties listed below are registered CM/ECF users and have been served through the appellate CM/ECF system:

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