United States Tax Court

T.C. Memo. 2026-10

GARY C. GEORGE AND ROBIN A. GEORGE,
Petitioners

v.

COMMISSIONER OF INTERNAL REVENUE,
Respondent

GARY C. GEORGE AND ROBIN GEORGE,
Petitioners

v.

COMMISSIONER OF INTERNAL REVENUE,
Respondent

Docket Nos. 27494-16, 21889-21. Filed February 3, 2026.

John H. Dies, *Rosalind J. Lewis*, *Matthew S. Reddington*, and *Kerith A. Willard*, for petitioners.

Ronald S. Beach II, *Mayah Solh-Cade*, *Fatima Garcia*, *Justyna W. Jozwik*, *Vincent H. Kan*, and *Christopher A. Liegel*, for respondent in Docket No. 27494-16.

Ronald S. Beach II, *Fatima Garcia*, *Justyna W. Jozwik*, *Vincent H. Kan*, and *Christopher A. Liegel*, for respondent in Docket No. 21889-21.

MEMORANDUM FINDINGS OF FACT AND OPINION

GREAVES, *Judge*: The principal question in these consolidated cases concerns petitioners' entitlement to credits under section 41 for

Served 02/03/26

[*2] increasing research activities (research credits).[1] George's of Missouri, Inc. (GOMI), an S corporation for federal tax purposes, reported research credits for research activities related to broiler chickens between 2012 and 2014 (research years). These credits flowed through to the sole shareholder, Gary George. Gary George and his wife Robin George reported research credits on their original and amended income tax returns and attempted to apply them for tax years 2011, 2012, 2014, and 2016. The Internal Revenue Service (IRS or respondent) disallowed the research credits and imposed accuracy-related penalties for 2014 and 2016.[2]

The disallowed research credits relate to seven research trials conducted to create an "improved poultry product." The issues for decision are (1) whether any of the seven research trials constituted qualified research, (2) the amounts of research credits, if any, petitioners were entitled to, and (3) whether petitioners are liable for accuracy-related penalties for tax years 2014 and 2016. The primary dispute is whether GOMI conducted research trials during the research years or whether the alleged research trials are merely post hoc distortions of routine data collection into the model of section 41 qualified research. Forget the proverbial chicken or the egg; today we are called to answer which came first, the research or the research credit study?

FINDINGS OF FACT

Some of the facts are stipulated and are so found. The parties' stipulations of facts and the attached exhibits are incorporated herein by this reference. During the research years GOMI was an S corporation and Gary was the sole shareholder. Petitioners lived in Arkansas when the petitions were filed.

---

[1] Unless otherwise indicated, statutory references are to the Internal Revenue Code, Title 26 U.S.C. (Code), in effect at all relevant times, regulation references are to the *Code of Federal Regulations*, Title 26 (Treas. Reg.), in effect at all relevant times, and Rule references are to the Tax Court Rules of Practice and Procedure.

[2] Petitioners conceded that they are liable for accuracy-related penalties for 2011 and 2012 related to adjustments determined in the notice of deficiency.

[*3] I. *History of George's, Inc., and Related Entities*

Today, George's[3] is one of the largest fully integrated poultry processing companies in the United States. For four generations, the George family has ruled the roost in the chicken industry, but the story of George's starts with humble beginnings in Bush Creek, Arkansas.

In 1922 C.L. George owned and operated a successful small country grocery store. But the Great Depression hit, and like many others C.L. struggled to keep the small grocery store afloat. He decided to shift from the grocery business and began hauling live chickens to open-air markets in Kansas City, St. Louis, and Chicago to sell. As his sons Gene and Luther came of age, C.L. brought them into the live hauling business.

The trio shaped the business into something more akin to the George's of today. They focused on expansion and developed George's into the model of a traditional chicken producer. In the 1950s George's partnered with a processing plant in Springdale, Arkansas, to process live chickens. This "processing" looked very different from today's. Instead of neatly wrapped trays of select cuts of meat, the processor left the chickens whole and shipped them on ice to consumers.

By the 1960s George's owned a commercial production complex that included a female hatchery, a farm, a processing plant, and a small egg production plant. After the death of his father and brother, Gene continued the family business with an eye on expanding commercial production. As soon as his son Gary was old enough to work, Gene brought him into the family business. Naturally, Gary began his career at the beginning of the production process in the hatchery.

After a few years away from the business to attend college, Gary returned to George's full time. Gary started learning the ropes by observing the day-to-day activities of George's and attending meetings. After eight years of observation without a set role in the company, his father named Gary the president of George's as a 30th birthday gift in 1980. This made him the third generation to run George's.

Gary was focused on the big picture and looked to delegate the management of George's day-to-day activities. To that end, Gary hired

---

[3] Unless otherwise stated, this Opinion uses "George's" to include George's, Inc., and all affiliated entities, including GOMI, George's Farms, Inc., and George's Processing, Inc.

[*4] Monty Henderson as the chief operating officer, a decision Gary characterized as the second-best decision of his life after marrying his wife.

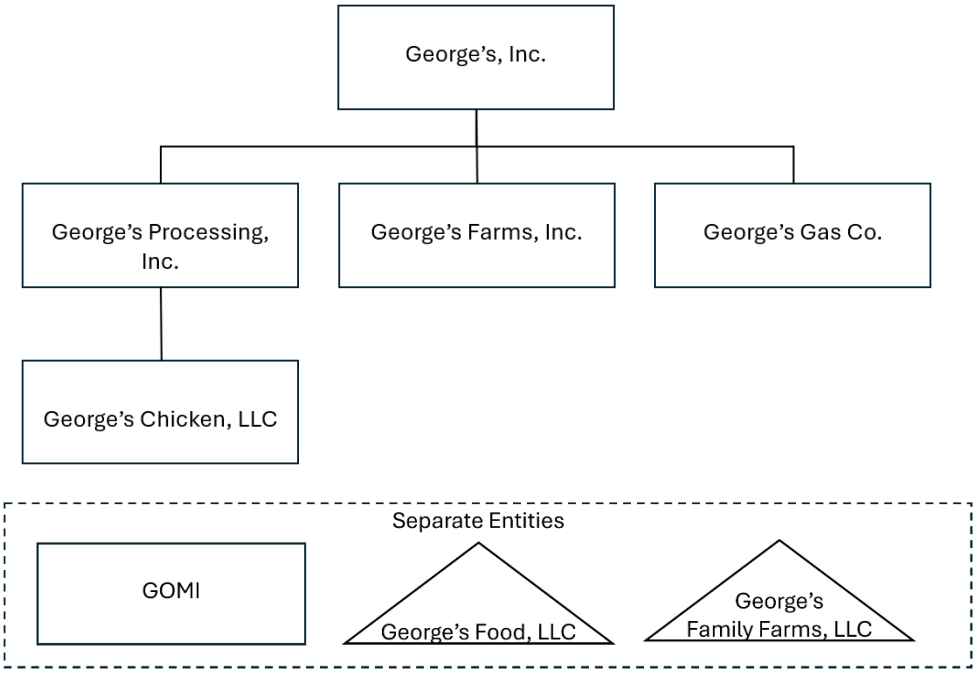
With Mr. Henderson handling the day-to-day affairs, Gary focused on growth. He expanded George's size by adding new commercial product complexes north of Springdale. But like his ancestors, Gary felt cooped up in George's regional market. In 2001 George's acquired a commercial product complex in Virginia to unlock the east coast retail market. Gary also spent time creating and maintaining good relationships with fast food companies, including Kentucky Fried Chicken.

In 2012 Gary kept the family tradition by naming his twin sons, Carl and Charles, as co-presidents of George's on their 30th birthday. Gary remained, and is still, the chairman of the board.

II. *A Tangled Nest of Entities*

George's patchwork of growth over 100 years created a tangled nest of an entity chart. George's entity structure is a creature devised by accountants and lawyers with little practical impact on the day-to-day operations of George's. People who worked at George's were often unaware of which entity employed them and paid their salaries. Generally, people familiar with the company referred to all entities involved in George's chicken production as George's, Inc., regardless of actual ownership. However, because it is relevant to later discussions, we will attempt to tease apart the ownership structure and responsibilities of each entity during the research years. An organizational chart, as explained in detail below, follows:

[*5]



George's, Inc., is a C corporation that acts as the parent company for certain subsidiaries. George's, Inc., directly owns three subsidiaries: George's Processing, Inc.; George's Farms, Inc.; and George's Gas Co. George's Processing, Inc., wholly owns George's Chicken, LLC. In addition to these related companies, George's entities include three entities unrelated by ownership: GOMI; George's Food, LLC; and George's Family Farms, LLC. Each entity is responsible for a different part of the poultry production process.

GOMI is the entity responsible for the live production portion of the business from the incubation of eggs through transporting the chickens for slaughter. GOMI manages the hatcheries, live haul, feed mills, and farms. GOMI is an S corporation that is 100% owned by Gary.

George's Farms, Inc., purchases the chickens from GOMI at cost plus one percent. George's Farms, Inc., is the entity that ultimately sells the processed chicken to end customers, but it does not process the chickens. That task is left to George's Processing, Inc., which owns and operates the processing plants in Missouri and Arkansas. It processes the chickens from George's Farms, Inc., for a fee.

[*6] George's Gas Co. sold and hauled propane to farmers to heat the chicken houses in the winter.[4] George's Chicken, LLC; George's Food, LLC; and George's Family Farms, LLC, are associated with chicken production in Virginia and are not relevant to the issues in these cases.

With the number of entities involved in George's chicken production and the less than clear demarcation between entities, expenses were often paid by the incorrect entity. We note that while GOMI was not always the entity to initially pay for the feed, the ultimate cost was transferred to GOMI's general ledger as the entity responsible for the live production during the research years. A similar process occurred for employee compensation. George's Farms, Inc., paid the live production employees' salaries and issued them Forms W–2, Wage and Tax Statement. At the end of each month, George's Farms, Inc., transferred the wage expenses to GOMI, which accounted for them in the overhead expenses associated with each flock.

III. *Commercial Chicken Production*

The poultry industry classifies chickens into two categories: breeders and broilers. While both are the same genetic line of chicken, they lead vastly different lives. Breeders are hens that lay eggs that eventually hatch into broilers for commercial sale. Farmers raise breeders for 21 weeks on a farm, at which point they are transferred to the laying house. Here, they lay eggs until they reach approximately 65 weeks of age when egg production begins to decline. At this point, the breeders are cycled out of the laying house and killed. Because breeders live well beyond the usual life of a commercial broiler, they are vaccinated against various diseases to prevent outbreaks in the laying houses. In addition to controlling disease spread in the laying houses, vaccination allows the breeder to pass its immunity to certain diseases to its progeny.

Broilers are chickens raised for commercial processing and sale. GOMI divides broilers further into two groups based on the target end weight: small broilers and large broilers. Small broilers are raised until they hit four pounds, at which point they are generally between 35 and 37 days old. By contrast, large broilers are raised until they weigh between seven and eight pounds, which takes approximately 60 days. During the research years GOMI primarily raised small broilers in Missouri and large broilers in Arkansas. Within GOMI, the live

[4] George's Gas Co. is no longer operating.

[*7] production manager oversees the short but complicated lifecycle of the broilers. During the research years, Benny McClure was the live production manager for GOMI.

GOMI organizes its broiler production process into commercial product complexes that contain all facilities needed to raise broilers. Each commercial product complex consists of a hatchery, grow farms, a processing facility, and a feed mill. The first stop in a broiler's life is the hatchery. Eggs from the laying house are transported to the hatchery for incubation and hatching. During the incubation process, GOMI may administer certain vaccines into the egg (in ovo) based on vendor-established guidelines. While at the hatchery, the broiler chicks are given vaccines and other medications to build immunity to diseases that they are likely to encounter later in life at the grow farms (farms).

Soon after hatching, the broiler chicks are sent to farms where they will live until they reach the target weight. Each farm has one or more tunnel-like structures with concrete floors that are referred to in the industry as houses. The floor of a house is covered in shavings as bedding for the broilers. The farms do not change the bedding between flocks to encourage immunity to diseases common in that house.

Importantly, GOMI does not own these farms. Instead, independent contractor growers own the farms and agree to care for the broilers, maintain their facilities, and provide utilities to each house. GOMI continues to own the broilers and provides the growers with the necessary food and medications for the broilers. GOMI contracts with these farms on an "evergreen basis" in which the contracts continue from year to year unless one party terminates the agreement. Each contract covers several flocks that are placed on a farm at the same time. Each farm generally is covered by two or more contracts.

GOMI classifies farms as either company-related or contract farms. Company-related farms are those owned by someone closely related to the company, such as a member of the George family or an employee of George's. The company-related farms during the research years were Bals, Boss East, Boss West, Bush Creek, Carpenter Farm, Highfill Farm, Leslie Broilers, Littrell Broilers, Twin G.W., and Twin G.E. By contrast, contract farm owners are unrelated to the company. GOMI provides each grower with the George's handbook, which sets forth best practices in raising broilers.

[*8] The time spent on the farm is the most important and riskiest part of broiler production. Consequently, the growers closely monitor the broilers for signs of disease or other symptoms that indicate a failure to thrive. Multiple times per day the growers walk the broiler houses to pick up dead broilers and log the number of diseased broilers for GOMI.

The growers are not alone in raising the broilers. GOMI sends broiler service technicians to the farms to advise the growers on the best practices for raising broilers. These service technicians visit the farms at least weekly to review the mortality logs, observe the broilers for any odd behavior that could indicate illness, and administer any vaccinations or medications that are required. Occasionally, these service technicians collect blood from the broilers to test for immunity to certain diseases. These visits and associated tests help GOMI to determine the effectiveness of vaccination campaigns and to monitor for any unexpected diseases in the houses.

Additionally, GOMI organizes "posting sessions" at least every eight weeks. During these sessions, the service technicians collect samples of live broilers from several farms and bring them to a common location for examination by a veterinarian. The veterinarian euthanizes the broilers and performs a necropsy to look for any obvious signs of disease. To detect less visible signs of illness, the veterinarian collects samples of the broilers' gut tissues for laboratory testing. In addition to these surveillance posting sessions, GOMI veterinarians are on call to address issues with flocks as they arise.

After a month or two of careful monitoring by the growers and GOMI personnel, the broilers finally reach their target weight and are ready for processing. The GOMI live operations team travels to the farms, counts each head of live broiler, and loads them on a specialized truck for transport to the processing plant. The broilers are unloaded at the processing plant, and at this point George's Farms, Inc., takes over. George's Farms, Inc., then contracts with Geroge's Processing, Inc., to process the birds at the processing plant. The date on which the broilers are transported to the processing plant and killed is known as the settlement date.

Upon arrival at the processing plant, the broilers are examined by U.S. Department of Agriculture Food Safety and Inspection Service workers that look for one of seven condemnable conditions. If signs of these conditions are found, the inspection worker cuts off the diseased portion of the broiler if possible or condemns the entire broiler.

[*9] During the research years, GOMI transported between 30 and 40 small broiler contracts and between 12 and 15 large broiler contracts per week to the processing plant. Between small and large broilers, this accounted for approximately 3.5 million heads processed weekly. Throughout this process, employees collected several statistics, which the live production account manager compiled into weekly grower reports.

The final portion of each commercial product complex is the feed mill. The feed mill, as the name would suggest, is where the feed recipes are mixed for each farm. During the research years, GOMI had two feed mills: the Springdale Feed Mill and the Cassville Feed Mill. Each feed mill supplied the farms closest to it.

Throughout their time on the farms, the broilers are given different feed recipes that correlate with their age and nutritional needs. In the beginning, broilers need a high protein, low energy diet. As they age, this ratio flips with broilers requiring a low protein, high energy diet. Small broilers are fed three different recipes throughout their life, and large broilers are fed four different recipes.

Feed is the most expensive part of raising broilers and requires striking a balance between cost savings and nutrition targets. Consequently, GOMI employed an animal nutritionist to review and revise the feed recipes weekly during the research years. Starting in 2010 GOMI employed Matthew Greenwood as an animal nutritionist consultant. Dr. Greenwood viewed himself as a progressive nutritionist that always looked for cutting-edge developments in the poultry space. During the research years, he balanced a consulting practice of 13 to 16 clients. Each week, Dr. Greenwood reviewed the current feed recipes with the goal of maximizing performance while minimizing cost. He set the "specs" for the feed, which included specific targets for fat, proteins, and amino acids. He then created feed recipes to hit these specs with the most cost-effective ingredients and sent them to Mr. McClure for approval. Once approved, Mr. McClure sent the recipes to the feed mill. There was a lag between Dr. Greenwood's signoff on a feed recipe and the time when GOMI delivered the feed to the farms. The length of the lag depends primarily upon whether GOMI has the required ingredients in stock.

[*10] IV. *Flocks and Flocks of Data*

Poultry production is a high-volume, low-margin industry with even small changes having dramatic impacts on profitability. If all the stars align and everything goes according to plan, a poultry producer can expect to earn approximately one penny of profit per pound. While the profit per pound is incredibly small, when it is multiplied by millions of heads of broilers each year the poultry business is quite lucrative for those with a strong stomach.

The single most important driver of profit in the industry is the size and uniformity of the broilers. It is of utmost importance for a poultry producer to limit the variance in size between broilers. George's contracts with its customers for very precise specifications for each cut of meat. For example, Kentucky Fried Chicken, one of George's largest customers, requires each piece of meat to fit within a narrow range of sizes so that it can be used in mass production. If a broiler does not fit within this range, it must undergo additional processing, adding costs. Even after additional processing, the meat is sold at a discount. Ensuring uniformity is challenging. Even broilers that are genetically identical, raised on the same farm, and fed the same food naturally vary in size. In addition to uniformity, the distribution of white and dark meat on a broiler has a large impact on profitability. In the United States, white meat demands a premium with breast meat selling for the highest price.

The tight margins and ample opportunity for failure create an obsession for data and data analytics in the industry. With millions of broilers processed weekly, there is no shortage of raw data for GOMI to review and analyze. GOMI tracks the costs for each flock to the fraction of a penny. In addition to costs, GOMI records various metrics throughout a broiler's life and during processing, including weight and mortality. GOMI compares these live metrics to historic performance and industry performance reported by voluntary reporting organizations, such as Agri Stats, to monitor any trends in the data.[5] During the research years, the job of compiling all this information into

[5] Agri Stats is a comparative data analysis tool that prepares monthly data analytics and anonymously benchmarks poultry producers on the following metrics: ingredient purchasing, feed formulation, feed milling and delivery, breeder production, broiler production, processing, sales, and profitability. Agri Stats obtains its data from voluntary self-reporting by customers.

[*11] a useable format fell to the live production account manager, Gary Hopkins.

During the research years, Mr. Hopkins oversaw recording all costs associated with each broiler, including the cost of the chick, feed, and medication, in a data management system called Lawson. Of particular importance was tracking the feed cost associated with each contract. GOMI recorded each lot of feed that was delivered to the farms for this purpose and Mr. Hopkins was tasked with determining the cost of each lot. Mr. Hopkins first calculated the cost of the ingredients added to the feed delivered to the farms and then made adjustments for any feed loss inherent in production, including loss due to water weight, spillage, or spoilage (shrink adjustment). This artificially increased the cost associated with the feed to account for lost product. GOMI adopted a standard fixed percentage of the cost to produce each pound of food that is added to the final total cost to account for the shrink adjustment. During the research years, GOMI added a shrink adjustment of 0.5% to 1% to its feed. The feed cost also included the wages for live production staff, delivery expenses, and cost of any medication added to the feed.

Mr. Hopkins then matched this cost data to the data he received from the production plant for each flock. Mr. Hopkins refined this data into spreadsheets to determine grower compensation and create trend analyses for broiler health. First, he used the raw data to calculate a grower's payment for raising the broilers. GOMI followed a tournament style of compensation for growers in which growers are paid based on their performance. GOMI compensated growers that performed above average more and companies that fell below the average less. Then Mr. Hopkins calculated the average for contract farms and ranked their performances. This list was used to calculate contract farms' compensation. After calculating this, Mr. Hopkins added back in the company-related farms and redid the calculations and rankings. This was the basis for the company-related farms' compensation. This split system was designed to control any perception of preferential treatment of the company-related farms compared to the contract farms. In addition to the tournament style payment, GOMI paid farmers a premium if they upgraded their houses.

Mr. Hopkins also synthesized the data to create useful metrics to gauge broiler performance based on field and process plant records. These metrics included feed conversion and average daily weight gain. Feed conversion is the amount of food required for a broiler to gain a pound. It is calculated by dividing the end weight of all broilers by the

[*12] total pounds of feed delivered to the farm. The average daily weight gain is the final weight of the broilers divided by the number of days the flock was in the field. He also added to the report the useful portions of the raw data including average weight, the number of broilers that made it to the processing plant, and the number of condemned broilers. GOMI and its veterinarians reviewed these weekly reports to gauge performance across live operations.

V. *Not All Sunny-Side Up*

Even though their lives are very short, broilers confront a variety of parasites and diseases that diminish their performance and lead to mortality. Just when GOMI thought that it had a solution for a parasite or disease, the ground would shift from under it requiring it to find a new solution.

During the research years, one of the most difficult parasites to manage was coccidiosis. Coccidiosis is a parasite that lives in the gut of broilers and is acquired from the environment. Every animal that eats off the ground has coccidiosis, but the parasite only causes issues to animals in captivity because of added stress. The coccidiosis parasite causes damage to the broiler's gut, which limits nutrient absorption and ultimately leads to underweight and nonuniform broilers. Each year, the coccidiosis parasite evolves and causes new side effects in the infected broilers.

Drugs that treat coccidiosis are called coccidiostats. Generally, GOMI rotated coccidiostats in cycles throughout the year because after a couple months of use, the parasite would become resistant to a specific treatment. Generally, GOMI had three treatment cycles per year. Before the research years, GOMI relied heavily on the drug 3-Nitro to prevent coccidiosis. However, 3-Nitro was removed from the market in 2011.

In addition to this parasite, GOMI was confronted time and time again by three diseases: infectious bursal disease (IBD), Laryngotracheitis (LT), and necrotic enteritis. IBD is a virus that attacks the immune system of a broiler. For the first three to four weeks of life, a broiler's immune system is dependent on B-cells produced from the bursa gland that sits at the base of its tail. After this period, immunity is provided from T-cells, which are produced in the thymus. IBD attacks the bursa gland and inhibits it from producing B-cells, leaving the broilers immunocompromised in their early life. Broilers do

[*13] not die of IBD but rather die of other infectious diseases that attack the broilers' weakened immune systems.

LT is a highly contagious, often fatal, respiratory infection in broilers. It is formally diagnosed in a laboratory by closely examining an infected broiler's trachea. But these laboratory tests are not needed for experienced growers and field service technicians who know the telltale symptoms of infection. LT attacks and kills a broiler's trachea cells. These cells then slough off and enter the airway making it difficult for the broiler to breathe. As the broiler's airway fills with this tissue, the broiler attempts to expel the blockage. However, a broiler cannot cough so its efforts cause a distinctive wheezing sound. The broilers also become lethargic, and their eyes become crusty. LT is a state reportable disease that calls for all-hands-on-deck coordination between commercial poultry producers.[6]

Every winter, GOMI had an LT outbreak in the same geographic region around Interstate 49 (I–49). This region was home to large commercial poultry producers along with unregulated backyard chickens. The proximity of these unregulated birds and the commercial production flocks made this area a hotbed for LT. LT started as a seasonal disease that GOMI focused on in the winter. However, by 2014, outbreaks occurred year round.

Once an LT outbreak started, there was no stopping it. Growers were forced to let the disease run its course, often killing many broilers. During the research years, breeders were vaccinated proactively against LT because of their longer lives. On the other hand, broilers were generally not vaccinated unless there was an outbreak.

The final disease that hit GOMI particularly hard during the research years was necrotic enteritis. Necrotic enteritis is caused by a bacteria that attacks a broiler's midgut. It is commonly diagnosed via a necropsy focusing on the gut. The gut of a broiler with necrotic enteritis has a distinct look that appears like fuzz growing from the intestine walls. Necrotic enteritis causes high mortality in broilers.

While not a parasite or disease, another force around the research years threatened to upend everything the poultry industry knew about raising broilers. Around this time, antibiotic-resistant bacteria were on

---

[6] A state reportable disease is a disease that must be immediately reported to the Arkansas State Veterinarian Office and/or the U.S. Department of Agriculture, Veterinary Services.

[*14] the rise and people began questioning whether antibiotics given to the animals we eat were a contributing factor. It was standard industry practice to administer large-molecule antibiotics to treat many diseases. The fear of antibiotic resistance pushed forward the idea of no-antibiotic-ever chicken, a broiler raised without the use of antibiotics.

The industry panicked as very few poultry producers had ever raised broilers without the help of antibiotics. Facing the mounting pressure around 2012, the market, including GOMI, began looking for ways to eliminate the use of antibiotics. This led to an immediate decline in broiler performance, including worsening average daily weight gain and feed conversion rates. Everyone scrambled to find ways to improve broiler performance without introducing antibiotics.

The no-antibiotic-ever chicken trend was also at odds with animal welfare regulations. When broilers get sick, animal welfare regulations require that the producers treat the broilers. For several diseases, this treatment is antibiotics. If a producer was forced to administer antibiotics, it would lose the premium for no-antibiotic-ever chicken and be forced to find a new market for the flock.

GOMI primarily relied on its veterinarians to manage the moving target of these ailments. Around 2011 GOMI retained two consulting veterinarians: Leonard Fussel and David Fields. Dr. Fussel was the primary veterinarian for GOMI's live production process between 2011 and 2014. He conducted surveillance visits on a random selection of farms once per month to check the broilers' health. In addition to these visits, he frequently met with GOMI employees to review performance data and laboratory reports. In contrast, GOMI used Dr. Fields as a stopgap consultant when an issue arose and Dr. Fussel was unavailable.

In 2014 the Food and Drug Administration changed its regulations to require a veterinarian's signature before certain drugs that GOMI used could be administered to broilers. Because of this increased demand on veterinarian time, GOMI decided it was finally time to hire an in-house veterinarian. In 2014 GOMI hired Robinette Gilbert. Dr. Gilbert assumed Dr. Fussel's tasks including surveillance visits, necropsies, trend monitoring, and special visits to farms to address urgent concerns such as outbreaks. Dr. Gilbert also trained the service technicians to perform field necropsies and other monitoring tests.

[*15] VI. *Runt and Stunt Challenges (Base Year Activities)*

GOMI constantly sought to improve its production process. One of the most significant challenges GOMI ever confronted was the outbreak of runt and stunt syndrome between 2010 and 2012. Runt and stunt syndrome is a condition that causes feed refusal, diuretic episodes, and poor performance. This syndrome is particularly devastating for small broiler production because the short life of these broilers does not offer an opportunity to recover from the disease. GOMI and the industry saw a large uptick in the number of cases between 2010 and 2011. While other companies began to resolve the issue in early 2011, GOMI could not get ahead of its outbreak.

Dr. Greenwood, who was new to GOMI in 2010, spent a lot of his early days with GOMI in the field with the broilers to identify the cause of the syndrome. One theory was that runt and stunt syndrome was related to coccidiosis—or at least controlling coccidiosis would lessen the detrimental effects of the syndrome. Dr. Greenwood implemented a rotating coccidiosis treatment program for more effective control. Dr. Greenwood also sought to create a more uniform feed program to limit exogenous variables. For example, he discovered that the salt levels in different batches of feed varied wildly because of the salt content in raw materials. He worked with the internal laboratory to monitor feed ingredients as they arrived to gauge the level of salt. This allowed him to more accurately control the salt levels in the batches of feed in the hopes of controlling the diarrhetic symptoms of runt and stunt syndrome. However, altering the salt in the feed did not resolve the runt and stunt syndrome outbreak. Dr. Greenwood continued to work on runt and stunt syndrome from his start in 2010 through a portion of 2012.

Dr. Greenwood was not alone in his fight against runt and stunt syndrome. Dr. Fussel also took an active role on the veterinarian side when he started with GOMI in 2011. Dr. Fussel spent considerable time in the field observing the broilers and collecting data. This observation led him to the theory that the syndrome was related to something living in the litter of the broiler houses. But swapping out the litter between flocks was not financially feasible. Instead, it was standard practice for growers to only add a top-dressing between contracts. Dr. Fussel posited that this allowed the organism that caused runt and stunt syndrome to transfer between flocks. Dr. Fussel developed a plan of leaving the litter in the houses without broilers for five to six weeks that he called biologic downtime. This biologic downtime seemed to work as new flocks were

[*16] not infected at the same rate. GOMI also collaborated with a vendor to identify and formulate a vaccine for the disease-causing organism. Dr. Fussel could not identify the farms where he conducted his research.

VII. *Research Trials at Issue*

As new drugs and treatments come on the poultry market, the drug vendors frequently call upon producers to buy their products. To develop these products, the vendor undertakes significant research to determine the effectiveness of the drug or treatment. The goal of these tests is to determine the treatment's effectiveness against the target that it seeks to control. These experiments are performed in sterile laboratory environments to control and eliminate as many exogenous variables as possible. This includes eliminating any factors that may cause stress on the broilers.

While these tests are a good starting point for poultry producers, they do not indicate how these products will work in the real world. As much control as GOMI tries to exercise over the broilers, there are always exogenous variables that alter a treatment's effectiveness. For example, temperature fluctuations, which are common in broiler houses but controlled for in a lab, alter the effectiveness of medications. Even between two seemingly identical farms, a treatment's effectiveness can vary. On one farm, a grower may find that the broilers develop a resistance to a treatment that works perfectly at the farm next door. Each farm also has a unique mix of viruses, bacteria, and protozoans that affect broiler performance.

With the loss of vital products, the recurrence of diseases that decimated flocks, and a new health-conscious push for no antibiotics, GOMI entered the research years with a lot of questions. It hoped to find the answers through a series of research trials. The research trials included testing the following feed additives, which are explained in greater detail *infra*:

[*17]

Feed Additive or Medication	*Use*
Salinomycin	Coccidiosis treatment
HatchPak	Coccidiosis vaccine
Tylan	Antibiotic for treatment of infections
Floramax	Probiotic for gut health
Calsporin	Probiotic for gut health
Sporulin	Probiotic for gut health
Phytase	Enzyme to increase phosphorus digestion
Vaxxitek	IBD vaccine

In some cases, GOMI tested combinations of these drugs.[7] GOMI's research projects also included off-label uses for the drugs.

A. *Salinomycin*

Salinomycin is a chemical compound added to feed to treat coccidiosis. During the research years it was sold under the brand names Bio-cox and Sacox. The main indication for Salinomycin was to prevent coccidiosis from cycling between broilers. That is, Salinomycin kills the coccidiosis parasite in the broiler's body before it can be passed along to another broiler in the infected waste. Ordinarily, when a broiler is infected with coccidiosis it sheds some of the parasite in its waste onto the floor of the house near the feed. The next broiler comes along and eats the feed contaminated by the waste and will likewise become infected. If the litter in the house is not changed between flocks, it is possible that the coccidiosis will spread to the next flock. Salinomycin stops this transmission cycle, but its benefits are known to decline over time.

[7] Petitioners and GOMI employees have linked each treatment to a specific uncertainty. Therefore, in the consideration of each project in the coming sections we will focus on the uncertainty identified by petitioners and GOMI employees for each drug.

[*18] GOMI used Salinomycin before the research years and considered it a failure in 2011. Between 2009 and 2011 GOMI regularly added between 0.83 pound and 1 pound of Salinomycin per ton of feed. However, there still remained a question of the most effective manner of use to control coccidiosis.

As Dr. Fussel and Dr. Greenwood joined GOMI, they began theorizing that a higher dose of Salinomycin combined with chemical coccidiostats such as Robenz could improve performance. Petitioners identified the following 12 contracts between January and June 2012 as those used to test GOMI's hypothesis:

Farm	*Dates in 2012*
Bals 18-27	January 2–February 22
Boss West 1–8	January 2–February 22
Brush Creek 1–8	January 9–February 29
Leslie Broilers 1–5	February 1–March 7
Boss East 9–17	February 5–March 28
Twin G.W. 1–8	February 12–April 4
Twin G.E. 9–16	February 26–April 18
Bals 18–27	March 11–May 2
Boss West 1–8	March 17–May 9
Brush Creek 1–8	March 18–May 9
Leslie Broilers 1–5	March 21–April 25
Twin G.W. 1–8	April 15–June 6

The feed recipes indicated that GOMI added the same dosages of Salinomycin to the feed as it had in prior years. GOMI added Robenz to one of the feed recipes for broilers between the age of 17 and 27 days on

[*19] April 3, 2012.[8] GOMI employees provided no additional information on how the results of these trials were analyzed. GOMI considered this test a failure.

B. *HatchPak and Tylan*

Fresh off the failure of the Salinomycin trials, GOMI still had not found a replacement for 3-Nitro in its coccidiosis program. Adding to the difficulty, the coccidiosis parasite continued to evolve and cause issues in the broilers. GOMI set its sights on a combination of HatchPak Cocci III (HatchPak) and Tylan to prevent coccidiosis. HatchPak is a coccidiosis vaccine administered via spray that is based on a strain of coccidiosis that does not naturally occur. This genetically engineered strain of coccidiosis is susceptible to the traditional treatments for coccidiosis. The main purpose of HatchPak is to replace the strain of coccidiosis circulating in the broiler house with the vaccine strain. With this strain now the dominant strain, poultry producers could use the traditional treatment for coccidiosis to eradicate the parasite. A well-known side effect of HatchPak is necrotic enteritis.

Tylan is an antibiotic generally used in the poultry business to treat mycoplasma, a respiratory illness, in breeders. GOMI administered Tylan to breeders infected with mycoplasma and broiler chicks hatched from those breeders. Tylan may also be used to treat necrotic enteritis. GOMI regularly added Tylan-40 to its feed starting in or around 2009.

GOMI theorized that administering the HatchPak vaccine in the hatcheries to broiler chicks and administering Tylan in the field later would effectively control coccidiosis and prevent any adverse side effects. GOMI administered HatchPak and Tylan in the third and fourth quarters of 2012 and 2013 on all company-related farms. GOMI ensured that it fed these flocks a feed recipe that did not contain a coccidiosis vaccine that would inactivate the HatchPak. To denote these recipes, Dr. Greenwood created feed recipes throughout 2012 that were labeled in the 800s. In 2012 GOMI administered the combination of

[8] Although petitioners cited Robenz as an example of a chemical coccidiostat that GOMI used in conjunction with Salinomycin, they did not provide the name of any other chemical coccidiostats used in these trials. Therefore, we are unable to determine based on the feed record when any other chemical coccidiostats tests occurred.

[*20] HatchPak, Tylan, and Floramax to flocks covered by 14 contracts.[9] These contracts had settlement dates between July and November 2012. The adjusted feed expenses, excluding the shrink adjustment and overhead expenses, for these flocks were $5,115,281.[10]

To monitor the success of the research trials, GOMI focused on whether the combination reduced coccidiosis and whether cases of necrotic enteritis increased. Both conditions were monitored by more frequent necropsies conducted by vendor veterinarians that reported to the GOMI veterinarians. These vendor veterinarians performed onsite examinations of the broilers' guts to count the number of coccidiosis parasites and lesions. GOMI also compared these flocks' weight, feed conversion, and seven-day mortality to historic data. Reviewing these criteria in 2012, GOMI determined that the combination treatment was successful because the broilers gained more weight and had a better feed conversion ratio. The trial flocks had an average increase in weight of 0.1 pound per broiler.

At this time, Mr. McClure believed that there were "no real indicators that [the combination treatment] wasn't going to work" going forward. Likewise, Dr. Fussel indicated that the 2012 trials showed that HatchPak and Tylan "worked like a charm." Dr. Fussel was not concerned with the possibility of the coccidiosis parasite's becoming resistant to the HatchPak and Tylan combination because resistance was not common with these types of medications. If anything, Dr. Fussel expected the performance of the HatchPak and Tylan combination treatment to become more effective over time. Happy with the results of the 2012 study, GOMI decided to administer HatchPak and Tylan in the third and fourth quarters of 2013. GOMI followed the exact same procedure it had in 2012 to administer the combination treatment to all company-related farms, which included flocks covered by 20 contracts.

GOMI first administered the combination of HatchPak, Tylan, and Vaxxitek to flocks covered by two contracts with settlement dates in July 2013. Next, GOMI administered the combination of HatchPak, Tylan, Vaxxitek, and Calsporin to flocks covered by seven contracts with settlement dates between July and September 2013. Finally, GOMI

---

[9] The flocks covered by contracts that were involved in two or more research projects were not double counted. However, they may be discussed in different sections of this Opinion.

[10] All dollar amounts are rounded to the nearest dollar.

[*21] administered the combination of HatchPak, Tylan, Vaxxitek, and Sporulin to flocks covered by 11 contracts with settlement dates between September and November 2013. GOMI undertook the same data analysis as in 2012 but got vastly different results. The average weight of these broilers declined and feed conversion worsened, both of which indicated that the research trials failed. GOMI theorized that the failure was due to the evolution of coccidiosis.

C. *Probiotics*

Producers do not normally use probiotics in broiler production because antibiotics adequately control the broiler's gut flora. However, with antibiotics falling out of favor, GOMI had to find another mechanism to control the broilers' gut health. GOMI began looking to probiotics to create more uniform broilers in the face of losing 3-Nitro and the growing shift to no-antibiotic-ever chicken. Dr. Fussel, Dr. Greenwood, and Mr. McClure led this initiative. They first developed a list of questions regarding the use of probiotics and invited several different direct-fed-probiotic vendors to a meeting. These vendors included the manufacturers of Floramax, Sporulin, and Calsporin. The vendors pitched their probiotics and fielded questions from GOMI. From this meeting, Dr. Fussel, Dr. Greenwood, and Mr. McClure theorized which probiotics were most likely to be successful in GOMI's standard production process and narrowed the list of possible probiotics to Floramax, Calsporin, and Sporulin. At this time, it was understood that these probiotics could take several cycles to become effective.

GOMI began its probiotics tests with Floramax in 2012 and continued into 2013. At this time Floramax was administered almost exclusively in turkeys, and Dr. Greenwood had experience with this application. Although both turkeys and chickens are poultry, there is little overlap in their veterinary care. For 2012 and 2013 petitioners identified the flocks covered by 45 contracts as the Floramax test flocks.[11] Floramax was administered to these flocks via water on select company-related farms. The remaining company-related farms did not receive Floramax and acted as a control group.

According to petitioners, GOMI administered the combination of Floramax and Salinomycin to flocks covered by 12 contracts with settlement dates between February and June 2012. Next, GOMI

[11] All representations concerning which contracts were included in the Floramax trials are based on petitioners' representations on brief. As discussed *infra*, we have no corroborating evidence that these flocks were research flocks.

[*22] administered only Floramax to flocks covered by ten contracts that settled between June and December 2012. During this time GOMI also administered a combination of Floramax, HatchPak, and Tylan to flocks covered by 14 contracts that were settled between July and November 2012. In the final series of tests, GOMI administered Floramax and Vaxxitek to nine flocks that were settled between December 2012 and February 2013. Seven of these flocks were settled in 2013.

The results of each of these tests were compared to the control group of broilers. Specifically, GOMI focused on whether Floramax improved feed conversion, average daily weight gain, and the seven-day mortality of the broilers. The data revealed no difference between the control and experimental groups.

Up next in the probiotic trials was Sporulin, a direct-fed microbial that promotes gut health that was introduced to the market around 2012. Because it was a new product, not much was known in the industry about its effectiveness. Preliminary research indicated that Sporulin effectively treated salmonella, but GOMI theorized it could reduce necrotic enteritis.

GOMI added Sporulin to broiler pre-starter, starter, and grower feed between July and November 2013. GOMI added Sporulin to the feed at the GOMI feed mill, which meant that all company-related farms that received this recipe received Sporulin. There is no record of GOMI's previously adding Sporulin to its feed recipes.

GOMI administered Sporulin to flocks covered by 18 contracts. First GOMI administered the combination of Sporulin, Vaxxitek, Tylan, and HatchPak to flocks covered by 11 contracts with settlement dates between September and November 2013. Next, GOMI administered the combination of Sporulin and Vaxxitek to flocks covered by seven contracts with settlement dates between November and December 2013. The adjusted feed expenses, excluding the shrink adjustment and overhead expenses, for these flocks were $4,748,616.

Because all company-related farms received the feed with Sporulin, GOMI compared the performance of these flocks to historic data from previously settled flocks on company-related farms. This data review focused on weight gain, feed conversion, overall mortality, and seven-day mortality. GOMI also monitored whether these broilers were treated for necrotic enteritis and performed necropsies to look for signs of the disease. The results of this analysis showed that the broilers

[*23] performed no better than the previously settled flocks on company-related farms. GOMI was unsure whether this failure occurred because Sporulin was ineffective or because other extrinsic factors influenced broiler performance. Dr. Greenwood recommended discontinuing use.

The final probiotic GOMI tested on its flocks was Calsporin. Calsporin is a direct-fed microbial product that promotes gut health and reduces the occurrence of necrotic enteritis. Before commercialization, the vendor tested the performance of Calsporin in university laboratories in Japan and the United States to determine effectiveness. This study focused on feed intake, weight gain, feed conversion, and mortality. To determine the effectiveness in the real world, GOMI decided to replicate this study by measuring the same variables when Calsporin was added to the feed for all company-related farms. GOMI added Calsporin to the broiler pre-starter and starter feed between May and December 2013. There is no record of GOMI's previously adding Calsporin to its feed recipes.

GOMI administered Calsporin to flocks covered by seven contracts in 2013. For these flocks, GOMI administered the combination of Calsporin, Vaxxitek, Tylan, and HatchPak. These contracts were settled between July and September 2013. The adjusted feed expenses, excluding the shrink adjustment and overhead expenses, for these flocks were $2,531,962.

As in the Sporulin trials, GOMI compared the broilers' performance to historic data because of the lack of a control group. GOMI compared the same data as in the Sporulin trial: weight gain, feed conversion, overall mortality, seven-day mortality, and occurrence of necrotic enteritis. However, GOMI reviewed the data and found the results were not consistent across the research flocks. Because of this variance, GOMI could not determine the effectiveness of Calsporin.

D. *Phytase*

Corn, a staple in most broiler diets, is high in phosphorus, an important nutrient for broilers that affects bone density. However, because of the molecular structure of corn, broilers are unable to break down this natural source of phosphorus. Instead, poultry producers must add an additional source of phosphorus to the feed, which increases the cost. The phosphorus in the corn remains indigestible and passes through the broilers' digestive system. It concentrates in the broilers'

[*24] waste and prevents the poultry producer from selling the waste as manure for fields.

Around 1999 a new product called phytase (brand name Phyzyme) was introduced to the market. Phytase is an enzyme that allows a broiler to break down naturally occurring phosphorus in corn and reduces or eliminates the need to add additional phosphorus to the feed. Because the phosphorus in the corn is digested by the broilers, the phosphorus levels in the broilers' manure is also reduced. This means the grower can sell the manure as fertilizer as a secondary source of income. As an enzyme, phytase is heat and moisture sensitive and can be rendered ineffective at extremes. This first generation of phytase had mixed success. After several failed attempts early on, GOMI ultimately discontinued use of phytase.

The first generation of phytase had limited success across the industry. The vendor worked to improve phytase and eventually released a second generation of the product to more effectively break down the phosphorus in corn. In 2010 and 2011 GOMI added between 0.3 and 0.5 pound of this second generation of phytase per ton of feed. This second generation of phytase was labeled in GOMI's feed recipes as the brand name Phyzyme TPT 2500. At an unknown time before the research years, GOMI transitioned from the first to the second generation of phytase.

Petitioners represented that in 2012 GOMI focused on unlocking the potential of the second generation of phytase to lower production costs, under the direction of Dr. Greenwood. Dr. Greenwood theorized that if GOMI altered the dosage of phytase according to the feed composition, it could receive the promised cost savings. GOMI conducted phytase trials between September and December 2012. Phytase was allegedly given to all farms—contract and company related. Petitioners identified flocks related to 232 contracts as receiving the experimental dose of phytase. GOMI's feed recipes show that GOMI continued to add between 0.3 and 0.5 pound of Phyzyme TPT 2500 per ton of feed. Over the relevant feed recipes identified by petitioners, all feed recipes added Phyzyme TPT 2500 as a consistent 0.4 pound per ton. Before this trial, Dr. Greenwood ran several tests on the feed composition to determine the amount of naturally occurring phosphorus available, including sending samples to a laboratory in March 2012.

To determine the effectiveness of phytase, Dr. Greenwood walked the broiler flocks to look for gait and mobility issues that signaled low

[*25] bone density. If a broiler had one of these issues, Dr. Greenwood euthanized it and performed a necropsy with particular focus on bone development. In particular, he looked for green bone, a condition in which a broiler's leg bone can be bent in half without breaking. Dr. Greenwood developed a formula based on this testing for the successful dosage of phytase.[12]

E. *LT*

Each winter LT threatened to decimate GOMI's flocks west of I–49. Thus it was an existential threat that GOMI always looked to neutralize. In each of the research years, GOMI faced an outbreak of LT west of I–49. As noted above, GOMI did not generally vaccinate broilers for LT without an active outbreak because the vaccine negatively affected performance.

With each outbreak, GOMI faced several urgent decisions to protect the health of the flocks. First was the question of whether GOMI should vaccinate its broilers or whether quarantine would be sufficient to control an outbreak. GOMI chose the wrong answer many times. In some instances, GOMI assumed that quarantine would work to contain the spread, only for broilers outside the quarantine radius to develop LT. At other times, GOMI aggressively vaccinated nearby flocks to the detriment of performance, only for the infection to remain quarantined on a single farm.

Next came the question of which vaccine to administer. The industry standard was the chicken embryotic vaccine (CEO vaccine) which was derived from a chicken embryo. To make this vaccine, the LT virus is injected into an egg during the incubation process. The chick and the virus develop together in the egg. The incubated virus is then harvested from the egg and refined into a vaccine. CEO vaccines are exceptionally potent because the virus matures with the chicken embryo. These vaccines have been known to cause significant side effects or even an LT infection in the broilers because of the potency. Within the industry, these vaccines were generally given to the longer living breeders because any short-term decline in egg production was outweighed by long-term immunity. During the research years it was known that the CEO vaccines were effective, but it was unknown what

[12] It appears that in 2013 GOMI added a new phytase brand called Optiphos to the feed. However, because this new brand was used after the claimed research trials, we do not consider any experimentation that may have occurred with this introduction.

[*26] side effects would occur and how those side effects should be treated. The large poultry producers in the area often coordinated administration of the CEO vaccine to promote collective immunity. Leading up to the research years, GOMI administered the CEO vaccine by spraying it on broilers.

In either 2012 or 2013 GOMI began to question whether spraying the broilers was the best method to administer the vaccine. While this was the typical industry method and recommended by the manufacturer, GOMI found that it resulted in uneven administration that caused varying levels of immunity among the same flock. Seeing this issue, GOMI considered other techniques. It started with a simple solution of attaching laser pointers to the ends of the leaf blowers used to administer the vaccine so that the user could see where he was spraying. Unfortunately, this did not improve the uniformity of administration. GOMI next turned to more unorthodox methods.

It is common in the poultry industry to administer vaccines in drinking water. While the prevailing thought was that the CEO vaccine could not be administered via water because LT was a respiratory virus, GOMI decided to try it. GOMI field technicians mixed one ounce of the CEO vaccine in a gallon of water. The field technicians then turned off the drinking water to the houses for a period to make the broilers thirsty. The mixture was then sent through the water lines and consumed by the broilers. GOMI collected data regarding mortality, symptoms, and performance. GOMI compared the performance of these broilers to broilers vaccinated via the traditional spray method. It determined that the broilers that drank the vaccine in the water had more uniform immunity to LT and better outcomes. GOMI also determined that the severity of the side effects was reduced. GOMI performed LT experimentation on all flocks west of I–49 in 2012 and 2013. Petitioners identified flocks covered by 27 contracts in 2012 and 111 contracts in 2013.[13]

In 2014 GOMI sought to make the process of vaccination less harsh for broilers with a new vector vaccine (HVT–LT vaccine). A vector vaccine is a vaccine that promotes immunity by using a portion of a virus's DNA that cannot alone cause infection. This vaccine trains a broiler's immune system to detect and fight any disease with that

[13] All representations concerning which contracts were included in the LT method of administration trials are based on petitioners' representations on brief. As discussed *infra* we have no corroborating evidence that these flocks were research flocks.

[*27] portion of DNA. A vector vaccine is used when traditional vaccines that expose the broiler to the entire virus have too great an infection risk. But vector vaccines have a drawback. If a disease evolves such that the portion of DNA used in the vaccine changes, the broiler's immune system will not detect and fight off the disease. This causes most vector vaccines to quickly lose effectiveness. Because of this, vector vaccines are less effective than CEO vaccines.

Despite the emergence of the new vector vaccine in 2014, the large poultry producers in the area selected the CEO vaccine to administer in response to the 2014 outbreak of LT. While GOMI also administered the CEO vaccine, it saw a possible alternative use for the HVT–LT vaccine. In breeders, GOMI commonly administered a vector vaccine in the hatchery to provide initial weak immunity to the virus. Then in the field, GOMI administered the CEO vaccine to the breeders for continued immunity. Because the breeders had prior exposure to the virus through the vector vaccine, their reactions to the CEO vaccine were less severe. GOMI referred to this process as priming. While it was a common practice in breeders, GOMI did not normally prime broilers. On the basis of conversations with farms on the east coast, GOMI theorized that it could prime the broilers with the HVT–LT vaccine that would reduce later side effects to the CEO vaccine.

In 2014 GOMI primed flocks of broilers at the hatchery and monitored the broilers' reactions to the later CEO vaccines. The primed flocks had less severe side effects, and GOMI decided to implement this priming going forward. As of September 2, 2014, the vaccine protocol for 2014 indicated that all big broilers west of I–49 and north of Interstate 40 (I–40) were primed with the HVT–LT vaccine. Some flocks of small broilers in the same location were also primed. According to petitioners, GOMI performed LT experimentation on all flocks west of I–49, which included flocks covered by 133 contracts. Of these flocks, 24 were placed after September 2, 2014, and 6 were big broilers. The adjusted feed expenses, excluding the shrink adjustment and overhead expenses, for these 6 flocks were $1,521,039.

F. *Vaxxitek*

As noted above, one recurrent issue in raising broilers was IBD, a disease that affects a broiler's immune system. Before the research years, GOMI vaccinated broilers for IBD several times throughout their lifetime to maintain immunity. Generally, GOMI administered one vaccine at day 1 of a broiler's life, one vaccine between day 14 through

[*28] 16 of a broiler's life, and for large broilers, one vaccine around day 60 of a broiler's life.

Vaxxitek came onto the market to cut down on the need to repeat vaccinations for IBD throughout a broiler's life.[14] Vaxxitek is a viral vector vaccine. The unique thing with the Vaxxitek vaccine is that the IBD virus is delivered to the broiler's immune system on a deactivated herpes virus. As in humans, herpes is an incurable infectious disease that continues to replicate in the host's body throughout life. As the herpes virus replicates in the broiler's body, the IBD virus portion of the DNA continues to replicate causing a continued immune response. This allows the broiler to maintain immunity without additional vaccinations. Vaxxitek was marketed to the industry as a drug that would improve uniformity in broilers by limiting the spread of IBD. GOMI theorized that Vaxxitek would help control cases of IBD and lead to more uniform broilers.

GOMI's experience with Vaxxitek started prior to the research years. Before the research years, GOMI noticed during routine necropsies that its broilers had smaller than average bursa glands. This set off the IBD alarm bells. In response, GOMI administered Vaxxitek at the manufacturer's recommended dosage. After one cycle of Vaxxitek, GOMI saw an immediate improvement in the broilers. The broilers had better feed conversion ratios, were more uniform, and had larger bursa glands.

GOMI was eager to confirm these results and administered Vaxxitek for a second and third consecutive trial. The effectiveness quickly declined as the IBD virus evolved such that it no longer matched the portion of IBD DNA in the Vaxxitek vaccine. Performance fell and necropsies showed signs of IBD. But GOMI did not view the research trials as a failure. Instead, GOMI determined that the Vaxxitek vaccine was effective for one cycle at the manufacturer's recommended dosage but that the Vaxxitek vaccine should be given for only one cycle per year.

This brings us to the research years. Although GOMI knew that Vaxxitek worked at the full dosage in one cycle, it questioned whether a lower dosage would provide the same immunity and save money. Profits in the poultry industry are measured by fractions of a penny per pound so any cost savings would pay off big for GOMI. During this time,

---

[14] There are multiple versions of Vaxxitek vaccines for different diseases. The focus of GOMI's research project related to Vaxxitek was the Vaxxitek vaccine for IBD.

[*29] GOMI administered Vaxxitek to broilers with the goal to determine the lowest effective dosage that could be administered. GOMI purchased vials of Vaxxitek from Merial Select, Inc., for these trials between December 2012 and February 2014.

According to petitioners, GOMI administered Vaxxitek for these trials between 2012 and 2014.[15] In 2012 GOMI administered the combination of Vaxxitek and Floramax to flocks covered by nine contracts. Two of these contracts were settled in 2012 with the remaining flocks carrying over to 2013. After the carryover contracts settled in 2013, GOMI administered only Vaxxitek to flocks covered by 26 contracts. These contracts were settled throughout 2013 with six stretching into 2014. In 2013 GOMI also sequentially tried the following combinations: Vaxxitek, HatchPak, and Tylan to flocks covered by two contracts; Vaxxitek, HatchPak, Tylan, and Calsporin to flocks covered by seven contracts; Vaxxitek, HatchPak, Tylan, and Sporulin to flocks covered by 11 contracts; and Vaxxitek and Sporulin to flocks covered by seven contracts. Finally, in 2014 GOMI administered only Vaxxitek to flocks covered by six contracts that were settled between February and March 2014. The record does not contain any information regarding the dosages given to each flock.

As with the pre-research year study, GOMI continued to monitor health trends and perform necropsies to measure bursa size. Petitioners did not provide the results of these trials.[16]

G. *Ross 708*

When picking up a plastic tray of chicken from the grocery store or a bucket of Kentucky Fried Chicken, the average consumer does not know the genetic line of chicken that produced the meat. But the genetic line drives the entire production process for the poultry producer. Each genetic line of chicken performs differently. One genetic line of chicken may perform better as big broilers, and another may perform better for deboning. Each genetic line of chicken has different nutrient needs and will be predisposed to different ailments. Because of the impact on the

---

[15] All representations concerning which contracts were included in the Vaxxitek trials are based on petitioners' representations on brief. As discussed *infra* we have no corroborating evidence that these flocks were research flocks.

[16] On brief, petitioners conflate these research trials regarding dosage with the pre-research years' trials to determine the effectiveness of Vaxxitek. We disregard any analysis as it relates to the tests to determine the effectiveness of Vaxxitek before the research years.

[*30] production process, poultry producers take the decision to switch genetic lines very seriously. The importance of making the correct decision is amplified because once a decision to switch is made, it can take up to three years to convert production to that genetic line.

New genetic lines of chickens were constantly being created and evaluated by genetic vendors to produce the best quality product. After making a few tweaks to a genetic line, these genetic vendors undertook extensive laboratory experimentation in clean conditions to see how the chickens performed under ideal conditions. With the results of these studies in hand, genetic vendors visited poultry producers with the hope of swaying them away from their current genetic line of chickens. If the sales call went well, the poultry producer purchased eggs from the genetic vendor to raise as breeders. Those breeders then produced the broilers.

In determining whether to switch genetic lines, GOMI's primary consideration was the sales mix currently demanded by end customers. For example, GOMI's customers demanded uniformity that would allow mass production in a fast-food setting. After narrowing down possible breeds to fit the product mix, GOMI next considered whether the broilers would perform well under its standard production process. Even small changes, such as geography, can make the same genetic line perform dramatically differently.

In 2012 GOMI raised the Cobb 500 genetic line of broilers, which it purchased from Cobb-Vantress. The Cobb 500 genetic line of broilers was initially designed to produce the best small broilers on the market. As such, the broilers had a steep growth curve that tended to flatten out as they grew over four pounds. Because a portion of GOMI's customers demanded big broilers, GOMI had to push the Cobb 500 broilers past the plateau with more feed and extended growth times. Cobb 500 broilers are resilient towards environmental stressors, such as coccidiosis, but are at an increased risk of bowel obstructions. GOMI based its nutrition plans on the needs of the Cobb 500 broilers; for example, the diets included more fiber.

At the same time, George's operations in Virginia ran a genetic line trial to compare the performance of the Cobb 500 broilers to Ross 708 broilers, a genetic line sold by Aviagen for large broiler production. The research trials showed that in the first few weeks of life, the Ross 708 broilers have a flatter growth curve, with Ross 708 broilers weighing less than Cobb 500 broilers at three weeks. After four weeks the rate of

[*31] growth flipped with the Ross 708 broilers growing from seven to nine pounds very quickly. However, the Ross 708 broilers are highly susceptible to coccidiosis. During the genetic line trials, Virginia operations had resounding success with the Ross 708 broilers.

One successful trial in Virginia was not enough for GOMI to switch to the Ross 708 broiler, especially considering the influence of geography on performance. GOMI undertook a genetic line trial in 2014 for its large broilers looking to replicate the success in Virginia. GOMI reviewed Agri Stats to determine genetic line performance across the industry. Agri Stats showed that the Ross 708 breeds produced fewer chicks per egg incubated than the Cobb 500. With caution based on this information, GOMI reached out to Aviagen, who organized an egg swap with another poultry producer for the Ross 708 breed. GOMI assigned this genetic line code 3677 in its records.[17] GOMI incubated the test eggs at its hatchery. GOMI also selected a group of its standard Cobb 500 eggs to run as a control test. GOMI assigned this genetic line code 1977 in its records. These eggs were incubated and hatched alongside the Ross 708 eggs.

When the chicks hatched, they were ready to be transferred to farms to grow. GOMI selected the Littrell Broiler Farm, a company-related farm for the research trial. Around July 1, 2014, GOMI placed two houses of Cobb 500 and two houses of Ross 708 at the Littrell Broiler Farm. It appears from the record that GOMI reported expenses related to two houses of Cobb 500 (houses 1 and 5) and one house of Ross 708 (house 3).[18] The adjusted feed expenses, excluding the shrink adjustment and overhead expenses, for these flocks were $398,520.

The next question GOMI faced was how to feed the test houses. As noted above, Cobb 500 broilers and Ross 708 broilers have vastly different growth curves that demand unique nutritional programs. Aviagen provided GOMI with nutrition guidelines that were derived outside of the United States, which GOMI found to be inapplicable. It would be counterintuitive to the experimental design to feed the flocks different feeds when the goal was to determine whether the Ross 708 broilers were superior under GOMI's standard operating procedures. GOMI slightly altered the nutritional content of its standard feed to

---

[17] Reviewing GOMI's weekly grower analysis report, it appears as though GOMI had run this genetic line of Ross on only one prior occasion in 2012.

[18] While testimony and contemporaneous emails indicated that two houses of Ross 708 broilers were placed as part of this trial, petitioners reported research credits related to only one house of Ross 708 broilers.

[*32] meet the unique demands of the Ross 708 broilers' diet. The test and control houses were fed this slightly altered formulation.

GOMI raised a portion of these broilers to its standard big broiler weight of seven pounds. GOMI used this group to determine how the different genetic line would perform under standard operations. GOMI raised the remainder of the broilers to 8.5 pounds before they were processed. In the processing, GOMI focused on the yield of each cut of meat. Instead of the normal George's processing plant, GOMI sent these test broilers to the University of Arkansas for yield analysis. The University of Arkansas maintains a specialized processing plant to more finely dissect broilers into the different cuts of meat.

GOMI received a report from the University of Arkansas on October 7, 2014, which showed the weight of the live broiler, carcass, fat, and cuts of meat. GOMI's corporate lab director, Bill Potter, analyzed this data to determine the margin per pound and resulting annual margin that GOMI could expect if it switched to the Ross 708 broilers. Generally, he determined that the Ross 708 broilers had an increased margin of $0.021 per pound, which would increase the annual margin by over $4 million. The Ross 708 broilers also had more breast meat, one of the most expensive cuts.

As for the broilers processed at seven pounds, the corporate lab director noted that the Ross 708 broilers had slightly lower feed conversion rates and a higher mortality. Despite this, the Ross 708 broilers that survived until processing were of higher quality and more valuable. As a result of these trials, GOMI switched the genetic line for its large broilers to the Ross 708.

VIII. *Research Credit Study*

George's was a longtime client of Frost PLLC, an accounting firm in Little Rock, Arkansas. Frost PLLC developed a deep understanding of George's business over the 50-plus-year relationship. In fact, George's, Inc.'s chief financial officer, Gini Driskell, was a former employee of Frost PLLC. Accountants at Frost PLLC worked closely with George's in-house accountants to prepare the annual returns for all the George's entities. With petitioners' returns intertwined with the business of George's, Frost PLLC also prepared petitioners' personal returns.

One year, Frost PLLC called Ms. Driskell out of the blue with a proposal to have alliantgroup review George's financials to determine

[*33] whether George's was eligible for research credits. alliantgroup is a tax consulting and lobbying firm with over a thousand employees, including many attorneys. By the time of the recommendation, alliantgroup had over 12 years of experience in performing tax credit and incentive studies. It had numerous employees with experience in the highest levels of tax law, including a former IRS commissioner, former tax counsel to the U.S. Senate Finance Committee, and former members of Congress. alliantgroup extensively trains its employees on the intricacies of the Code upon recruitment and hosts annual trainings to keep employees up on the latest developments. Ms. Driskell took this suggestion to Gary. Gary had never heard of the research credit or alliantgroup, but he thought it was worth further investigation exclusively on the recommendation of his trusted accounting firm Frost PLLC. This green light was the extent of Gary's involvement in the research credit study with Gary delegating management of it to his sons, the co-chief executive officers and co-presidents of George's.

On August 30, 2014, one of petitioners' sons signed an engagement letter with alliantgroup to conduct a research credit study on behalf of George's, Inc., and related entities. alliantgroup assigned Associate Director Jeremy Troutman as the lead consultant on the research credit study. Mr. Troutman had been with alliantgroup for 16 years and completed approximately 300 research credit studies by the time of trial. He focuses on research credit studies in the agriculture industry.

Mr. Troutman approached the research credit study in three phases. In the first phase he spoke to the technical, accounting, and finance employees of George's to determine whether George's had any potentially qualifying activities. Some of the clients who engage alliantgroup never make it out of this stage because alliantgroup determines that they did not perform any qualified research. Mr. Troutman made two visits to George's to interview employees from all stages of the commercial broiler production process. This included interviews with those that would have the best sense of what, if any, research was occurring at George's: Mr. McClure (live production manager), Mr. Hopkins (live production accountant), Dr. Gilbert (veterinarian), William Potter (vice president of quality assurance), and others. Mr. Troutman also requested any documents that would shed light on the qualifying activities. Kyle Avey, a service technician and broiler manager, was delegated this task and supplied the documents, including those reflecting changes in feed ingredients and vaccinations.

[*34] On the basis of these interviews and documents, alliantgroup informed George's that it had identified potential credits.

Then came the second phase of the study, which focused on substantiation. alliantgroup requested all documents linking expenses to the research trials it had identified in phase 1. Mr. Troutman and his team also interviewed several employees regarding the product development process. George's provided alliantgroup with numerous spreadsheets showing settlement and feed information. Mr. Troutman reconciled these documents into a single spreadsheet that connected each flock to settlement data, feed expenses, and research trials.

Mr. Troutman determined the following projects were qualified research that could be substantiated for 2012 and 2013: Calsporin, Floramax, HatchPak, LT, Salinomycin, Sporulin, Tylan, and Vaxxitek. As for 2014, he determined the following projects were qualified research that could be substantiated: LT, Vaxxitek, and Ross 708.

To calculate the value of the research credit, Mr. Troutman relied on GOMI documents to connect each flock with the research trial and feed expenses. He received relevant documents from Ms. Driskell and Mr. Hopkins. In reviewing the feed costs for each flock, Mr. Troutman considered whether the amount recorded as feed expenses on settlement data included any expenses that should be removed. One expense he removed was the shrink adjustment expense, which reduced the credit to only feed consumed by the broilers. He calculated the average shrink adjustment per year, including Virginia farms, and removed this amount from the qualified research supplies. Mr. Troutman also removed the estimated manufacturing overhead cost that GOMI adds to its feed costs. He estimated this overhead expense by dividing the total tons of feed per flock by the cost of overhead at each of the mills and removing the resulting expense.

In total, Mr. Troutman determined that GOMI had the following qualified supply expenses: $16,450,745 in 2012; $29,478,367 in 2013; and $17,025,243 in 2014. Although alliantgroup claimed it found qualified activities and related services, it did not calculate any qualified service expenses because the process to determine the value of the credit was not worth the intense effort to allocate the wages.

To calculate the base amount, Mr. Troutman estimated research expenses between 2009 and 2011. He calculated the average ratio of qualified supply expenses to total expenses for the research years, which

[*35] was 10.23%. He then applied this ratio to the total supply expenses between 2009 and 2011 to calculate the qualified supply expenses for these years. He used these numbers to calculate the base amount for 2012. For tax year 2013, alliantgroup used the estimates for 2010 and 2011 but the actual qualified supply expenses for 2012 as determined in the report. For tax year 2014, alliantgroup used the estimate for 2011 and the actual qualified supply expenses for 2012 and 2013 as determined in the report.

In total, Mr. Troutman determined that GOMI was entitled to the following research credits: $1,070,380 for 2012, $2,870,901 for 2013, and $530,317 for 2014. Mr. Troutman's calculations and determinations were checked by two additional people at alliantgroup. Additionally, Frost PLLC verified facts and financial data. At the end of this second phase, alliantgroup provided petitioners with pro forma Forms 6765, Credit for Increasing Research Activities, that they could file to report the research credits.

alliantgroup's work with George's was not complete. The third and final phase of the research credit study was to draft two reports detailing the information gathered from the earlier phases. At some point after February 6, 2017, alliantgroup memorialized its findings in two undated written reports. The reports set forth extensive detail about the research trials and the calculation of qualified supply expenses for each trial. In total, Mr. Troutman spent between 700 and 800 hours on the reports.

IX. *Tax Reporting and Tax Court*

The exact timing of the end of the alliantgroup research credit study, petitioners' tax reporting, and the audits in these cases is murky. For clarity, we will explain petitioners' tax reporting and audits separately though they were happening simultaneously.

A. *Tax Reporting*

GOMI did not report any research credits on its timely filed Forms 1120S, U.S. Income Tax Return for an S Corporation, for tax years 2012 through 2014. Through a series of amendments in 2016 and 2017, GOMI reported qualified research expenses and credits as follows:

[*36]

Tax Year	*Amendment Date*	*Qualified Research Expenses*	*Research Credit*
2012	September 16, 2016	$16,450,745	$1,070,380
2013	September 12, 2017	29,478,367	2,870,901
2014	November 10, 2015	17,025,243	530,317[19]

Before petitioners filed the amended returns, alliantgroup provided Frost PLLC pro forma Forms 6765 that reported the research credits as calculated in the research study. Frost PLLC used these pro forma Forms 6765 in preparing the amended returns. The Forms 6765 submitted with the amended returns are identical to the pro forma Forms 6765 contained in the final research credit reports.

For tax years 2011 and 2012, petitioners did not report any research credits on their timely filed individual income tax returns. On October 17, 2016, petitioners filed amended 2011 and 2012 tax returns. On the amended 2012 tax return, petitioners reported a research credit attributed to GOMI's amended tax return for tax year 2012 of $1,070,380. Petitioners used a portion of this credit for 2012 and carried the remainder back to tax year 2011 through the amended 2011 tax return. Reporting these credits resulted in refund claims for petitioners. Respondent processed the amended returns except for certain partnership adjustments and denied the refund claims.

For tax year 2013, petitioners again did not report any research credits on their timely filed individual income tax return. On September 29, 2017, petitioners submitted an amended individual tax return that reported research credits attributed to GOMI's amended Form 1120S for tax year 2013 of $2,870,901. Petitioners did not use any of the credits and the credits were carried forward.

For tax year 2014, petitioners timely filed their individual tax return. They reported and used research credits attributed to GOMI's

[19] This amount was reduced from $815,873 by an election under section 280C. Section 280C generally provides that a taxpayer's deductions (or the amounts it would otherwise charge to its capital account) for qualified research expenses must be reduced according to the amount of the taxpayer's research credit. § 280C(c)(1) and (2). Alternatively, a taxpayer may avoid these requirements by electing to reduce the amount of its research credit pursuant to section 280C(c)(3).

[*37] amended Form 1120S for tax year 2014 of $530,317. On October 2, 2017, petitioners filed an amended individual tax return that reported a research credit carryforward of $1,879,611. This carryforward resulted in a refund claim. Respondent processed the return and denied the refund claim. On June 18, 2018, petitioners filed another amended individual tax return, reporting a research credit carryforward of $2,870,901. Respondent did not process this second amended return.

For tax year 2015, petitioners did not report or use any research credit on their timely filed individual tax return. On October 2, 2017, petitioners filed an amended individual tax return that reported a research credit carryforward of $476,280. Respondent processed this amended return. On June 18, 2018, petitioners filed a second amended individual income tax return. Therein, petitioners reported a research credit carryforward of $1,467,570. Respondent did not process this return.

For tax year 2016, petitioners reported and used on their timely filed individual tax return a research credit carryforward of $476,280 from tax year 2014. On June 18, 2018, petitioners filed an amended individual tax return reporting a research credit carryforward of $1,467,570. Petitioners used a portion of this carryforward and claimed a refund. Respondent did not process this return.[20]

Following all the amendments, both accepted and rejected, petitioners reported the following research credits:

[20] Shortly before trial, petitioners filed an additional petition in this Court to challenge a notice of deficiency for tax year 2019 that disallowed petitioners' research credits carried forward from tax years 2013 and 2014. Respondent determined a deficiency in petitioners' individual income tax of $842,907 and accuracy-related penalties of $168,581. On November 22, 2023, the parties executed a stipulation to be bound by these cases.

[*38]

Tax Year	*Research Credit Used*
2011	$550,320
2012	520,060
2013	-0-
2014	1,933,648
2015	-0-
2016	624,663

B. *Audits and Tax Court*

Before petitioners amended their individual returns, respondent selected their originally filed 2011 and 2012 returns for audit. On August 1, 2016, a revenue agent was assigned to the audit. On September 21, 2016, respondent issued petitioners a notice of deficiency for tax years 2011 and 2012 unrelated to the research credits. On December 23, 2016, petitioners filed a petition with this Court for a redetermination of the deficiencies and accuracy-related penalties.[21] On April 1, 2019, petitioners amended the petition, alleging that GOMI was entitled to $1,070,380 in research credits for tax year 2012, which flowed through to petitioners' 2012 tax return. Petitioners and respondent have settled all issues from 2011 and 2012 except for the research credits.

Respondent also selected petitioners' 2014 and 2016 returns for audit. These original returns reported research credits as discussed above. On July 15, 2021, respondent issued petitioners a notice of deficiency for tax years 2014 and 2016. Respondent disallowed petitioners' research credits and determined accuracy-related penalties of $106,063 for 2014 and $95,256 for 2016. Petitioners petitioned this Court for redetermination of the deficiencies and penalties. On February 14, 2022, we consolidated these cases for trial, briefing, and opinion.

[21] As noted above, petitioners conceded the accuracy-related penalties for tax years 2011 and 2012, which were related to adjustments no longer at issue.

[*39] OPINION

I. *Jurisdiction and Burden of Proof*

Where notices of deficiency issued to an S corporation shareholder include adjustments to both S corporation items and other items unrelated to the S corporation, we have jurisdiction to redetermine the correctness of all adjustments in the shareholder-level deficiency proceeding. *See Johnson v. Commissioner*, 160 T.C. 18, 28 (2023) (citing *Winter v. Commissioner*, 135 T.C. 238, 245–46 (2010)). We thus have jurisdiction to determine the correctness of both respondent's adjustments to petitioners' shares of GOMI's reported research credits and any other determinations in the notices of deficiency.

The Commissioner's determinations set forth in notices of deficiency are presumed correct, and taxpayers bear the burden of proving that they are erroneous. Rule 142(a)(1); *Welch v. Helvering*, 290 U.S. 111, 115 (1933). Credits are a matter of legislative grace, and taxpayers must demonstrate their entitlement to credits reported. *See Feigh v. Commissioner*, 152 T.C. 267, 270 (2019) (citing *INDOPCO, Inc. v. Commissioner*, 503 U.S. 79, 84 (1992)). Petitioners have neither alleged nor established that they meet the requirements of section 7491(a) as necessary to shift the burden of proof to respondent on any factual issues.

II. *Expert Witnesses*

Both parties relied on expert opinions to support their theories on how we should resolve the disputed issues. We evaluate an expert's opinion in the light of his or her qualifications and all the evidence in the record. *See Helvering v. Nat'l Grocery Co.*, 304 U.S. 282, 295 (1938); *Estate of Mellinger v. Commissioner*, 112 T.C. 26, 39 (1999). "The persuasiveness of an expert's opinion depends largely upon the disclosed facts on which it is based." *Estate of Davis v. Commissioner*, 110 T.C. 530, 538 (1998). We are not bound to follow any expert witness' opinion where it is contrary to our own judgment. *Helvering v. Nat'l Grocery Co.*, 304 U.S. at 295; *Estate of Hall v. Commissioner*, 92 T.C. 312, 338 (1989). We may adopt or reject an expert's opinion in whole or in part. *Estate of Davis*, 110 T.C. at 538.

Respondent offered the expert testimony of Elizabeth Bobeck, an associate professor of animal sciences at Iowa State University. At trial she was qualified as an expert in poultry nutrition, poultry immunology, and broiler production. Her opening expert report was received at trial

[*40] as her direct testimony under Rule 143(g)(2). Her report provided background information on broiler production and evaluated whether the two alliantgroup research credit reports contain sufficient information to show that GOMI engaged in the scientific method with respect to the research trials. Ultimately, reviewing the research credit reports, Dr. Bobeck concluded that there was insufficient information to determine that GOMI followed the scientific method in performing the research trials.

Petitioners offered the rebuttal expert testimony of Corey Johnson, a poultry nutritionist at a feed manufacturer. At trial he was qualified as an expert in poultry nutrition. His rebuttal report was received at trial as his rebuttal testimony under Rule 143(g)(2). Solely on the basis of the research credit reports, Dr. Johnson agreed with Dr. Bobeck's conclusion that the reports do not contain enough information to demonstrate that GOMI followed the scientific method. He noted, however, that Dr. Bobeck was not provided the underlying GOMI documentation. In his review of the underlying data, he concluded that GOMI did follow the scientific method.[22]

Both experts agree that basic and applied research are critical in the poultry industry because the "sterile" confines of the basic research performed in laboratory settings may not directly translate to the large-scale, less controlled environment of the farms.

III. *Section 41 Research Credit*

A. *Basic Structure*

Section 38(a) permits a taxpayer to report on his return a credit against tax equal to the sum of (1) business credits carried forward to the tax year, (2) current year business credits, and (3) business credits carried back to the tax year. Current year business credits include the credit under section 41 for increasing research activities. § 38(b)(4).

Section 41 provides several alternative approaches to calculate the research credit. *See* § 41(a), (c)(3), (4), (5). GOMI elected to calculate its research credits under the alternative simplified method of

[22] We struck a large portion of Dr. Johnson's report as exceeding the scope of a proper rebuttal report to Dr. Bobeck's report.

[*41] section 41(c)(5).[23] Under the alternative simplified method, the research credit is equal to 14% of the excess of the taxpayer's qualified research expenses (QREs) in the credit year over 50% of the average of the taxpayer's QREs from the three preceding years. § 41(c)(5)(A). If the taxpayer has no qualified research in each of the three preceding years, the credit is reduced to 6% of the taxpayer's QREs in the credit year. § 41(c)(5)(B); Treas. Reg. § 1.41-9(c)(1).

QREs are limited to the amounts "paid or incurred by the taxpayer during the taxable year in carrying on any trade or business." §§ 41(b)(1), 7701(a)(25). QREs comprise in-house research expenses and contract research expenses. § 41(b)(1). As relevant to these cases, in-house research expenses are (1) "any wages paid or incurred to an employee for qualified services performed by such employee" and (2) "any amount paid or incurred for supplies used in the conduct of qualified research" (qualified supplies). § 41(b)(2)(A)(i) and (ii). Qualified services are defined as either (1) engaging in qualified research or (2) engaging in the direct supervision or direct support of qualified research. § 41(b)(2)(B). Generally, wages are considered in-house research expenses to the extent that the wages were paid for qualified services of an employee. § 41(b)(2)(A)(i); Treas. Reg. § 1.41-2(d)(1). Qualified supplies include all tangible property other than land, improvements to land, or depreciable property. § 41(b)(2)(C).[24]

B. *Qualified Research*

To constitute qualified research, the research must satisfy a four-part statutory test:

> Sec. 41(d). Qualified research defined. . . .
>
> (1) In general.—The term "qualified research" means research—
>
> (A) with respect to which expenditures may be treated as expenses under section 174,
>
> (B) which is undertaken for the purpose of discovering information—
>
> (i) which is technological in nature, and

[23] The alternative simplified credit reported by GOMI was moved from section 41(c)(5) to section 41(c)(4) by the Consolidated Appropriations Act, 2018, Pub. L. No. 115-141, div. U, § 101(c), 132 Stat. 348, 1160.

[24] The Secretary has promulgated regulations under section 41. Petitioners do not challenge the validity of these Treasury regulations.

[*42] (ii) the application of which is intended to be useful in the development of a new or improved business component of the taxpayer, and

(C) substantially all of the activities of which constitute elements of a process of experimentation for a purpose described in paragraph (3).

The four-part statutory test is applied separately to each business component. § 41(d)(2)(A).

If a business component fails any part of the four-part statutory test, we may apply the test to a subset of the product or process (shrinking-back rule). Treas. Reg. § 1.41-4(b)(2). The shrinking-back rule instructs us to reapply the four-part statutory test to the business component at its most significant subset of elements. *Id.* If that subset of elements again fails, we generally drill down to a more granular subset of the business component until either (1) a subcomponent satisfies the test or (2) the most basic level of the component fails to satisfy the test. *Id.*

1. *The Business Component Test*

In applying the four-part statutory test, a taxpayer must first establish the business component it sought to develop. § 41(d)(2); *Siemer Milling Co. v. Commissioner*, T.C. Memo. 2019-37, at *35 (holding that a taxpayer failed the business component test because it failed to establish what business component it sought to develop). A business component is "any product, process, . . . technique, formula, or invention" which is to be held for sale or used by the taxpayer in its trade or business. § 41(d)(2)(B). Critically, section 41(d)(2)(C) directs us to treat the product a taxpayer produces as a separate business component from its production process. If a taxpayer produces a product as part of its trade or business, the taxpayer's search for a way to produce the same product in greater quantity or at lower cost may be qualified research on the production process, but not on the product itself. *See Union Carbide Corp. & Subs. v. Commissioner*, T.C. Memo. 2009-50, slip op. at 275–78, *aff'd*, 697 F.3d 104 (2d Cir. 2012); Treas. Reg. § 1.41-4(b)(1) (last sentence).[25] We have previously held that to the extent a research trial

[25] While this memorandum opinion and the opinion of the U.S. Court of Appeals for the Second Circuit are not binding in these cases, neither party contests the rationale of these cases. Given this, we find these cases persuasive in our analysis.

[*43] seeks to improve the process alone, QREs do not include the costs of the experiment the taxpayer would have incurred to manufacture the same product by the standard method. *Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 275–78; *see also Union Carbide Corp. & Subs. v. Commissioner*, 697 F.3d at 108–09 (agreeing with the Tax Court's conclusion on ordinary production costs).

To illustrate, imagine that a taxpayer tests two experimental production processes designed to improve on its standard process for producing Product X. In Test A, the taxpayer evaluates an experimental process designed to produce an improved product, Product X+. Test B, on the other hand, should yield the same Product X but at a lower cost than the standard process.[26] Section 41(d)(2)(C), *Union Carbide Corp. & Subs.*, and Treasury Regulation § 1.41-4(b)(1) tell us that if Test B involves qualified research at all, the taxpayer conducts such research on the production process alone.

After a taxpayer establishes which business component it sought to develop, the business component test requires that the taxpayer intend for the discovered information to be useful in developing a new or improved business component of the taxpayer. § 41(d)(1)(B)(ii). To be useful within the meaning of this test, the research need only provide some level of functional improvement to the taxpayer. *Norwest Corp. & Subs. v. Commissioner*, 110 T.C. 454, 495 (1998).

2. *The Technological Information Test*

The technological information test requires that the research be undertaken for the purpose of discovering information that is "technological in nature." § 41(d)(1)(B)(i). Information is technological in nature if "the process of experimentation used to discover such information fundamentally relies on principles of the physical or biological sciences, engineering, or computer science." Treas. Reg. § 1.41-4(a)(4). The technological information test does not require the taxpayer to rely on novel applications of science. *See id.* Instead, a

---

See Dunaway v. Commissioner, 124 T.C. 80, 87 (2005) (explaining that memorandum opinions are not binding); *Golsen v. Commissioner*, 54 T.C. 742, 757 (1970) (stating that when a "squarely [o]n point" decision of the appellate court to which an appeal would lie contradicts our own precedent, we will follow the appellate court's decision), *aff'd*, 445 F.2d 985 (10th Cir. 1971).

[26] The same rationale would be applicable for a taxpayer seeking to produce a greater quantity of product X with the same input.

[*44] taxpayer may rely on existing principles of science and engineering to satisfy this requirement. *See id.*

3. *The Section 174 Test*

Next, the research must be research "with respect to which expenditures may be treated as expenses under section 174." § 41(d)(1)(A). We refer to this as the "section 174 test," whereby the taxpayer must show (1) that the research activities constituted research and development within the meaning of section 174, and (2) that the research expenditures would be eligible for deductions under section 174. *See Norwest Corp. & Subs.*, 110 T.C. at 491 (requiring "the taxpayer to satisfy all the elements for a deduction under section 174"); *Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 197 (analyzing whether a taxpayer's activities constituted research and development within the meaning of section 174 and whether the costs associated with these activities may be treated as expenses under section 174).

For background, section 174 operates as a narrow, elective exception to the general capitalization rules. §§ 174(a), 263(a)(1), 263A(c)(2). Section 174(a) allows a taxpayer to elect a current deduction for research and expenditures which are paid by the taxpayer during the taxable year in connection with the taxpayer's trade or business.[27] *See also* Treas. Reg. § 1.174-1. Research and experimental expenditures are research and development costs in the experimental or laboratory sense and generally include all costs incident to the development or improvement of a product. Treas. Reg. § 1.174-2(a)(1).

We apply a two-step test to determine whether a taxpayer's activities constituted research and development within the meaning of section 174. In the first step the taxpayer must show that the information objectively available to it did not establish the appropriate design of the product. *See Betz v. Commissioner*, T.C. Memo. 2023-84, at *70; Treas. Reg. § 1.174-2(a)(1); *see also Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 195–96. If such information was not available to the taxpayer with respect to establishing either the capability, method, or appropriate design, then uncertainty existed. *See Betz*, T.C. Memo. 2023-84, at *70; *Union Carbide Corp. & Subs.*, T.C.

[27] Section 174 was later amended to eliminate the current deduction and instead requires amortization of research and development expenditures for tax years starting after December 31, 2021. *See* Tax Cuts and Jobs Act of 2017, Pub. L. No. 115-97, § 13206, 131 Stat. 2054, 2111–13.

[*45] Memo. 2009-50, slip op. at 195; Treas. Reg. § 1.174-2(a)(1). In determining whether uncertainty existed, we examine the information objectively available to the taxpayer, rather than the taxpayer's subjective understanding of that information. *See Max v. Commissioner*, T.C. Memo. 2021-37, at *30 (finding no uncertainty where appropriate design may have been subjectively unknown to the taxpayer but the taxpayer "already ha[d] the information necessary to address that unknown"); *Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 195–96 ("Whether an uncertainty exists is an objective test that depends on the information available to the taxpayer." (citing *Mayrath v. Commissioner*, 41 T.C. 582, 590–91 (1964), *aff'd*, 357 F.2d 209 (5th Cir. 1966))). Uncertainty may extend over multiple tax years if the taxpayer continues to face uncertainty that was not resolved in prior years. *See Siemer Milling Co.*, T.C. Memo. 2019-37, at *27 ("[The taxpayer] could have faced the same uncertainties for several years in a row; not all uncertainties are neatly resolved within the confines of a single taxable year."); *see also* Treas. Reg. § 1.174-2(a)(1).

In the second step, if uncertainty existed, the taxpayer must show that it undertook investigative activities that were "intended to discover information that would eliminate uncertainty." Treas. Reg. § 1.174-2(a)(1); *see Max*, T.C. Memo. 2021-37, at *30–31 (citing *Mayrath*, 41 T.C. at 590) (requiring the taxpayer to show it undertook investigative activities because the purpose of section 174 was to limit deductions to expenditures of an investigative nature). The resolution of this uncertainty does not necessarily require experimentation. *See Little Sandy Coal Co. v. Commissioner*, T.C. Memo. 2021-15, at *36, *aff'd*, 62 F.4th 287 (7th Cir. 2023).

If a taxpayer shows that the research activities constituted research and development within the meaning of section 174, the taxpayer must then show that the expenses related to these activities are deductible under section 174. *See Norwest Corp. & Subs.*, 110 T.C. at 491. As a general rule, section 174 applies to the costs of developing the concept of a product but not to the costs of building the product itself. *See Mayrath*, 41 T.C. at 590; *Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 196 (citing *Mayrath*, 41 T.C. at 590). But when a taxpayer constructs a physical product for the purpose of assessing the viability of its concept—a pilot model—the construction costs can be considered costs of developing the concept of the product and thus can be deducted under section 174. *Little Sandy Coal Co.*, T.C. Memo. 2021-15, at *38.

[*46] The 2014 amendments to Treasury Regulation § 1.174-2 clarified that point by adopting a definition of "pilot model" and providing examples of the treatment of pilot models under section 174.[28] This amendment defined pilot model as "any representation or model of a product that is produced to evaluate and resolve uncertainty concerning the product during the development or improvement of the product." Treas. Reg. § 1.174-2(a)(4). Because these expenditures are undertaken to resolve the uncertainty, the pilot model expenses are not production costs but instead costs associated with the development of the concept of the product. *Id.* subparas. (2) and (3). This is the case even if the taxpayer later sells the pilot model. *Id.* subpara. (11) (example 7).

Treasury Regulation § 1.174-2(a)(11) (example 7) confirms that the costs of producing a pilot model can qualify as research or experimental expenditures under section 174. The example involves an aircraft manufacturer who sought to develop an experimental aircraft capable of taking off and landing vertically. The taxpayer "produce[d] a working aircraft at a cost of $5,000,000" for the purpose of "evaluat[ing] and resolv[ing] uncertainty during the development or improvement of the product and test[ing] the appropriate design" of the aircraft. Treas. Reg. § 1.174-2(a)(11) (example 7). The example concludes that the aircraft the taxpayer built was a pilot model, as defined by Treasury Regulation § 1.174-2(a)(4), and that "the $5,000,000 of costs that [the taxpayer] incurred in producing the aircraft qualifie[d] as research or experimental expenditures under section 174." *Id.* subpara. (11) (example 7). That was true even though the taxpayer sold the aircraft "[i]n a later year." *Id.*

4. *The Process of Experimentation Test*

Finally, section 41 requires that substantially all the research activities constitute elements of a process of experimentation for a qualified purpose. § 41(d)(1)(C). We refer to this as the process of experimentation test. A process of experimentation is a "process designed to evaluate one or more alternatives to achieve a result where . . . the appropriate design of that result, is uncertain as of the beginning

[28] The amendments to Treasury Regulation § 1.174-2 adopted in 2014 "apply to taxable years ending on or after July 21, 2014." *Id.* para. (d). The regulations, however, allow taxpayers to apply the amended provisions "to taxable years for which the limitations for assessment of tax ha[ve] not expired." *Id.* We take petitioners' invocation of the definition of "pilot model" provided in Treasury Regulation § 1.174-2(a)(4), as amended in 2014, as an indication that they have chosen to apply the amended provisions for tax years 2012 and 2013.

[*47] of the taxpayer's research activities." Treas. Reg. § 1.41-4(a)(5)(i). The requisite uncertainty under this test is essentially identical to the uncertainty required by the section 174 test. *Betz*, T.C. Memo. 2023-84, at *68 n.23; *Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 199. The process of experimentation test requires a more structured method of discovering information than section 174. *Betz*, T.C. Memo. 2023-84, at *68 n.23; *Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 200. The regulations elaborate on what a process of experimentation involves:

> 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.

Treas. Reg. § 1.41-4(a)(5)(i); *see also Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 201 (explaining that the process of experimentation requires the use of the scientific method).

The substantially all requirement is satisfied if "80 percent or more of a taxpayer's research activities, measured on a cost or other consistently applied reasonable basis . . . , constitute elements of a process of experimentation for a [qualified purpose]." Treas. Reg. § 1.41-4(a)(6). The substantially all requirement is satisfied even "if the remaining 20 percent (or less) of a taxpayer's research activities with respect to the business component do not constitute elements of a process of experimentation for a [qualified purpose], so long as these remaining research activities satisfy the [section 174 test] and are not otherwise excluded under section 41(d)(4)." *Id.*

The final part of the process of experimentation test requires that the activities be for a qualified purpose as defined in section 41(d)(3). Qualified research includes research that is related to (1) a new or improved function, (2) performance, or (3) reliability or quality.

[*48] § 41(d)(3). Research related to style, taste, cosmetic, or seasonal factors is not for a qualified purpose. *Id.*

C. *Activities That Are Not Qualified Research*

Section 41(d)(4) sets forth a list of additional activities that are specifically excluded from the definition of qualified research. Two exclusions are relevant to these cases: (1) adaptation of an existing business component and (2) routine data collection and quality control testing. § 41(d)(4)(B), (D).[29]

Research conducted to adapt an existing business component to a customer's particular requirements or needs is not qualified research. § 41(d)(4)(B). We have previously noted that the word "adaptation" must be read in its ordinary sense. *See Betz*, T.C. Memo. 2023-84, at *97 n.44 (citing *Adaptation*, *Oxford English Dictionary* (3d ed. 2011), https://www.oed.com/view/Entry/2115 (last updated March 2023)) (defining adaptation as "[t]he action or process of adapting one thing to . . . suit specified conditions, esp. a new or changed environment, etc."). That is, minor alterations of a design are excluded from the definition of qualified research. *Id.*

Studies and surveys, including routine data collection and routine testing for quality control do not constitute qualified research. § 41(d)(4)(D)(iv) and (v). We have previously held that testing that is performed to determine whether a research trial was successful is not routine data collection or quality control testing. *Norwest Corp. & Subs.*, 110 T.C. at 520–21. We elaborated on this holding in *Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 218. In that case a taxpayer generally collected information during its manufacturing process to ensure that the equipment was operating normally. During the research trial, the taxpayer collected some data that it ordinarily did not collect and took measurements more frequently for the purpose of determining whether the research trial was effective. *Id.* After collecting this data, the taxpayer analyzed the data, which it did not ordinarily do. *Id.* We held that these activities went beyond routine data collection and therefore were not excluded from the definition of qualified research. *Id.*

---

[29] In his answering brief, respondent also contends that to the extent we determine that any of the research trials related to a process business component, the exclusion under section 41(d)(4)(A) for research after commercial production applies. We need not reach this argument.

[*49] D. *Substantiation Principles*

Section 6001 requires that taxpayers keep records in compliance with the rules and regulations prescribed by the Secretary. Accordingly, taxpayers are required to "keep such permanent books of account or records . . . as are sufficient to establish the amount of gross income, deductions, credits, or other matters required to be shown" on a tax return. Treas. Reg. § 1.6001-1(a). With respect to the research credit, the taxpayer "must retain records in sufficiently usable form and detail to substantiate that the expenditures claimed are eligible for the credit." Treas. Reg. § 1.41-4(d). To substantiate research expenses, a taxpayer need not necessarily maintain and produce records in any particular form. *See Fudim v. Commissioner*, T.C. Memo. 1994-235, 1994 WL 223280, at *12 (accepting "testimony and other evidence in the record" as basis for the *Cohan* rule to estimate time spent performing qualified services); *Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 254 ("[Treasury Regulation § 1.41-4(d)] does not require that a taxpayer substantiate its research credit claim with any particular types of documents . . . .").

When a taxpayer fails to introduce contemporaneous records of qualified research expenses, we have previously applied the *Cohan* rule to estimate expenses when the taxpayer provides a reasonable estimate of the qualified expenses. *See Cohan v. Commissioner*, 39 F.2d 540, 544 (2d Cir. 1930); *Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 294–95; *Fudim v. Commissioner*, 1994 WL 223280, at *12. However, we do not apply the *Cohan* rule to estimate expenses paid or incurred if the taxpayer provides "no evidence at all that would permit an informed estimate" of the deduction, basis, or other tax advantage. *Reinke v. Commissioner*, 46 F.3d 760, 764 (8th Cir. 1995), *aff'g* T.C. Memo. 1993-197; *see also Shami v. Commissioner*, 741 F.3d 560, 568 (5th Cir. 2014) ("[T]he *Cohan* rule is not implicated unless the taxpayer proves that he is entitled to some amount of tax benefit[;] [i]n the context of the § 41 credit, a taxpayer would do so by proving that its employee performed some qualified services."), *aff'g in relevant part* T.C. Memo. 2012-78; *Mendes v. Commissioner*, 121 T.C. 308, 316 (2003) ("Even under *Cohan*, there must be sufficient evidence in the record to provide a basis upon which an estimate may be made." (citing *Vanicek v. Commissioner*, 85 T.C. 731, 742–43 (1985))); *Moore v. Commissioner*, T.C. Memo. 2023-20, at *11 ("Even if some of [employee's] activity on these three products was qualified research, we have no basis for estimating how much of his time was so spent."), *aff'd*, 101 F.4th 509 (7th Cir. 2024).

[*50] IV. *Qualification of Trial Projects as Qualified Research*

We turn to the issue of whether any research trial entailed qualified research within the meaning of section 41. Before we consider the qualification of each research project, we pause to address two preliminary arguments respondent relies upon to defeat the research credits without consideration of the individual trials. First, respondent argues that GOMI was the incorrect entity to report the research credit. Respondent argues that George's Farms, Inc., not GOMI, paid all the employees that petitioners brought to testify about the research trials. Consequently, he reasons that even if the employees conducted qualified research, it was not on behalf of GOMI.

We reject this argument because it conflicts with the record before us. The day-to-day operations of George's paid little mind to the divisions between the separate entities. In no place is this clearer than the accounting books and records. George's Farms, Inc., initially paid the employees and issued Forms W–2 reporting the wages. These wage expenses were then transferred to GOMI's books and records as an overhead expense on the feed. Incorporating the wage expenses into the feed overhead allowed GOMI to allocate the wage expenses to each flock in a manner it deemed fair. An alternative approach would have required the field staff to separately record time entries for each flock in the field. Be it from a disinterested attitude about managing the separate entities or a clever way to more appropriately track expenses to each flock, it is clear GOMI ultimately bore the cost of the employees. It is also clear that these employees worked on tasks assigned to GOMI in the entity chart. The activities of the field service staff, veterinarians, and nutritionists were all related to the live production side of the business. Therefore, any activities of these employees are attributed to GOMI. *See Kornhauser v. United States*, 276 U.S. 145, 153 (1928) (determining that legal expenses were business expenses of a taxpayer because the expenses "proximately resulted from . . . his business").

Respondent also argues that petitioners' failure to claim research credits for qualified wage expenses precludes their claiming research credits for qualified supply expenses. We reject this argument easily. Nowhere in the statute nor the accompanying Treasury regulations is claiming qualified supply expenses contingent on claiming qualified wage expenses. *See* § 41(b)(2)(A). Instead, to claim qualified supply expenses, the taxpayer need only show that the supplies were used in the conduct of qualified research. § 41(b)(2)(A)(ii). Wages for these qualified activities could be but are not required to be claimed as QREs.

[*51] § 41(b)(2)(A)(i). There are a multitude of reasons that a taxpayer may choose to claim only a portion of the credit that he is entitled to claim. In these cases that reason is the large expense required to substantiate the wage portion of any QREs compared to the payoff. Therefore, petitioners may claim qualified supply expenses as QREs, regardless of whether they claimed qualified wage expenses, so long as the expenses otherwise satisfy the four-part statutory test. We turn to that determination now. Below, we will address only the relevant portions of the four-step statutory test for each research trial.

A. *Salinomycin*

The Salinomycin research trials fail the section 174 test because petitioners have not substantiated the research activities. Petitioners claim that the Salinomycin research trials were conducted for an improved poultry product business component. Petitioners admit that Salinomycin effectively controlled coccidiosis even though its effectiveness declined over time. But this diminishing effectiveness was not the uncertainty petitioners roosted on. Petitioners allege that GOMI was uncertain as to whether higher dosages, combined with chemical coccidiostats, would increase Salinomycin's efficacy. It theorized that this would produce an improved poultry product with fewer coccidiosis infections.

As framed by petitioners, this project appears promising. GOMI may very well have been uncertain as to whether a higher dosage of Salinomycin administered with a chemical coccidiostat would produce an improved poultry product by effectively controlling coccidiosis. However, GOMI's contemporaneous records peck away at the claim that GOMI conducted investigatory activities to resolve this uncertainty. In fact, GOMI's feed recipe records demonstrate that it continued to add the same dosage of Salinomycin to the feed before and during the research trials. As petitioners admitted, there was no uncertainty at the time that this dosage would work.

We likewise fail to see evidence in the feed recipes that GOMI added chemical coccidiostats to the feed provided to the research flocks. Petitioners identified only Robenz as the brand of chemical coccidiostats that GOMI used during the Salinomycin trials. Because this is the only brand of chemical coccidiostats petitioners highlighted, we are unable to search the voluminous feed recipes to identify any other chemical coccidiostats to corroborate that these research trials occurred. We will not rely solely on GOMI's employees' testimony that other chemical

[*52] coccidiostats were added to the feed, because of the conflict in testimony highlighted above regarding the dosage of Salinomycin.

The only record of GOMI's adding Robenz to a feed recipe during the research trials is a grower feed recipe dated April 3, 2012. By this time, the experimental flocks covered by five contracts were settled with additional experimental flocks settled the next day. The remaining six contracts had settlement dates after the date on the feed recipe. However, petitioners have provided no connection between the April 3, 2012, feed recipe and the experimental flocks covered by these remaining six contracts. This data is particularly critical because the six remaining flocks were at different stages of development by the time this feed recipe was created. GOMI added Robenz to the feed recipes fed to flocks between the ages of 17 and 27 days. Accounting for the lag between formulation of the recipe and the time it was fed to the broilers, it appears likely that some of the remaining six flocks would have missed this window. Without any evidence that these flocks received the Robenz feed, we cannot find that GOMI conducted investigatory activities with respect to the flocks covered by these contracts.

These alleged trials are a clear example of the chicken (research credit study) coming before the egg (research). Petitioners failed to demonstrate that GOMI undertook research activities to resolve the alleged uncertainty in the Salinomycin trials as they relate to any of the flocks covered by the 12 contracts.

Petitioners generally argue that if any research trials failed, we should apply the shrinking-back rule to find QREs. However, they provided no meaningful basis upon which to apply this rule, nor is one apparent. Consequently, we will leave dissecting the broilers down to cuts of meat to the processing plants and will not apply the shrinking-back rule. Therefore, we will deny petitioners research credits as they relate to the Salinomycin research trials in their entirety.

B. *HatchPak and Tylan*

GOMI performed qualified research with respect to the HatchPak and Tylan trials in 2012 but not in 2013. Petitioners claim that the HatchPak and Tylan trials constitute qualified research and that the specific business component at issue is an improved poultry product. Respondent contests the classification of these research trials as product-related business components and in the alternative argues that these trials fail the four-part statutory test.

[*53] 1. *The Business Component Test*

The parties' dispute starts with the task of identifying the business component at issue in the HatchPak and Tylan research trials. Petitioners alleged that the business component was an improved poultry product, specifically one that was more resistant to coccidiosis and had better gut health. According to petitioners this is an improvement over its standard broiler—a broiler+ from the example discussed above—which is a product-related business component. Respondent on the other hand argues that the business component is a process-related business component. Respondent contends that these research trials were targeted at the bottom line with the goal to produce the same broiler GOMI always produced, just at a lower cost.

The business component at issue in these trials was a product-related business component. The aim of these research trials was not to save money or produce more broilers with the same inputs. Instead, it was aimed at creating higher quality broilers that did not suffer from the adverse health consequences of coccidiosis. Coccidiosis was a recurrent issue in GOMI's standard production process that damaged gut health and led to nonuniform broilers. If successful, the broilers created in these trials would have better gut health and be more uniform—an improvement over GOMI's standard broiler that suffered the consequences of coccidiosis. We are satisfied with petitioners' characterization of the business component as a product-related business component.[30]

Other than the dispute as to whether the business component was a process or a product, respondent does not dispute that GOMI otherwise met the business component test. We are satisfied that the HatchPak and Tylan research trials were designed to improve the broilers' health. This is an improvement to the quality of GOMI's standard broiler business component. It is also clear that GOMI intended to sell these healthier broilers to George's Farms, Inc. Therefore, the HatchPak and Tylan trials meet the business component test.

---

[30] In his opening brief, respondent complains that petitioners were not forthcoming as to the business component for any of the research trials. Although there are inconsistencies in the record as to petitioners' description of the business components, petitioners stipulated that the business component GOMI sought to improve was an improved poultry product. Thus, this is the business component upon which we conduct the four-part statutory test.

[*54] 2. *The Technological Information Test*

The activities related to the HatchPak and Tylan trials likewise meet the technological information test. The information GOMI sought to discover in these trials related to the health outcomes of the broilers in the research trials. In the pursuit of this discovery, GOMI relied on biologic sciences to study the broilers' performance including health monitoring and necropsies. The HatchPak and Tylan trials satisfy the technological information test.

3. *The Section 174 Test*

The activities related to the HatchPak and Tylan trials satisfy the section 174 test in 2012 but not in 2013. Petitioners allege that GOMI was uncertain as to the capabilities of the combination of HatchPak and Tylan to effectively control coccidiosis, which in turn would produce broilers with superior gut health, in its standard production process. Petitioners rely on the subsequent failure of HatchPak and Tylan in 2013 as proof that uncertainty continued into 2013. Respondent argues that there was no uncertainty as to these drugs because both were commercially available and widely used during the research years. Respondent also points out that before the research years, GOMI routinely administered Tylan.

Related to 2012, there was objective uncertainty as to the capabilities of HatchPak and Tylan to effectively control coccidiosis on GOMI farms. While the parties disagree on brief as to the possibility of uncertainty, their experts did not. Both Dr. Bobeck and Dr. Johnson agreed that vendor research conducted before a product is launched is not readily applicable to commercial scale poultry production. In sharp contrast with conditions in the field, vendor research is conducted in sterile conditions on a small number of broilers. While this research is a helpful basis for GOMI to determine the intended results of HatchPak and Tylan, it does not answer how the additives will perform when combined with GOMI's standard production process and the unique conditions on each farm. Even between commercial poultry producers, additives can have drastically different effects. There is no evidence that Tylan was specifically recommended to treat the side effects of HatchPak during the research years. Nor was there information on the interaction between the two additives. There was objective uncertainty as to the capability in 2012.

[*55] The research trials for 2013 are of a different feather. While uncertainty may stretch beyond the bounds of a single tax year, a taxpayer must show that the information objectively available to it in the tax year for which it seeks a research credit did not establish the capability, method, or appropriate design. *See Siemer Milling Co.*, T.C. Memo. 2019-37, at *26–27. When a taxpayer runs a test in a previous tax year that provides objective information that resolves the uncertainty, the taxpayer may not claim uncertainty for a later identical test. *Id.* at *33. For example, in *Siemer Milling Co.*, T.C. Memo. 2019-37, at *7, *33, we held that a taxpayer did not have section 174 uncertainty as to whether a machine was capable of operating at over 3,600 revolutions per minute when it had previously run the machine at 5,000 revolutions per minute. *See also Betz*, T.C. Memo. 2023-84, at *85 (holding that objective uncertainty as to the appropriate design of an oxidizer was resolved when the taxpayer obtained detailed measurements and performed calculations that established the required size and features).

We must focus on whether the information objectively available to GOMI established the capabilities of HatchPak and Tylan to effectively control coccidiosis in GOMI's standard production process. At the end of 2012 GOMI had objective data from 14 flocks across company-related farms that were raised under GOMI's standard production process. Overall, these flocks performed better than the control group. Like the previous 5,000 revolutions per minute test in *Siemer Milling Co.*, the 2012 trials provided a definitive answer that HatchPak and Tylan effectively control coccidiosis in GOMI's standard production process.

Critically, GOMI thought the uncertainty regarding the capability was resolved as well. Mr. McClure, the live production manager in charge of the live production side of the business, and Dr. Fussel, the main veterinarian at the time of these trials, both testified that after the 2012 trials, they expected the combination of HatchPak and Tylan to control coccidiosis under GOMI's standard production process. In fact, Dr. Fussel added that he expected performance to improve the longer GOMI used the combination treatment.[31] This

[31] To the extent petitioners' arguments could be construed as putting forth an uncertainty related to coccidiosis' becoming resistant to GOMI's standard treatments, we reject this argument. Petitioners did not claim that the uncertainty in 2013 was whether HatchPak and Tylan could control the *resistant* coccidiosis under its standard production process. It claimed the same uncertainty in 2012 as to whether HatchPak

[*56] testimony, coupled with the large amount of data established during the 2012 research trials, demonstrates that there was no uncertainty as to the capabilities of HatchPak and Tylan to effectively control coccidiosis in GOMI's standard production process. The successful results in 2012 resolved the uncertainty in 2013. *See Siemer Milling Co.*, T.C. Memo. 2019-37, at *33.

Petitioners latch onto the subsequent failure to show that there was lingering uncertainty as of 2013. While the failure in 2013 may have caused uncertainty going forward, the focus of our analysis is whether uncertainty existed at the *beginning* of the research activities in the tax year for which a taxpayer claims research credits. *See Siemer Milling Co.*, T.C. Memo. 2019-37, at *26–27; Treas. Reg. § 1.41-4(a)(5)(i). As discussed above, at the beginning of the 2013 research trials there was no uncertainty as to the capabilities of HatchPak and Tylan to effectively control coccidiosis in GOMI's standard production process. We cannot accept a post hoc justification of uncertainty due to a subsequent unexpected failure that was not anticipated at the beginning of the alleged research trials. The activities related to the HatchPak and Tylan trials for 2012 are research and development within the meaning of section 174, but the 2013 trials are not.

In 2012 GOMI employees undertook investigative activities to resolve the uncertainty as to whether HatchPak and Tylan would produce an improved poultry product under GOMI's standard production process. GOMI employees administered the additives to the broilers and studied the resulting condition of the broilers. This more than exceeds the bar for investigative activities under section 174.

Finally, the 2012 feed expenses are expenditures that would be deductible under section 174. As explained above, research and development expenditures under section 174 include the cost to produce a pilot model "to evaluate and resolve uncertainty concerning the product during the development or improvement of the product." *See* Treas. Reg. § 1.174-2(a)(1), (3), (4); *see also Little Sandy Coal Co.*, T.C. Memo. 2021-15, at *38. The broilers subjected to the HatchPak and Tylan trials are pilot models within the meaning of Treasury Regulation § 1.174-2(a)(4) because the uncertainty could be resolved only by testing on the broilers after they reached their end weights. *See Little Sandy Coal Co.*, T.C. Memo. 2021-15, at *31. It then follows that the costs to

---

and Tylan could control coccidiosis in GOMI's standard production process. We also note that Dr. Fussel testified that this type of resistance is not seen with HatchPak.

[*57] develop the broilers, including feed costs, would qualify as research and experimental expenditures under section 174, like the cost of producing the experimental aircraft in Treasury Regulation § 1.174-2(a)(11) (example 7).

While not addressing the pilot model argument, respondent maintains that the feed expenditures are not deductible under section 174 because HatchPak was not administered in feed. This distinction does not make a difference in whether petitioners can claim the costs of the feed as qualified research expenditures. All costs of developing the broilers under these trials are deductible as pilot model expenses. *See* Treas. Reg. § 1.174-2(a)(1), (3), (4). The feed is a necessary expenditure in developing the pilot model broilers and resolving the uncertainty. Therefore, the expenditures would be deductible under section 174. The 2012 HatchPak and Tylan trials satisfy the section 174 test.

4. *The Process of Experimentation Test*

The activities related to the 2012 HatchPak and Tylan trials satisfy the process of experimentation test. These trials are a natural continuation of the Salinomycin trials. Having failed with those trials, GOMI moved to its next hypothesis: that HatchPak would effectively control coccidiosis and Tylan would effectively curtail any adverse side effects. After developing the hypothesis, it began the research trials. GOMI employees administered HatchPak at the hatchery and followed up with dosages of Tylan to limit side effects to flocks covered by 14 contracts. GOMI collected data and performed necropsies in conjunction with the vendor to determine whether the broilers were infected with coccidiosis and/or had necrotic enteritis. It then compared this data to historic performance with a particular focus on seven-day mortality. Reviewing the results, GOMI determined that the broilers raised under the combination treatment had better outcomes than historic data from other flocks. This experimental design follows the pattern set forth in the regulations that define process of experimentation: GOMI identified an uncertainty and a possible alternative to resolve that uncertainty and conducted a process of evaluating that alternative. This, at a minimum, is systematic trial and error.

Respondent calls "fowl" on GOMI's experimental design. Specifically, respondent takes issue with the lack of a control group raised contemporaneously with the experimental flocks and the addition of other additives such as Calsporin to the experimental flocks. Respondent's first argument ignores the wide availability of data in the

[*58] commercial poultry industry. As explained above, the poultry industry is data driven and GOMI is no exception. GOMI meticulously tracked and recorded data on each flock, including weight, mortality, and illness statistics. This data, from the very farms where the HatchPak and Tylan trials occurred, acted as a control group to which GOMI compared the results of its research trials.

Respondent next argues that the overlapping of experimental groups defeats the process of experimentation test because GOMI could not isolate the effects of HatchPak and Tylan from those of the other additives. Respondent notes that according to Dr. Bobeck certain combinations of additives would inactivate each other. For example, Tylan would likely inactivate Calsporin. We reject this argument. In laboratory research designed to test the efficacy of these additives, combining experiments would be unheard of. But GOMI was not looking to gauge the effectiveness of these additives in isolation. In fact, the integration of extraneous variables was exactly the point of GOMI's research. GOMI wanted to see whether the HatchPak and Tylan combination would work under its standard production process, which involved a constant rotation of additives and medications. Therefore, it does not strike us as unusual that these trials would include extraneous variables. As for the possibility of inactivating the additives, respondent misreads his expert's report. Throughout the report, Dr. Bobeck noted that certain combinations of additives *could* inactivate one another. Even she could not state for certain that these additives *would* inactivate one another. If anything, Dr. Bobeck's report supports the need to combine different experimental treatments to test the outcome.

GOMI conducted this process of experimentation to evaluate the effect that HatchPak and Tylan would have on coccidiosis to improve broiler performance. Effective coccidiosis control would have resulted in better gut health and more uniform broilers. This is an improved quality and thus a permitted purpose.

Finally, we come to the "substantially all" portion of the test—whether at least 80% of GOMI's activities were part of a process of experimentation for a permitted purpose. Petitioners contend that GOMI satisfied this portion of the test because there are no activities that would be included in the denominator of the fraction (research activities under section 174) that would not also be included in the numerator of the fraction (research activities that are part of a process of experimentation for a permitted purpose). Respondent argues that the activities fail the substantially all test because petitioners have not

[*59] substantiated the employee hours spent on the HatchPak and Tylan trials as allegedly required by this Court in *Little Sandy Coal Co.*

In *Little Sandy Coal Co.*, T.C. Memo. 2021-15, at *25, a taxpayer argued that it satisfied the substantially all test by showing that over 80% of the business component was new. The taxpayer reasoned that if over 80% of the business component was new, that meant that at least 80% of the activities involved a process of experimentation. *Id.* The taxpayer relied on *Trinity Industries, Inc. v. United States*, 691 F. Supp. 2d 688 (N.D. Tex. 2010), *aff'd*, 757 F.3d 400 (5th Cir. 2014), in which a district court used novelty as a proxy to determine the portion of activities that was part of a process of experimentation. *Little Sandy Coal Co.*, T.C. Memo. 2021-15, at *26.

These cases are distinguishable from both *Little Sandy Coal Co.* and *Trinity Industries, Inc.* Unlike the taxpayers in those cases, petitioners are not attempting to prove the portion of research activities that constitutes a process of experimentation on the basis of novelty of the business component. Instead, petitioners provided the Court with witness testimony and contemporaneous documentation to show that GOMI engaged in a process of experimentation.

This testimony and documentation establish that all activities performed by GOMI employees qualify as qualified activities for a permitted purpose under section 41. Therefore, the expenditures for the supplies they used in these activities are qualified as research expenditures under section 174. We have previously applied the substantially all test without the mathematical precision that contemporaneous time logs would provide. *See Suder v. Commissioner*, T.C. Memo. 2014-201, at *46–53; *Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 212–15. In a review of the record and the activities of GOMI employees, we are satisfied that substantially all of GOMI's activities in 2012 related to the HatchPak and Tylan trials were part of a process of experimentation for a permitted purpose.

5. *Activities Excluded Under Section 41(d)(4)*

The activities related to the 2012 HatchPak and Tylan trials are not excluded from the definition of qualified research by section 41(d)(4). Respondent argues that the routine testing or quality control exclusion and the adaptation exclusion apply. These exclusions are not applicable.

First, respondent argues that GOMI merely purchased commercially available HatchPak and Tylan and tested the drugs to

[*60] determine whether they conform to the information supplied by the vendor. This characterization of activities is one of routine quality control testing, which is excluded from the definition of qualified research. Respondent relies on Treasury Regulation § 1.41-4(a)(8) (example 2) to support his argument. In this example, a paint manufacturer changed the color of its widgets from blue to green. *Id.* After selecting the green paint, the manufacturer determined that it needed a new paint nozzle to apply the green paint. *Id.* The manufacturer consulted with the paint nozzle supplier, who pointed the manufacturer to the appropriate nozzle. *Id.* The manufacturer then tested the paint nozzle in its plant to ensure it worked with the green paint. *Id.* The example concludes that the paint nozzle supplier resolved the manufacturer's uncertainty as to the appropriate nozzle in the meeting. *Id.* It further concludes that the tests after installation were routine or ordinary testing or inspection for quality control because the objective was to determine whether the nozzle worked as stated by the supplier. *Id.*

This example is unpersuasive. As discussed above, the vendor research did not resolve the uncertainty as to whether these products would work to control coccidiosis under GOMI's standard production process. Instead, this uncertainty could only be resolved through applied research on commercial farms. Our caselaw has confirmed that testing that is necessary to resolve an uncertainty is not routine testing or quality control. *See Norwest Corp. & Subs.*, 110 T.C. at 521 (holding that installation and testing that was critical to the success of a technology was not routine testing or quality control); *see also Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 217–19 (finding that collecting and analyzing data to determine whether anticoking technology reduced the formation of coke and whether the technology could improve a taxpayer's production process was not routine data collection or quality control).

Nor does GOMI's practice of collecting large amounts of data throughout its standard production process transform the activities related to these trials into routine data collection. GOMI collected additional metrics to determine the effectiveness of the HatchPak and Tylan regime, including performing more frequent necropsies. GOMI also analyzed this data in a way it did not typically review standard data. As discussed above, GOMI and the poultry industry more widely are extremely data driven and often monitor trends in performance to detect issues as they occur. This trend monitoring is different from the data analytics undertaken by GOMI in relation to the HatchPak and

[*61] Tylan trials. In these trials, GOMI was monitoring the occurrence of coccidiosis and necrotic enteritis as compared to historic data. GOMI's data collection and analysis are not routine data collection activities. *See Norwest Corp. & Subs.*, 110 T.C. at 521 (holding that installation and testing that was critical to the success of a technology was not routine testing or quality control); *Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 218 (holding that a taxpayer's activities were not routine data collection when it collected additional data that it did not normally collect during its standard production process and performed additional analysis on the data).

We also reject respondent's contention that GOMI's activities were related to adapting an *existing* business component to fit customers' specifications under section 41(d)(4)(B). Respondent reasons that any project related to controlling uniformity is merely an adaptation because GOMI must produce broilers of a certain size to sell to customers. As determined above, the improved poultry product is a different business component from GOMI's standard broilers. Additionally, the coccidiosis control hypothesized by GOMI is a magnitude of change greater than minor alterations of the broilers. *Cf. Betz*, T.C. Memo. 2023-84, at *97 n.44 (holding that minor site-specific modifications to machinery fall within the adaptation exclusion). Therefore, these activities fall outside the definition of an adaptation.

6. *The Amount of QREs*

Petitioners have adequately substantiated GOMI's QREs as they relate to the HatchPak and Tylan trials for 2012. Given petitioners' framing, we are looking for two pieces of substantiation: identification of the experimental flocks and calculation of the feed expenses. Petitioners identified the flocks covered by 14 contracts as the experimental group in 2012 and calculated the feed expenses for each flock. There is sufficient information in the record to show that these flocks were the experimental flocks. Testimony established that the HatchPak and Tylan experiments were conducted on the company-related farms during the second half of 2012. The flocks petitioners identified were all raised on the company-related farms. To identify the specific experimental flocks, petitioners direct us to the feed recipes labeled in the 800s, which indicate that those flocks were not given chemical coccidiostats that would inactivate the HatchPak. These feed recipes and those immediately following recipes contain Tylan. Finally, the start dates and settlement dates of the flocks petitioners identified align with the dates that the previously identified feed recipes would

[*62] have been fed. Piecing together testimony and the various contemporaneous spreadsheets provided by petitioners, we are satisfied that petitioners adequately identified the flocks for which they claim research credits.

As for calculating the feed expenses, petitioners rely on the feed expenses as determined by alliantgroup. These calculations start with the feed expenses GOMI recorded in contemporaneous settlement data. As noted above, GOMI tracked feed expenses per contract. These feed expenses took in general overhead, including an allocation of employee wages. Because GOMI wanted to claim QREs only for the feed, alliantgroup removed the average overhead expenses. alliantgroup also removed the shrink adjustment to ensure credits were claimed only for feed that made it to the farms. Again, we can match the settlement dates and contract numbers identifying experimental flocks with the contemporaneously maintained feed expenses spreadsheets. Petitioners' adjustments to remove the shrink adjustment and overhead expenses are corroborated by GOMI records and the testimony of Mr. Hopkins. Petitioners appropriately calculated the amount of feed expenses assigned to each contract. Accordingly, as it relates to the HatchPak and Tylan trials, GOMI had $5,115,281 in QREs for 2012.

C. *Probiotics*

GOMI performed qualified research with respect to the probiotic trials, and therefore petitioners are entitled to research credits for qualified supplies to the extent the research trials are substantiated. Petitioners claim that the probiotic trials constitute qualified research and that the specific business component at issue is an improved poultry product. Respondent contests the classification of these research trials as product-related business components and in the alternative argues that these trials fail the four-part statutory test.

1. *The Business Component Test*

As with the HatchPak and Tylan trials, the parties dispute whether the probiotic trials were aimed at a product-related or a process-related business component. Petitioners allege that the business component was an improved poultry product, specifically one with better gut health that does not require as many antibiotics. Borrowing from the illustrative example above, petitioners' argument boils down to the claim that GOMI was producing broilers+ rather than

[*63] its standard broilers. Respondent disagrees, arguing that the business component is the process for raising the broilers at a lower cost.

The business component at issue in these trials was a product-related business component. The aim of these research trials was not to save money or produce more broilers. Rather it was aimed at producing higher quality broilers that had better gut health and were less reliant on antibiotics. At the time, the market viewed the reduction or elimination of antibiotics in the broilers as yielding a superior quality poultry product. We are satisfied that the business component is the product-related business component of an improved poultry product.

Other than the dispute as to whether the business component was a process-related or product-related business component, respondent does not dispute that petitioners otherwise satisfy the business component test. It is clear from the record that the probiotic trials were designed to improve the health and therefore the quality of the broiler business component. It is also undisputed that GOMI intended to sell the broilers to George's Farms, Inc. Therefore, the probiotic trials pass the business component test.

2. *The Technological Information Test*

The activities related to the probiotic trials meet the technological information test. The information GOMI sought to discover in these trials related to the health outcomes of the broilers on the probiotics. In the pursuit of this discovery, GOMI relied on biologic sciences to study the performance of the broilers including health monitoring and necropsies. The probiotic trials satisfy the technological information test.

3. *The Section 174 Test*

The activities related to the probiotic trials satisfy the section 174 test. Petitioners claim that GOMI was uncertain as to the capabilities of the probiotics to produce improved broilers that had better gut health and required less antibiotics in its standard production process. Respondent argues that there was no uncertainty as to these probiotics because they were all commercially available products and GOMI met with the vendors for additional information.

For the same reasons discussed in relation to the HatchPak and Tylan trials, we reject respondent's argument that uncertainty cannot exist when a product is commercially available. Both experts agreed

[*64] that applied research trials with GOMI's standard production process were required to test the probiotics' real-world efficacy. Likewise, the probiotic vendor meeting did not resolve the uncertainty as to how the probiotics would perform. The meeting consisted merely of a presentation with a question-and-answer session during which the vendors provided information to GOMI consistent with their laboratory research. Without conducting the tests at commercial scale under GOMI's standard production process, the vendors could not be certain that the probiotics would produce an improved poultry product. When GOMI decided to undertake the probiotic trials, the information available to it did not establish that the probiotics could produce an improved poultry product under GOMI's standard production process. *See Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 209–10 (holding that a research trial met the uncertainty requirement of section 174 when a taxpayer did not know whether a technology would work in the taxpayer's manufacturing process).

GOMI employees undertook investigative activities to resolve the uncertainty as to whether the probiotics would produce an improved poultry product under GOMI's standard production process. GOMI employees administered the probiotics to the broilers and studied the resulting condition of the broilers. This more than exceeds the bar for investigative activities under section 174.

Respondent rehashes his argument about whether the feed expenses are deductible under section 174, this time concentrating his attention on the Floramax trials. Respondent contends that the feed expenses associated with the Floramax trials are not deductible because Floramax is administered in water. For the same reasons as with the HatchPak and Tylan trials, we reject this argument. Without feeding and raising the broilers to full weight, GOMI could not determine the capabilities of Floramax to produce improved broilers that had better gut health and required less antibiotics in its standard production process. The feed expenses are expenditures incurred in the production of the pilot model broilers intended to eliminate uncertainty. *See* Treas. Reg. § 1.174-2(a)(4); *see also Little Sandy Coal Co.*, T.C. Memo. 2021-15, at *31. Therefore, the expenses are research expenditures under section 174. The probiotic trials satisfy the section 174 test.

4. *The Process of Experimentation Test*

The activities related to the probiotic trials satisfy the process of experimentation test. In conducting the probiotic trials, GOMI

[*65] employees engaged in a process resembling the scientific method. GOMI did not merely implement the probiotic protocol on all farms and determine whether the change satisfied its basic needs. Instead, GOMI conducted a series of trials for each probiotic on the company-related farms to collect and analyze the broiler outcomes. GOMI met with the probiotic vendors to develop a hypothesis as to which, if any, of the probiotics would improve broiler gut health. It then tested the hypothesis through a series of trials and compared the results to either the control group in the case of Floramax or historic data from the specific farm for the other probiotics.

GOMI started by testing the hypothesis that Floramax would improve broiler gut health. After collecting and analyzing the data under varying conditions, GOMI employees determined that Floramax did not result in a noticeable difference in the health of the broilers. With this result in hand, GOMI revised its hypothesis to consider whether Sporulin would improve broiler gut health. GOMI again administered Sporulin to several flocks under varying conditions and collected data throughout the research trials. GOMI employees analyzed the data and again found no meaningful difference between the flocks that were given Sporulin and the historic data used as a control group. Still not defeated, GOMI employees once again revised the hypothesis, this time to test Calsporin. The employees administered Calsporin, collected the health data, and analyzed the results. Ultimately, none of the probiotic trials confirmed GOMI's hypothesis. These trials, analysis, and retrials are a clear example of the scientific method and satisfy the rigid requirements of the process of experimentation test.

Respondent contends that several flaws in GOMI's methods establish that the probiotic trials were not part of a process of experimentation: a control group was lacking, his expert concluded that GOMI did not follow the scientific method, and the activities were merely evaluating available products. Again, we reject respondent's argument that the lack of control groups for the Sporulin and Calsporin trials defeats GOMI's research credit. GOMI has sufficient historic data from these very farms to compare to the experimental flocks.

We likewise reject respondent's reliance on the opinion of his expert Dr. Bobeck to show that GOMI did not follow the scientific method. As noted above, the scope of Dr. Bobeck's assignment in these cases was narrow: to ascertain whether the research credit reports contained enough information to determine that GOMI followed the

[*66] scientific process. This is a different question from the one we consider in this analysis. We review the activities of the taxpayer de novo without regard to the research credit reports. The evidence presented at trial is more than sufficient to show GOMI engaged in a process of experimentation.

Finally, we reject respondent's contention that the probiotic trials were an evaluation of available alternatives rather than a process of experimentation like that in *Siemer Milling Co.* In *Siemer Milling Co.*, T.C. Memo. 2019-37, at *5, a wheat milling taxpayer claimed research credits for a wheat hybrid project. During this project the taxpayer tested new varieties of wheat to determine whether they could be used in current and new products. *Id.* at *8. The taxpayer received samples from vendors, milled the wheat, and tested the composition and product yield of each sample. *Id.* We disallowed the research credit on two grounds: that the taxpayer failed to identify a business component and that the activities were more akin to evaluating available products on the market because the taxpayer failed to establish a process of experimentation. *Id.* at *35–36. In reaching the latter grounds for disallowance, we relied on an example in the regulations in which a company's testing of alternative software packages to find one that met its need was not a process of experimentation. *Id.*

Unlike *Siemer Milling Co.*, these cases have no lack of evidence as to the experimental design of the probiotic trials. As explained above, GOMI followed a systematic process to not only determine whether the probiotics satisfied its needs but also to evaluate the effectiveness of the probiotics in its standard production process. The process of experimentation described far exceeds a simple evaluation of alternatives. *See Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 213 (holding that activities designed to evaluate a technology's use rather than merely changing the technology and evaluating whether the technology satisfied a taxpayer's need was a process of experimentation).

GOMI conducted the process of experimentation for the permitted purpose of evaluating the effect on gut health that the probiotics would have with the goal of improving performance. Better gut health would have resulted in healthier broilers that require little to no antibiotics. This is an improved quality and thus a permitted purpose. Finally, petitioners satisfied the substantially all portion of the test for the identical reasons set forth in the HatchPak and Tylan trials. In a review of the record and the activities of GOMI employees, we are satisfied that

[*67] substantially all of GOMI's activities related to the probiotic trials were part of a process of experimentation for a permitted purpose.

5. *Activities Excluded Under Section 41(d)(4)*

Again, respondent argues that the routine testing or quality control exclusion and the adaptation exclusion apply. For the same reasons set forth in the HatchPak and Tylan trials, we reject these arguments.

6. *The Amounts of QREs*

Petitioners failed to adequately substantiate the QREs for the Floramax trials but have substantiated those for the remaining probiotic trials. Again, for the research trials, we must determine the identity of the research flocks and the amounts of feed QREs associated with the flocks. Excluding the research credit study, there is nothing in the record that identifies the experimental flocks in the Floramax trials. Nor does the record contain any corroborating details that would indicate on which company-related farms Floramax was administered. Unlike the flocks in the HatchPak and Tylan trials, these flocks were not given a special diet that we can use to identify the flocks in the Floramax experiment. Nor will we base our decision solely on alliantgroup's determination as to which flocks were part of the Floramax trials because we do not know the basis for this determination. Petitioners failed to adequately substantiate the QREs related to the Floramax trials, and we will not wing it with an estimate ungrounded in the record. Therefore, the associated QREs are disallowed.

By contrast, petitioners adequately substantiated the QREs for the Calsporin and Sporulin trials. We start with the identification of the research flocks. Petitioners identified the flocks covered by 18 contracts as the experimental flocks for Sporulin with settlement dates between September and December 2013. Petitioners identified the flocks covered by seven contracts as experimental flocks for Calsporin between July and September 2013. Testimony established that the Sporulin and Calsporin trials were conducted on the company-related farms in 2013. The flocks petitioners identified were all raised on the company-related farms. Likewise, the contemporaneous feed recipes contain records of GOMI's adding both probiotics to the feed during this time. Finally, the start dates and settlement dates of the flocks petitioners identified align with the dates that the previously identified

[*68] feed recipes would have been fed. Petitioners have sufficiently identified the research flocks.

As for the QRE amounts, petitioners again rely on the alliantgroup calculations. We can independently verify the costs associated with each flock through contemporaneous documentation. For 2013, GOMI had QREs of $4,748,616 related to the Sporulin trials. Also for 2013, GOMI had QREs of $2,531,962 related to the Calsporin trials.

D. *Phytase*

The phytase trials fail the section 174 test because petitioners have not substantiated any research activities. Petitioners claim that the phytase trials were aimed at unlocking the full potential of the second generation of phytase by developing a matrix that would estimate the proper dosage of phytase according to the phosphorus content of the other ingredients. To do this, petitioners allege that Dr. Greenwood varied the dosages to determine the most effective dosage.

As framed by petitioners, this project appears promising, especially considering GOMI's difficulty implementing phytase. However, GOMI's contemporaneous feed recipes do not support the claim that Dr. Greenwood varied the dosages, let alone undertook investigative activities or a process of experimentation. GOMI's feed logs show that as far back as 2010 GOMI was adding Phyzyme TPT 2500 to its broiler feed ingredients in a range between 0.3 and 0.5 pound per ton of feed. During the alleged trial period, GOMI added Phyzyme TPT 2500 within this range. In fact, all of the relevant feed recipes during the alleged trials added Phyzyme TPT 2500 at a constant 0.4 pound per ton. It is difficult then to conclude that Dr. Greenwood altered the quantity of this additive to determine the most effective dosage. While the record does show that Dr. Greenwood sent samples of feed to laboratories to test the phosphorus levels in March 2012, we have no way to connect these tests to any alleged investigatory activities because the dosages did not change. Because of the conflicting testimony and the contemporaneous documentation in the record, we cannot even determine that GOMI undertook the phytase research trials.

Again, petitioners provided no basis upon which to dissect the broilers into subcomponents to apply the shrinking-back rule. Petitioners failed to carry their burden to show that they were entitled to any research credits based on the phytase trials.

[*69] E. *LT*

GOMI's alleged LT trials occurred during all the research years. Petitioners briefly mentioned several alleged research trials related to LT, most of which were underbaked, unconnected to a specific period, and not developed on brief. We consider the LT trials that petitioners focused on in brief that have the best possibility of qualifying: the method of administration trials and the priming trials.[32] We look at the research trials performed in 2012 and 2013 separately from those performed in 2014.

1. *2012 Through 2013 LT Trials—Method of Administration*

Petitioners failed to substantiate the LT trials associated with the administration technique for the CEO vaccine. Witness testimony set forth the sequence of research trials that GOMI performed on the alternative administration methods for the CEO vaccine, including administration with the assistance of a laser pointer and in water. However, no witness was able to pinpoint when these trials occurred. In fact, when witnesses were pressed on the issue, the timeline could only be narrowed to either 2012 or 2013. There are no documents in the record that establish even a semblance of a timeline for the research trials.

Petitioners failed to define when these trials occurred, yet GOMI claimed research credits for both tax years. Without definition of a year or timeline for the research trials, we cannot perform the four-part statutory test as demanded by section 41. If the research trials happened in 2012, was there any uncertainty remaining in 2013 as required by the section 174 test? If the research trials happened in 2013, what is the basis for GOMI's research credits for 2012? Finally, if the research project stretched to both years, was there uncertainty continuing throughout this whole period, and to which tax year should the research credits be allocated? The LT method of administration trials is an example of the chicken (research credit study) coming before

[32] The parties struggled to frame the exact LT trials that occurred between 2012 and 2013. Petitioners identified a slew of decisions made around the LT vaccination process including the decision of where and when to vaccinate. However, petitioners failed to meaningfully analyze these decisions within the context of section 41. To the extent petitioners argue that any of the activities related to these decisions constitute qualified research, these activities were not part of a process of experimentation.

[*70] the egg (research). We will disallow the QREs related to these studies. Again, we have no basis to apply the shrinking-back rule.

2. *2014 LT Trials—Priming*

GOMI performed qualified research with respect to the LT priming trials in 2014, and therefore petitioners are entitled to research credits to the extent the research trials are substantiated. Petitioners claim that the LT priming trials constitute qualified research and that the specific business component at issue is an improved poultry product. Respondent contests the classification of these research trials as product-related business components and in the alternative argues that these trials fail the four-part statutory test.

a. *The Business Component Test*

Again, the parties cannot agree on the proper business component. Petitioners allege that the business component was an improved poultry product that would have immunity to LT without suffering the adverse side effects of the CEO vaccine. This is a broiler+ in the lingo of the illustrative example above. Respondent again alleges that the business component is a process-related business component related to broiler production. Respondent frames the research trials as a means to produce more broilers for the same cost because fewer would die of LT. The business component at issue in these trials was a product-related business component. The aim of these research trials was to produce higher quality broilers that were healthier than standard GOMI broilers rather than to produce more broilers at a lower cost. We are satisfied that the business component is a product-related business component.

Other than the dispute as to whether the business component was a process-related or product-related business component, respondent does not dispute that petitioners otherwise satisfy the business component test. It is clear from the record that the LT priming trials were designed to improve the health, and therefore the quality, of the broiler business component. It is also undisputed that GOMI intended to sell the broilers to George's Farms, Inc. Therefore, the LT priming trials pass the business component test.

b. *The Technological Information Test*

The activities related to the LT priming trials meet the technological information test. The information GOMI sought to

[*71] discover in these trials related to the health outcomes of the broilers on the probiotics. In the pursuit of this discovery, GOMI relied on biologic sciences to study the performance of the broilers including vitals monitoring and field surveys of the health of the broilers. The LT priming trials satisfy the technological information test.

c. *The Section 174 Test*

The activities related to the LT priming trials satisfy the section 174 test. Petitioners claim that GOMI was uncertain as to the capabilities of priming with the HVT–LT vaccine to produce improved broilers that have fewer side effects as compared to the CEO vaccine. Respondent argues that there is no uncertainty as to the HVT–LT vaccine's effectiveness because it was a commercially available product.

Just as in our above analysis related to the HatchPak and Tylan trials, we reject respondent's argument that the mere fact the HVT–LT vaccine was commercially available means there was no uncertainty. Respondent's argument also oversimplifies GOMI's research trials. GOMI was not testing whether the HVT–LT vaccine was effective. Instead, GOMI conducted the research trials to determine whether priming with the HVT–LT vaccine would reduce the side effects of the CEO vaccine. This did not appear to be the marketed use for the HVT–LT vaccine.

GOMI's uncertainty was not resolved by its experience priming breeders. GOMI had never primed broilers before these LT trials. Although it had previous experience priming breeders with vaccines, this experience was not transferable because of the drastic differences between broilers and breeders. From the age of the chickens to the vaccines' purpose, the overlap between broilers and breeders is very small. Therefore, any uncertainty related to the priming in broilers was not resolved because of prior priming in breeders. When GOMI decided to undertake the LT priming trials, the information available to it did not establish that the priming would produce an improved poultry product that had fewer side effects from the CEO vaccine. *See Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 209–10 (holding that a research trial met the uncertainty requirement of section 174 when a taxpayer did not know whether a technology would work in the taxpayer's manufacturing process).

GOMI employees undertook investigative activities to resolve the uncertainty as to whether the LT priming would produce an improved

[*72] poultry product. GOMI employees primed the broilers in the hatchery and administered the CEO vaccine in the field. The employees then studied the resulting condition of the broilers. This exceeds the bar for investigative activities under section 174.

Finally, the feed expenses are research expenditures within the meaning of section 174. As with the HatchPak and Tylan trials, the feed expenses are expenditures incurred in the production of the pilot model broilers intended to eliminate uncertainty regarding the effectiveness of priming. *See* Treas. Reg. § 1.174-2(a)(1), (3), (4); *see also Little Sandy Coal Co.*, T.C. Memo. 2021-15, at *31. Therefore, the expenses are research expenditures under section 174. The LT priming trials satisfy the section 174 test.

d. *The Process of Experimentation Test*

The activities related to the LT priming trials satisfy the process of experimentation test. These trials are a continuation of GOMI's attempt to create a broiler that would fare better against the recurrent outbreaks of LT and have fewer side effects from the industry standard CEO vaccine. Seeing a reduction in the side effects of the CEO vaccine when administered through water, GOMI thought it could do better. Then came its newest hypothesis, that priming the broilers with an HVT–LT vaccine in ovo would reduce the harsh side effects of the later administered CEO vaccines. With this hypothesis in hand, GOMI began running trials administering the HVT–LT vaccine at the hatchery. Then when the time came for CEO vaccines, GOMI employees closely watched the broilers' reactions and recorded the side effects. It then compared this information to historic data about the broilers' reaction to only the CEO vaccine. Reviewing the results, GOMI saw a decrease in side effects from the CEO vaccine. GOMI determined that the priming was effective and implemented it in its standard practice when vaccinating for LT. This process of identifying a hypothesis, identifying alternatives, and analyzing the results satisfies the process of experimentation test as set forth in the regulations.

GOMI conducted this process of experimentation for the permitted purpose of evaluating the effect on broiler health that priming would have on controlling the harsh side effects of the CEO vaccine. Less severe side effects would have resulted in healthier broilers. This is an improved quality and thus a permitted purpose. Finally, petitioners satisfied the substantially all portion of the test for identical reasons as set forth in the HatchPak and Tylan trials. In a review of the

[*73] record and the activities of GOMI employees, we are satisfied that substantially all of GOMI's activities related to the LT priming trials were part of a process of experimentation for a permitted purpose.

e. *Activities Excluded Under Section 41(d)(4)*

Again, respondent argues that the routine testing or quality control exclusion and the adaptation exclusion from qualified research apply. For the same reasons as set forth in the HatchPak and Tylan trials, we reject these arguments.

f. *The Amounts of QREs*

For the LT priming trials, petitioners provided substantiation for flocks covered by six contracts. For 2014 petitioners identified flocks covered by 133 contracts as research flocks. For most of the flocks, nothing in the record points to their being experimental flocks. Witnesses were unable to identify when these trials started and stopped in 2014. The only contemporaneous evidence identifying the experimental flocks is the vaccine protocol dated September 2, 2014, which states that flocks would be primed after this date. Specifically, priming was done on all big broilers west of I–49 and north of I–40 and select small broilers in this location. Reviewing the settlement data, it appears as though flocks covered by 24 contracts were raised after this date. Of those, it appears from the number of days grown that only the flocks covered by six contracts were big broilers. The remaining contracts presumably covered small broilers.

Combined with the witness testimony, the settlement data is sufficient to substantiate the research credits related to the flocks covered by the six big broiler contracts:

[*74]

Contract Number	*Farm*	*Settlement Date*
11359-2	MJ Farms	November 26, 2014
15591-1	McAfee, S&D	December 3, 2014
18532-1	True Farm	December 3, 2014
16923-1	PLR Farms	December 3, 2014
13180-1	Green Flag Poultry	December 10, 2014
15782-1	Moore Farm 5–8	December 31, 2014

Aside from the research credit study, petitioners provided no information to identify which small broiler flocks were experimental flocks. Therefore, we are unable to determine whether the remaining 18 flocks were experimental flocks. Therefore, petitioners are entitled only to QREs related to the six big broiler contracts.

As for the QRE amounts, petitioners again rely on the alliantgroup calculations. We can independently verify the costs associated with each of the flocks through the contemporaneous documentation. Therefore, we accept petitioners' calculation. GOMI had total QREs in 2014 related to these flocks of $1,521,039.

F. *Vaxxitek*

Petitioners have failed to sufficiently substantiate the flocks upon which GOMI conducted the alleged Vaxxitek trials. It is clear in the record that as of the start of these alleged trials, there was no remaining uncertainty as to the effectiveness of the full dosage of Vaxxitek when implemented one cycle per year. Instead, petitioners allege that between the end of 2012 and the beginning of 2014, GOMI conducted qualified research to determine the lowest effective dose of Vaxxitek that would provide adequate protection from IBD.

However, nothing in the record allows us to corroborate that the Vaxxitek vaccine was administered at varying dosages to the flocks petitioners identified. No witness testified to the exact timeframe or the farms upon which the research trials were conducted. From three different witnesses, we received three different timeframes of the research trials: Dr. Fussel testified that the research trials started in

[*75] 2012, Dr. Gilbert testified that the research trials started in 2014, and Mr. McClure testified that the research trials occurred between 2012 and 2014.

Even accepting Mr. McClure's timeframe as accurate, we are unable to drill down further to determine which flocks were part of the research trials. Witness testimony and contemporaneous documentation did not set forth any metric by which we can identify the experimental flocks. Unlike with the HatchPak and Tylan trials, there is no special food label that we can link with flocks that received the vaccine. We likewise see no compelling evidence that all company-related farms received this treatment. Nor will we base our decision solely on alliantgroup's determination as to which flocks were part of the Vaxxitek trials because we do not know the basis for this determination. Consequently, we cannot identify which flocks were part of the experimental flocks such that their feed expenses would be QREs.

Finally, we have no information in the record regarding the varying dosages of the vaccine. The only vaccination programs in evidence that include Vaxxitek and reference a dosage are for breeders. The invoices for Vaxxitek likewise are not persuasive evidence that these Vaxxitek dosage trials occurred. The invoices could be related to the dosage trials but they just as likely could have been related to routine administration of Vaxxitek at the full dose, which GOMI knew was effective as of the time of the research trials. Because we lack sufficient information to identify experimental flocks in the Vaxxitek trials, we cannot even determine whether GOMI undertook these trials.

Petitioners provided no meaningful basis upon which to apply the shrinking-back rule. Therefore, we cull petitioners' research credits as they relate to the Vaxxitek trials.

G. *Ross 708*

GOMI performed qualified research with respect to the Ross 708 genetic line trial. Petitioners claim that the Ross 708 genetic line trial constitutes qualified research and that the specific business component at issue is an improved poultry product. For the first time, respondent agrees with the classification of the business component as a product-related business component. Instead, respondent argues that these trials fail the four-part statutory test.

[*76] 1. *The Business Component Test*

The Ross 708 genetic line trial was aimed at improving GOMI's standard broiler by changing to a genetic line that allegedly performed better as a big broiler. This is an improvement over GOMI's standard broiler, the Cobb 500, that struggled to gain the necessary weight at the end of its life cycle. GOMI intended to sell the improved broilers to George's Farms, Inc. Therefore, the Ross 708 genetic line trial satisfies the business component test.

2. *The Technological Information Test*

The activities related to the Ross 708 genetic line trial meet the technological information test. The information GOMI sought to discover in these trials related to the health and growth outcomes of the new genetic line of broilers. In the pursuit of this discovery, GOMI relied on biologic sciences to study the performance of the broilers and undertook an extensive processing procedure to ascertain quality of the meat. Therefore, the Ross 708 genetic line trials satisfy the technological information test.

3. *The Section 174 Test*

The activities related to the Ross 708 genetic line trial satisfy the section 174 test. Petitioners claim that GOMI was uncertain as to whether the new genetic line would produce higher quality broilers with more uniformity under GOMI's standard production process. Respondent argues that there was no objective uncertainty because GOMI received significant information from the genetic vendor that created the Ross 708 broilers.

For the final time, we reject respondent's argument. Reviewing the numerous documents respondent moved into evidence regarding the Ross 708 breed, we find that none of these documents state that the Ross 708 genetic line produces higher quality broilers with more uniformity under GOMI's standard production process. Instead, these documents detail best practices of raising the Ross 708 genetic line and appear to be based primarily on foreign markets. The documents likewise do not consider the restrictions GOMI encountered in altering the formula of its feed. GOMI could not immediately adjust its feed to the recipes on the vendor documentation because it was raising the Cobb 500 broilers that had different nutritional demands. Even if the trial was successful, an average genetic line change takes three years; and during this time GOMI would have to meet the nutritional needs of both breeds. The

[*77] information provided by the genetic vendor did not resolve the uncertainty.

Likewise, the trial in Virginia did not eliminate the uncertainty in the Ross 708 genetic line trial. Chicken production is a highly geography-dependent activity. What works on one farm may not work on the farm down the road, let alone on a farm across the country. Broiler performance is highly dependent on the environment and feed composition that will vary across such a great geographic divide. While the Virginia study may have been the impetus for the Ross 708 genetic line trial, the success in Virginia did not eliminate the uncertainty. We are satisfied that when GOMI undertook the Ross 708 genetic line trial, there was objective uncertainty as to the performance of the broilers.

GOMI employees undertook investigative activities to resolve the uncertainty related to the Ross 708 genetic line trial. GOMI employees hatched and placed on company-related farms flocks of the Ross 708 broilers and control flocks of the Cobb 500. Throughout the broilers' lives GOMI employees monitored the health and mortality of the broilers. The trial concluded with the broilers' being sent to a specialized processing plant to create highly precise measurements of the cuts of chicken and byproduct. GOMI employees then compared the results of the Ross 708 broilers with the control Cobb 500 broilers. This more than exceeds the bar for investigative activities under section 174.

Finally, the feed expenses are research expenditures within the meaning of section 174. The feed expenses are expenditures incurred in the production of the pilot model broilers intended to eliminate uncertainty regarding the capabilities of the Ross 708 breed. *See* Treas. Reg. § 1.174-2(a)(1), (3), (4); *see also Little Sandy Coal Co.*, T.C. Memo. 2021-15, at *31. Therefore, the expenses are research expenditures under section 174. The Ross 708 genetic line trial satisfies the section 174 test.

4. *The Process of Experimentation Test*

The activities related to the Ross 708 genetic line trial satisfy the process of experimentation test. In fact, these activities are the cleanest example of the scientific method presented in these cases. Noticing the struggles of the Cobb 500 genetic line to meet the weight requirements of a big broiler and the success in Virginia, GOMI began theorizing that a genetic line change was in order. GOMI employees hypothesized that the Ross 708 genetic line would produce higher quality broilers because

[*78] of the slower initial growth curves allowing for structural developments.

With the hypothesis regarding the Ross 708 genetic line in hand, GOMI employees began a research trial. GOMI employees started the experiment in the hatchery by incubating the Ross 708 experimental eggs and the Cobb 500 control eggs. GOMI employees closely tracked the hatch rate of the eggs before placing the broilers on the same farm. GOMI employees placed one house of Ross 708 and two houses of Cobb 500 on the same farm to be raised under the same conditions. GOMI employees monitored the health and mortality of the flocks. During this time, GOMI employees also collected and reviewed industry data on the Ross 708 breed.

At the conclusion of the test, GOMI employees sent the broilers to the University of Arkansas processing plant for a detailed breakdown of each broiler. GOMI employees analyzed the reports from the University of Arkansas, which included mortality, feed costs, and price-per-cut data. In reviewing this information, GOMI employees determined the trial was successful. This entire process is a clear example of the scientific method in which a hypothesis is formed and tested and the results analyzed.

GOMI conducted the process of experimentation for the permitted purpose of evaluating the performance of the Ross 708 genetic line, which it theorized would produce a better quality broiler. This is an improved quality and thus a permitted purpose.

Finally, petitioners satisfied the substantially all portion of the test for the identical reasons set forth in regard to the HatchPak and Tylan trials. In a review of the record and the activities of GOMI employees, we are satisfied that substantially all of GOMI's activities related to the Ross 708 genetic line trial were part of a process of experimentation for a permitted purpose.

5. *Activities Excluded Under Section 41(d)(4)*

Again, respondent argues that the routine testing or quality control exclusion and the adaptation exclusion apply. For the same reasons set forth in the HatchPak and Tylan trials, we reject these arguments.

[*79] 6. *The Amounts of QREs*

Petitioners have adequately substantiated the QREs as they relate to the Ross 708 genetic line trial. Reviewing the settlement data, we find it easy to identify the research flocks because the Ross 708 flocks were coded with a different genetic line code. We note that only one Ross 708 coded contract appeared on this settlement data. Petitioners claimed research credits related to these flocks only. Likewise, the control Cobb 500 groups can be identified by the Littrell Broiler Farm with the same settlement date. The settlement date of these flocks aligns with the report issued by the University of Arkansas processing plant. We are satisfied that the three contracts petitioners identified pertain to the experimental flocks.

As for the QRE amounts, petitioners again rely on the alliantgroup calculations. We can independently verify the costs associated with each of the flocks through the contemporaneous documentation. GOMI had QREs for this research trial for 2014 of $398,520.

H. *Total QREs*

For 2012, GOMI had QREs of $5,115,281. For 2013, it had QREs of $7,280,578. For 2014, GOMI had QREs of $1,919,559.

V. *Base Year Calculations*

Petitioners failed to substantiate QREs for the base years. As explained above, the alternative simplified credit is calculated with reference to the QREs generated in the three tax years preceding the credit years. § 41(c)(5)(A). The 2012 research credits are calculated with reference to 2009, 2010, and 2011. The 2013 research credits are calculated with reference to 2010, 2011, and 2012. Finally, the 2014 research credits are calculated with reference to 2011, 2012, and 2013.

Where the three preceding years encompass 2012 and 2013, we will use the QREs as determined above. This still leaves the burden on petitioners to show the amount of QREs that GOMI incurred for 2009, 2010, and 2011. To calculate the QREs for these years, petitioners relied on the estimates calculated by alliantgroup. It is unclear whether GOMI lacked the documentation to substantiate the QREs for these years or whether alliantgroup just failed to search for the substantiation. Either way, alliantgroup estimated the QREs for 2009, 2010, and 2011 with reference to the research years. alliantgroup averaged the percentage

[*80] of QREs to total feed expenses for the research years and determined that on average during this time GOMI's QREs related to feed expenses were 10.23% of the total feed expenses. alliantgroup then estimated the QREs for 2009, 2010, and 2011 by multiplying the total feed expenses by 10.23%. Petitioners urge the Court to adopt this estimate as a reasonable estimate of QREs for these years.

We reject petitioners' invitation. To start, the research credit study grossly overvalued the amount of QREs for the research years as discussed above. This would significantly lower the percentage applied to the feed expenses in 2009, 2010, and 2011 to estimate QREs. Even relying on alliantgroup's method of calculating the QREs, we would reject petitioners' estimate because petitioners failed to provide any basis for a reasonable estimate for qualified research for each of these years.

As explained above, when a taxpayer fails to present contemporaneous records, we may—but are not required to—apply the *Cohan* rule to estimate QREs if the taxpayer provides enough evidence to support an informed estimate. *See Union Carbide Corp. & Subs.*, T.C. Memo. 2009-50, slip op. at 294–95; *Fudim v. Commissioner*, 1994 WL 223280, at *12 (accepting "testimony and other evidence in the record" as basis for the *Cohan* rule estimate of time spent in performing qualified services); *see also Reinke v. Commissioner*, 46 F.3d at 764.

To show that we have sufficient evidence to make an informed estimate, petitioners pluck out every activity that could be qualified research from GOMI employees' memories and vague documentation. Petitioners allege that GOMI's perpetual striving to improve performance involved qualified research. Petitioners rely on board minutes between 2009 and 2011 for examples of qualified research. For example, petitioners allege that during this time GOMI performed genetic line trials between the Hubbard and MX genetic lines to determine which performed better. GOMI also worked to improve ventilation in the broiler houses during this time. A few words in board minutes referencing an improvement are insufficient to show that these activities constitute qualified research. For example, we are unable to determine whether these activities were part of a process of experimentation as required by the four-part statutory test. Therefore, the vague references in board minutes without additional details do not set forth a sufficient basis to estimate QREs for 2009, 2010, and 2011.

[*81] One project between 2010 and 2012 warrants additional consideration. During this time GOMI was dealing with runt and stunt syndrome in its broilers. Both Dr. Greenwood and Dr. Fussel testified as to their attempts to get the syndrome under control. While these activities could very well be qualified research, we have no basis upon which to calculate the QREs associated with them. Neither specialist testified as to how widescale the issue was nor to the size of the experimental groups. In fact, Dr. Fussel was specifically asked to identify the farms where he conducted his experiments but could not. Even in the research trials at issue in these cases, we saw a wide variety of experimental group sizes from 3 contracts in the Ross 708 genetic line trial to over 100 contracts per year in the LT trials. We also note that there was no testimony regarding any alleged runt and stunt syndrome research in 2009. There is no basis in the record for estimates as to the scope of this research, and we will not wing it. *See Reinke v. Commissioner*, 46 F.3d at 764.

Petitioners have failed to create a sufficient record for us to make an informed estimate of the QREs for 2009, 2010, and 2011. Therefore, we conclude that GOMI had no QREs during these years. The lack of QREs for these years triggers the limitation in section 41(c)(5)(B). Thus, GOMI's research credits will be 6% of the QREs for each taxable year.

VI. *Penalties and Reasonable Cause*

A. *Section 6662(a) Penalties*

Respondent argues that for tax years 2014 and 2016 petitioners are liable for accuracy-related penalties on the basis of negligence. In the alternative for tax year 2016, respondent argues that petitioners are liable for accuracy-related penalties on the basis of a substantial understatement of income tax.

Section 6662(a) and (b)(1) imposes an accuracy-related penalty on any underpayment of federal income tax which is attributable to negligence or disregard of rules or regulations. Negligence includes "any failure to make a reasonable attempt to comply" with the Code or a failure "to keep adequate books and records or to substantiate items properly." § 6662(c); Treas. Reg. § 1.6662-3(b)(1). A return position that has a reasonable basis is not attributable to negligence. Treas. Reg. § 1.6662-3(b)(1).

Section 6662(a) and (b)(2) imposes a 20% accuracy-related penalty on any portion of an underpayment attributable to a substantial

[*82] understatement of income tax. An understatement of income tax is "substantial" if it exceeds the greater of 10% of the tax required to be shown on the return or $5,000. § 6662(d)(1)(A). For the substantial understatement penalty to apply, Rule 155 computations must confirm a substantial understatement. *Clay v. Commissioner*, 152 T.C. 223, 246 (2019), *aff'd*, 990 F.3d 1296 (11th Cir. 2021). Generally, the Commissioner bears the initial burden of production to establish that a taxpayer is liable for penalties and additions to tax. § 7491(c); *see Higbee v. Commissioner*, 116 T.C. 438, 446 (2001). The Commissioner may satisfy this burden by presenting sufficient evidence to show that it is appropriate to impose the penalty in the absence of available defenses. *See Graev v. Commissioner*, 149 T.C. 485, 493 (2017) (citing *Higbee*, 116 T.C. at 446), *supplementing and overruling in part* 147 T.C. 460 (2016). Because we find that petitioners had reasonable cause for the underpayments, we need not consider whether respondent carried his initial burden.

B. *Reasonable Cause*

Section 6664(c)(1) provides that a penalty under section 6662 shall not apply to any portion of an underpayment if it is shown that there was reasonable cause for the taxpayer's position and that the taxpayer acted in good faith with respect to that portion. *See also Higbee*, 116 T.C. at 448. Whether a taxpayer acted with reasonable cause and in good faith is decided on a case-by-case basis, considering all pertinent facts and circumstances. Treas. Reg. § 1.6664-4(b)(1). Reasonable cause requires that the taxpayer exercised ordinary business care and prudence as to the disputed item. *See Neonatology Assocs., P.A. v. Commissioner*, 115 T.C. 43, 98 (2000), *aff'd*, 299 F.3d 221 (3d Cir. 2002). For underpayments related to passthrough items we look at all pertinent facts and circumstances, including the taxpayer's own actions, as well as the actions of the passthrough entity. *See* Treas. Reg. § 1.6664-4(e).

A taxpayer's reliance on professional advice may meet this standard if the taxpayer proves by a preponderance of the evidence that (1) the adviser was a competent professional who had sufficient expertise to justify reliance; (2) the taxpayer provided necessary and accurate information to the adviser; and (3) the taxpayer actually relied in good faith on the adviser's judgment. *Neonatology Assocs., P.A.*, 115 T.C. at 99; *see also Higbee*, 116 T.C. at 446–47 (holding that, in a situation such as here, the taxpayer bears the burden of proof with regard to issues of reasonable cause); Treas. Reg. § 1.6664-4(c)(1)

[*83] (providing additional rules for reliance on the advice of others). "Advice does not have to be in any particular form," but it must consist of a "communication . . . setting forth the analysis or conclusion of a person, other than the taxpayer, provided to (or for the benefit of) the taxpayer and on which the taxpayer relies." Treas. Reg. § 1.6664-4(c)(2). The mere fact that an accountant prepares a tax return does not mean that he has opined on the items reported therein. *Neonatology Assocs., P.A.*, 115 T.C. at 100.

Petitioners sought the advice of alliantgroup to determine whether any activities performed by GOMI qualified for research credits and if so, the amounts of such credits. At the time George's contracted for the research study, alliantgroup had over 12 years of experience in conducting tax credit and incentive studies for clients. Its ranks are filled with people who are knowledgeable on the intricacies of the tax code, including tax attorneys and those with tax policy experience. One such person was Mr. Troutman. He had a long history at alliantgroup and specialized in research credit studies for the agriculture industry. He also was an attorney who went through extensive internal training at alliantgroup to stay on top of the latest developments in the area.

The reputation of alliantgroup was also bolstered by Frost PLLC's recommendation. As Gary testified, Frost PLLC grew alongside George's and had a tremendous amount of knowledge about George's business operations. When Frost PLLC called regarding a possible collaboration with alliantgroup, it was reasonable for Gary to conclude that alliantgroup was competent in its field. alliantgroup had the necessary expertise to competently advise petitioners.

alliantgroup diligently requested and reviewed documents and met with employees to determine GOMI's eligibility for the research credits. Although petitioners did not directly provide alliantgroup with records, George's, the entity with the relevant documents, provided alliantgroup with open access to George's books and records and the plethora of data routinely gathered throughout the standard production process. George's used these documents for business purposes, including to determine grower compensation and to perform trend monitoring, so there is no reason to doubt the accuracy of the information contained therein. alliantgroup also had access to employees from the C-suite down to the field service technicians for interviews. Finally, alliantgroup worked closely with Frost PLLC, which provided additional documents, verified facts, and answered any lingering questions.

[*84] Respondent contends that alliantgroup requested cherry-picked documents that support only the alleged research trials. This is an incorrect characterization of the record. The documents provided by George's extend far beyond the narrow confines of the alleged research. For example, George's provided alliantgroup with settlement data and feed expenses for all flocks in the research years.

Finally, petitioners relied on alliantgroup's advice in good faith. Before completion of the research credit study, alliantgroup provided petitioners with pro forma Forms 6765 that were eventually filed with amended returns and corresponding justifications. alliantgroup then went on to memorialize its findings in two extensive reports that together are nearly 100 pages long. The Forms 6765 filed with GOMI's amended returns are identical to the Forms 6765 provided by alliantgroup. Therefore, it is reasonable to conclude that petitioners in fact relied on alliantgroup's advice.

To show that petitioners did not actually rely on alliantgroup's advice, respondent focuses on the confusing timing of the filing of the amended tax returns and the completion of the research credit study. He argues that because petitioners and GOMI appear to have amended their returns before the final research credit reports were issued, petitioners could not have relied on alliantgroup's advice. This argument ignores Mr. Troutman's testimony that alliantgroup was in constant contact with Frost PLLC and George's and provided the Forms 6765 and qualification information to them in advance of the final reports. *See* Treas. Reg. § 1.6664-4(c)(2) (providing that "[a]dvice does not have to be in any particular form" for purposes of the reasonable cause and good faith exception); *see also Woodsum v. Commissioner*, 136 T.C. 585, 593 (2011) (holding that, to constitute "advice" within the meaning of Treas. Reg. § 1.6664-4(c)(2), a communication must simply reflect the adviser's "analysis or conclusion").

Petitioners relied in good faith on alliantgroup's advice. alliantgroup's analysis of GOMI's qualification for the research credit was extensive. The research credit study took place over three years. The reports were extensive and provided an in-depth review of the activities performed by GOMI and the calculations for the credits. When presented with such thorough analysis, it is reasonable to conclude that petitioners relied in good faith on alliantgroup.

Respondent points to his expert's report to show that reliance on the research credit studies could not have been in good faith. Dr. Bobeck

[*85] opined that the research credit studies did not set forth sufficient details to show that GOMI engaged in the scientific method, which would be relevant to whether the activities constituted a process of experimentation. While we agree that the research credit reports could have contained additional information, we reject this argument. The research credit is one of the most complex provisions in the Code. Gary's lack of expertise in tax and business law led him to seek advice from those more skilled in complex tax law, Frost PLLC and alliantgroup. Gary did know the chicken industry and specifically the constant research and evolution that occurred on the ground. The research credit study reports captured this.

Respondent also cites *Betz*, T.C. Memo. 2023-84, at *113 n.53, to support his conclusion that petitioners could not have relied on alliantgroup in good faith. In a footnote of *Betz*, we stated "that any apparent reliance by [the taxpayers] on Alliantgroup with respect to claiming the research credits was inconsistent with ordinary business care and prudence and thus that [the taxpayers] failed to establish reasonable cause for their underpayments of tax." *Id.* Despite respondent's insistence, we have not established a hardline rule that reliance on alliantgroup can never be reasonable or in good faith. In fact, when the issue was properly raised and fully briefed in another case, we found the opposite. *Suder*, T.C. Memo. 2014-201, at *77–78 (finding that a taxpayer's reliance on a collaborative effort between alliantgroup and the taxpayer's employee was reasonable and in good faith). We also note that while *Betz* is a more recent case, *Suder* was the only decided case at the time petitioners relied on alliantgroup. Considering the facts in these cases, we determine that these cases align more closely with the circumstances in *Suder*.[33]

Petitioners reasonably relied in good faith on the advice of alliantgroup. Accordingly, petitioners are not liable for the section 6662(a) accuracy-related penalties for tax years 2014 and 2016.

---

[33] Respondent also contends that he is entitled to a presumption that testimony from a representative of Frost PLLC would have been unfavorable to petitioners because they could have called a Frost PLLC representative to testify but chose not to. *See Wichita Terminal Elevator Co. v. Commissioner*, 6 T.C. 1158, 1165 (1946), *aff'd*, 162 F.2d 513 (10th Cir. 1947). Even if we did apply such a presumption, we would still find that the weight of the evidence favors petitioners. *See Diaz v. Commissioner*, 58 T.C. 560, 564 (1972) (observing that the process of distilling truth from the testimony of witnesses, whose demeanor we observe and whose credibility we evaluate, "is the daily grist of judicial life").

[*86] CONCLUSION

Whether the research credit study or the research itself came first remains as elusive as the chicken or the egg question. GOMI's research credits were a mixed basket of eggs: some good eggs supported by contemporaneous records and some rotten eggs that petitioners could not substantiate. GOMI is a highly data-driven business that collects substantial data as part of its standard production processes. However, despite extensive contemporaneous documentation, we were unable to identify sufficient evidence that certain research trials occurred or the information necessary to apply the four-part statutory test. Petitioners are entitled to research credits related to the following QREs: $5,115,281 for 2012; $7,280,578 for 2013; and $1,919,559 for 2014. The limitation of section 41(c)(5)(B) applies to reduce the research credit to 6% of the QREs for each taxable year. Petitioners are not liable for accuracy-related penalties for 2014 and 2016.

To reflect the foregoing,

Decisions will be entered under Rule 155.