

Tax Court of Canada Judgments

Airzone One Ltd. v. The Queen

Court (s) Database: Tax Court of Canada Judgments

Date: 2022-02-21

Neutral citation: 2022 TCC 29

File numbers: 2018-379(IT)G

Judges and Taxing Officers: Robert James Hogan

Subjects: Income Tax Act

Docket: 2

BETWEEN:

AIRZONE ONE LTD.,

and

HER MAJESTY THE QUEEN,

Appeal heard on December 6, 7 and 8, 2021, at Toronto, Ontario

Before: The Honourable Justice Robert J. Hogan

Appearances:

Counsel for the Appellant:	Mahyar Makki
Counsel for the Respondent:	Robert Zsigo Jason Winter

JUDGMENT

The Appellant's appeal with respect to the 2014 and 2015 taxation years is all matter is referred back to the Minister for reconsideration and reassessment in accordance with the attached reasons for judgment.

The parties will have until March 30, 2022 to agree on costs, failing which they must file their written submissions on costs no later than March 30, 2022. Such submissions must not exceed 10 pages.

Signed at Ottawa, Canada, this 21st day of February 2022.

"Robert J. Hogan"

Hogan J.

Citation:
D
Docket: 2

BETWEEN:

AIRZONE ONE LTD.,

and

HER MAJESTY THE QUEEN,

REASONS FOR JUDGMENT

Hogan J.

I. OVERVIEW

[1] The Appellant, Airzone One Ltd. (“Airzone”) provides comprehensive air quality services to government agencies and departments, international organizations, businesses. Airzone and predecessor corporations to Airzone has provided these services since 1979.

[2] The Appellant carried out work on three projects in each of its 2014 and 2015 tax years. The Appellant deducted the expenses incurred in connection with these six projects as research and experimental development (“SR&ED”) expenditures and claimed income tax credits (“ITCs”) for these expenses (the “Appellant’s SR&ED Claims”).

[3] The Minister of National Revenue (the “Minister”) disallowed all of the Appellant’s SR&ED Claims on the grounds that the work carried out in connection with the projects did not constitute SR&ED as defined in subsection 248(1) of the *Income Tax Act*, Canada.

[4] The Respondent’s Reply to Airzone’s Notice of Appeal contains a recital of the factual assumptions that the Respondent alleges were made by the Minister in disallowing Airzone’s SR&ED claim in full. These factual assumptions relate to how and why the Appellant carried out work on the six projects. How work is carried out and why work is carried out are the two key factors that must be considered to determine whether work qualifies as SR&ED within the meaning of that term.

[5] The “how factors” are based on the manner in which work is conducted. To satisfy the “how factors”, a taxpayer must establish that the work was carried out by way of investigation or search through experiment and analysis of a hypothesis. The results of the investigation must also be preserved. At the end of the hearing, counsel for the Respondent argued that the evidence establishes that the work carried out by Airzone satisfied the “how factors” and that the contrary factual assumptions alleged to be made by the Minister in the disallowance regard were incorrect.

[6] To satisfy the “why factor” a taxpayer must demonstrate that the work was carried out to resolve technical uncertainties that could not be solved through standard practices or methods. The Respondent now agrees that the sole factual assumption that the Appellant must rebut is the Minister’s assumption that Airzone resolved the technical uncertainties through standard practices or methods.

[7] This issue is largely a question of fact. Airzone bears the burden of demonstrating that the Minister's factual assumptions, in this regard, are incorrect.

[8] I believe that Airzone has satisfied its evidentiary burden with respect to project 1 for the 2014 taxation year, and project 2 for the 2015 taxation year. In contrast, I am of the opinion that Airzone has failed to satisfy its burden of proof with respect to projects 1 and 2 for the 2015 taxation year. The reasons for my opinions are stated below.

[9] The parties have agreed on the allocation of the expenses incurred by Airzone projects and the ITCs related thereto. Therefore I do not have to address this matter.

II. MATERIAL FACTS

[10] The evidence reveals that air quality monitoring is based on a three-step process. First, a sampling device must be identified for the purpose of gathering samples from the air in a designated area. Second, a process must be selected for the purpose of separately extracting contaminants from the samples present in a sample to allow for their proper identification. Finally, a contaminant must be identified and quantified based on its known attributes.

[11] Airborne contaminants can be actively or passively sampled. For example, active sampling often requires the use of a pump to direct air flow to the sampling medium. Passive sampling captures airborne pollutants on a collection medium based on the mechanism of wet deposition of contaminants on the collection medium. In both cases, the sample must be collected, and the contaminants must be extracted separately to allow for identification and quantification.

III. ISSUES TO BE CONSIDERED

[12] The issues in this appeal are:

- a) whether the Minister was justified in concluding that none of the work carried out by the Appellant on the six projects constituted SR&ED;
- b) whether the Minister was justified in denying the corresponding deduction in relation to the denied expenditures with respect to the Appellant's 2015 taxation years.

IV. ANALYSIS

- a. basic research, namely, work undertaken for the advancement of knowledge without a specific practical application in view;
- b. applied research, namely, work undertaken for the advancement of knowledge with a specific practical application in view, or
- c. experimental development, namely, work undertaken for the purpose of achieving technological advancement for the purpose of creating improving existing, materials, devices, products or processes, incremental improvements thereto,

and, in applying this definition in respect of a taxpayer, includes

- d. work undertaken by or on behalf of the taxpayer with re engineering, design, operations research, mathematical analysis, programming, data collection, testing or psychological research, v work is commensurate with the needs, and directly in support, described in paragraph (a), (b), or (c) that is undertaken in Canada behalf of the taxpayer,

but does not include work in respect to

- e. market research or sales promotion,
- f. quality control or routine testing of materials, devices, pro processes,
- g. research in the social sciences or the humanities,
- h. prospecting, exploring or drilling for, or producing, minerals, petr natural gas,
- i. the commercial production of a new or improved material, d product or the commercial use of a new or improved process,
- j. style changes, or
- k. routine data collection;

[Em

The definition is based on a “catch and release” concept. The definition first inc category of development activities under paragraphs (a) to (c), then items otherwis excluded under paragraphs (e) to (k).

[14] The definition of SR&ED encompasses basic research, applied research and

[15] To qualify the work on the projects as experimental development, I demonstrate that it undertook the work to tackle technical uncertainties for the purpose of gaining “know-how” or “technical knowledge” not available within its organization or from publicly available sources. The “technical knowledge” or “know-how” in this context involves creating or improving methods, procedures and processes to carry out air quality monitoring in unique environments. On this point, I observe that the concept of “experimental development” includes activities undertaken to achieve incremental improvements to existing methods or procedures.

[16] The factors that must be considered to determine whether a particular project is an eligible SR&ED project are now well known. In *CW Agencies Inc v The Queen*,^[1] the Federal Court of Appeal summarized the factors as follows:

1. Was there a technological risk or uncertainty which could not be removed by engineering or standard procedure?
2. Did the person claiming to be doing SRED formulate hypotheses specifically reducing or eliminating that technological uncertainty?
3. Did the procedure adopted accord with the total discipline of the scientific method including the formulation, testing and modification of hypotheses?
4. Did the process result in a technological advancement?
5. Was a detailed record of the hypotheses tested, and results kept as the work progressed?

[17] The factors described in paragraphs 2, 3 and 5 require the Court to examine whether the work was conducted by a taxpayer. I referred to these factors earlier as the “how factors”. The Respondent has conceded that the evidence demonstrates that the manner in which the work was carried out on the six projects satisfies the “how factors”.

[18] The factors described in paragraphs 1 and 4, in my opinion, are interrelated and require consideration of the purpose of a project. The questions set out in paragraph 1 can be reformulated as follows: Did the taxpayer use standard procedures or methods to carry out the work in the taxpayer’s field of activity? If the answer is “yes”, then there was no technological uncertainty that was required to be resolved. In such a case, the project was not eligible for the SR&ED credit. The work was routine in nature.

[19] While each of the above factors must be considered separately, if a project satisfies the “how factors” this may help tip the balance in favour of a taxpayer when the line between what constitutes the use of standard methods or procedures is blurred. In

[20] In their oral submissions, both parties referred me to a number of cases, carefully considered.^[2] -As is often the case in SR&ED matters, the outcome is largely fact-dependent.

[21] I will now undertake a review of the evidence on a project-by-project basis whether Airzone has satisfied its evidentiary burden in the context of the above.

[22] As a general comment, before undertaking a review of the evidence, I found the sole witness to be called by the Appellant, to be an extremely knowledgeable reliable witness. He graduated with a degree in chemistry from the University of Toronto in 1972. He has been employed in one capacity or another in the field of air quality since 1976.

[23] Mr. Fellin is a founder of Airzone. He was directly responsible for overseeing the work carried out by Airzone on the six projects. I am inclined to give Mr. Fellin considerable weight, considering all of the above.

[24] Mr. Melnyk, a research and technology advisor for the Canada Revenue Agency (“CRA”) was called by the Appellant and not the Respondent to testify. Mr. Melnyk conducted the technical audit of the six projects on behalf of the CRA.

[25] The Respondent accepted that Mr. Melnyk’s examination could be conducted by the Appellant. His report was entered into evidence.

[26] Mr. Melnyk’s pre-trial examination for discovery was conducted by written questions. His questions and answers formed the basis of the Appellant’s cross-examination at trial.

[27] On discovery, Mr. Melnyk was asked a series of questions regarding how he conducted the technical audit and how he reached his conclusion that all of Airzone’s SR&ED claims were disallowed in total. His answer to Question number 15 is quite revealing. In Question 15, Mr. Melnyk was asked the following: “Please expand upon the conclusion in the TRC report for the 2011 taxation year, indicating that the work done in this project was known in the public domain and consisted of standard practice and no new knowledge was created.”^[3] -Mr. Melnyk’s answer to Question 15 as follows:

The full explanation supporting the conclusion is included within the SR&ED Review Report (SRR). The SRR did not indicate that the work done [in] this project was known and in the public domain or consisted of standard practice [at] the time. The conclusion was based on the fact that

SR&ED Claim because he believed that that factor was sufficient to deny Airzone

[29] Mr. Melnyk was asked a series of questions regarding how he prepared himself and the finalization of his report. He answered that he conducted a Google search of what information was available on the processes and methods used to conduct analyses. He answered that he found some general references that describe the types and methods on the topic of air quality monitoring but he acknowledged that the references were general in nature and did not provide much insight on the nature of the work of Airzone in connection with the six projects. He was also asked to cite his sources but that he could not recall exactly what he consulted because he did not cite the materials in the report. I believe that Mr. Melnyk did not cite the sources he consulted because of their particular relevance.

[30] On a series of follow-up questions regarding the rationale for his answers, he said the following:

There is a lot out there, but there isn't – if you were to read the literature, you can't find specific details to determine whether or not it aligns exactly with what Airzone did, so I didn't cite temperatures that were used or the exact pressures.

[31] Some of the factual assumptions alleged to have been made by the Minister appear to be helpful to the Appellant's case. For example, the following is stated as a factual assumption made by the Minister with respect to the first three projects:

The Appellant encountered technical challenges in achieving detectable results through tests, which were aimed at determining the suitability of each technique and optimizing existing methods rather than developing new methodologies to detect each compound.^[5]

[32] The phrase “technical challenges”, in my opinion, is synonymous with the phrase “uncertainty”.

[33] The phrase “optimizing existing methods” appears to me to be an acknowledgment by the Minister that Airzone undertook the work for the purpose, at least, according to the Minister, of improving existing processes, “including incremental improvements thereto”. The Minister specifically recognized this as a technological advancement in the context of development work.

[34] While Mr. Melnyk has a scientific background, I found his knowledge of his specialized field of activity to be understandably quite limited compared with the breadth of knowledge and experience.

occur in two ways. Experimental development can lead to the creation of a new method or the improvement of an existing process or method. In both cases taxpayer to earn recurring revenue. Experimental development can also establish or method that was experimented on by a taxpayer does not work.-^[7]

V. 2014 TAXATION YEAR

A. Project #1 Optimizing Passive Monitoring of Low-Concentration Compounds

[36] Mr. Fellin described the reasons why Airzone undertook this project. Airzone involved in establishing air detection protocol for air quality monitoring in residential beginning as early as 1987. In a domestic setting, airborne contaminants are at low concentration levels. This means that detection devices and techniques used in a commercial work environment must be adapted to obtain reliable measurements of contaminants in a domestic setting.

[37] In prior years, Airzone had success in establishing a detection protocol for a wide types of airborne compounds that may be present in a home environment at low concentration.

[38] According to Mr. Fellin, Airzone undertook the experimental work on to increase the range of detectable compounds from 44 to 52. Airzone did so to stay competitive in this highly specialized field.

[39] To obtain reliable measurements of these additional eight compounds, Airzone realized it could not rely on the extraction and identification protocol that it had established for 44 compounds.

[40] In light of this, Airzone first experimented with extraction times. The hypothesis work was conducted under was that the modification of the solvent used to extract the eight compounds would compromise the analysis of the existing suite of compounds. Mr. Fellin explained that that is why they started their test by using the existing solvent to extract the original compounds. Extraction techniques are known to fail because compounds are not separated from each other in a way that allows for the measurement of the concentration of each compound. After failing to obtain reliable data through a variation of extraction times, Airzone decided to test the hypothesis that a more polar solvent would improve measurements of the concentration levels of the additional eight compounds.

[41] Mr. Fellin explained that Airzone, rather than replace the solvent that it typically

efficiency. Airzone continued experimentation with a solvent combining carbon dioxide and 5% butanol to confirm that the solvent would work efficiently for the full suite of compounds.

[42] Mr. Fellin indicated that additional experimentation was then necessary to optimize chromatographic variables typically utilized to analyze each compound. These variables included temperature, column length, column type, flow rate through the column, carrier gas flow rate, and injection volume. Airzone carried out experiments with each variable to improve detection capabilities.

[43] After completing his technical audit, Mr. Melnyk recommended that Airzone's claim be disallowed for this project for the reasons set out below:

For the 8 new compounds of interest, optimization of the passive monitoring device and method required various parameter/condition modifications using a similar approach as was used in the previous year. For example, each set of tests for each compound included modifying carrier gas flow rates, solvent mixtures, solvent modifiers (to alter polarity), and chromatographic conditions with different chromatography machines.

...

The work described above involved optimizing established detection techniques and commercially available passive monitoring tools (3M brand) in an attempt to enhance the detection limits of multiple compounds of interest. Although the claimant encountered challenges in achieving detectable results through various tests, these tests were aimed at determining the suitability of each technique and optimizing existing methods rather than the development of new methodologies to detect each compound. Although the optimization/modification protocols allowed for greater detection sensitivity of each compound, there was no general new scientific knowledge or advancement in technology related to airborne compound detection.^[8]

[Em]

[44] The words “optimizing”, “optimization” and “modifications” are apt descriptions of the work Airzone set out to achieve. In my opinion, Airzone undertook the experiments described for the purpose of establishing a method in order to obtain a reliable identification and quantification method for 52 contaminants rather than 44.

[45] I was surprised when I read the CRA's reasons for disallowing Airzone's claim, particularly in light of what the CRA's published guideline describes as eligible experimental development. The most recent CRA guideline is dated August 13, 2021. The definition of experimental development has not changed. Here is what the guideline describes as experimental development:

When developing new or improved . . . processes, problems can occur when there is a need to achieve a set of . . . constraints.

. . .

Here are some characteristics of problems that may suggest the technological knowledge is insufficient:

- Existing design methods are not applicable;
- Requirements or specifications do not conform to existing standards;
- Too many variables or unknowns;
- Parameters or conditions are outside of the normal operating range;
- Nature of the problem is evolving;
- Data is not readily available;
- There are interlocking constraints.-^[9]

[Em

[46] The part that I underlined described the uncertainty that Airzone sought to resolve. There were too many variables or unknowns for Airzone to be able to accurately detect and quantify the full slate of 52 compounds. Data on how to extract the full slate of compounds was not publicly available. Airzone did not have this technical knowledge at the outset and it was difficult to establish tests to establish a reliable identification and quantification method.

[47] The evidence shows that standard methods, procedures and equipment may not be sufficient for detection limits when contaminants are present in low levels of concentration. Some compounds have similar attributes. In other cases, the attributes of compounds in an air sample may be very diverse. Extraction procedures can cause compounds to co-elute, which prevents accurate identification and quantification of each sample. According to Mr. Fellin, this was the problem that Airzone sought to resolve. An improved extraction and identification process was needed. This new process could not be established without systematic scientific investigation.

[48] Counsel for the Respondent argued that Airzone used standard methods and procedures to establish an extraction and identification protocol for the full slate of 52 compounds. Airzone was interested in measuring. I disagree. I believe that the Respondent placed too much importance on the fact that Airzone's personnel used the same sophisticated equipment that they use regularly to sample airborne contaminants. Mr. Fellin explained that

compounds during working hours. On the other hand, in residential settings the exposed to the compounds at lower concentrations — but for prolonged periods many years.

[49] Additionally, part of the uncertainty itself was creating a single protocol that covered 52 compounds. As Mr. Fellin explained, had Airzone used a separate device or procedure for eight additional compounds, it would have doubled the cost for any potential analysis. Instead, rather than use a new solvent specifically for the eight additional compounds, Airzone purposely sought to modify the solvent used for its existing suite of 44 compounds with its own host of challenges. The previous 44 compounds were simple hydrocarbons. Therefore, they could all be treated in the same way. Conversely, the new compounds had different properties (such as polar groups). This meant that the new compounds could not be extracted from the same medium with the same method. Additionally, because the previously used solvent had been modified, Airzone had to develop new chromatographic conditions for both the existing suite of 44 compounds and the new additional compounds. It was not simply a matter of adding new protocols to the existing methodology. Airzone had to develop a completely new protocol. In the end, the process was successful, except for two compounds.

[50] Airzone is a small corporation. It has limited staff. Airzone's staff must multitask. A part of the day for Airzone's staff is taken up by routine testing of air samples. From the evidence, at other times, work is undertaken by Airzone employees for the purpose of establishing a reliable identification and quantification protocol for an air sample that may contain previously untested contaminants. In the above context, experimentation is required to establish a new or revised protocol. Mr. Fellin testified that Airzone was not in a position to undertake such a project. Only when Airzone successfully established the protocol could it then generate revenue from its sampling activities.

[51] I confess that the dividing line between eligible and ineligible work in technical activity can often be blurred. That said, I am of the opinion that the "why factor" should be strictly applied that only large corporations that employ dedicated research staff can qualify for the SR&ED incentives. Moving the goal post so far afield, in my opinion, would be contrary to the intention of Parliament. This is consistent with the views of Justice Binnie in *Northwest Hydraulic*:

The tax incentives given for doing SRED are intended to encourage scientific research in the private sector (*Consoltech Inc. v. R.* (1997), 97 D.T.C. 724 (T.C.C.)). As such the legislation dealing with the incentives must be given "such fair, large and liberal construction and interpretation as will ensure the attainment of its objects" (*Interpretation Act*, section 12).-^[10]

to grow their business. The constraint that CCPCs typically face is that they have limited financial resources to undertake risky experimental development activities. Understood why Parliament made SR&ED ITCs refundable for CCPCs and not for their larger counterparts.

[52] Airzone is a leader in the field of the detection of low-concentration airborne compounds. It carried out the work to improve its technical knowledge in this highly specialized area of quality detection. The evidence shows that detection protocols are for the most part guarded secrets. The fact that Airzone carried out multiple experiments to establish protocols for the full suite of 52 compounds serves as strong corroboration of Mr. Fellin's testimony. Airzone undertook the work on this project to acquire useful technological knowledge.

[53] Consequently, I am satisfied that Airzone satisfied its evidentiary burden for this project.

B. Project #2 Improving Detection of Highly Reactive Sulphur Compounds

[54] In 2014, Airzone was retained by a consortium of oil companies to measure reduced sulphur compounds ("RSCs") emitted from oil sand operations. Airzone had previously worked with the client to identify various RSCs that were unique to oil sands operations. For example, such RSCs would have different profiles than RSCs emitted from a refinery. However, in the previous project, Airzone was working at the oil sand site itself. In this project, Airzone was asked to measure the level of RSCs emitted from the oil sands at ambient air concentrations ranging from 20 to 60 kilometres from the oil sand site. In this regard, the main challenge was the ability to detect low level concentrations of RSCs occurring at ambient level in the parts per billion range.

[55] According to Mr. Fellin, RSCs are highly reactive when in contact with any surface and degrade faster than other compounds. A rapid collection and analysis method was required to obtain reliable analytical data on the quantification of RSCs in this specific environment. Mr. Fellin explained that collection of RSCs on sorbent media does not work well because the sorbent will degrade the sample. Airzone identified that RSCs should be collected using a method such as Tedlar bags or treated Summa canisters. Because RSC samples are collected on absorbent media they are not concentrated within the whole sample. Samples collected using these devices still degrade rapidly. Airzone initially believed that the only way of preserving these samples is through the injection of large air volumes combined with a high concentration of RSCs, using apparatuses designed for less reactive compounds. Airzone experimented with a suite of 18 RSCs and determined the types of columns and flow rates and conditions most suitable for the analysis in gas/air samples, followed by the cryogenic conditions required to concentrate those samples.

experiments to determine whether it would be possible to obtain reliable measuremen

[58] Mr. Fellin indicated that Airzone next experimented with different types of chromatography columns. Generally speaking, these chromatography columns are used to separate compounds in a particular sample. A typical chromatography column is a tube filled with a substance that facilitates separation of compounds. Airzone varied the oven temperature ramps, etc. in an effort to optimize conditions for resolution. While the columns proved partially successful in identifying four of the compounds, resolution was an issue due to what Airzone concluded was the insufficient polarity for resolution of hydrocarbons in many of the samples.

[59] Airzone then experimented with a GasPro column, a type of column that Airzone would be successful in eluting the target RSCs and interfering hydrocarbons based on the properties of the column. The GasPro column is substantially different than the type used for separation purposes. It is a porous layer open tubular column.

[60] Mr. Fellin advised that experimentation with the GasPro column proved effective for separating the target and interfering compounds. However, the results were still inconclusive.

[61] Mr. Fellin stated that Airzone next experimented with establishing the cryogenic conditions required to concentrate samples, whereby a gas sampling valve introduces the sample into the inlet, which can be cryogenically cooled. Although the inlet prevented compound degradation, Airzone's conclusion was that the inlet did not effectively concentrate the compounds to high enough levels. As a result, the experiments that Airzone carried out were not sufficient for establishing a reliable identification and quantification protocol for RSCs in the environment where tests would be conducted in the future.

[62] The Respondent argues that Airzone used standards, methods and procedures. The experiment consisted of adjusting various parameters (like column type and experimental conditions) to achieve the desirable protocol. In my view, this is an oversimplified nature of Airzone's work and ignores the novel techniques and challenges it faced in the *Northwest Hydraulic*:

. . . Most scientific research involves gradual, indeed infinitesimal, progress. Spontaneous breakthroughs are rare and make up a very small part of the results of SRED in Canada.-

Airzone was using new collection methods. As Mr. Fellin explained, there had been previous attempts to measure RSCs by collecting them on absorbent systems. But this was not successful with all the specific oil sand compounds that Airzone was trying to mea

the compounds. Consequently, Airzone had to work under tight timelines-between hours depending on the collection technique.

[64] Third, the novel nature of the compounds rendered them incompatible methods. For example, a flame photometric detector can be used to detect sulphur and, therefore, measure RSCs in samples. However, the presence of high hydrocarbons in the samples interfered with the flame photometric detector's ability to measure sulphur. Additionally, Airzone was not measuring a single RSC. It was dealing with a mixture of different RSCs that it needed to measure at once. In this regard, different compounds reacted differently. Some reacted positively to the cryogenic approach, others could not be concentrated at temperatures below which the columns could operate in. This was a challenge for Airzone not being able to establish protocols for the full suite of compounds.

[65] In considering the above, I am satisfied that the work on this project was a success for Airzone to resolve technical uncertainties for the purpose of allowing Airzone to advance its technological knowledge in the field of activity that it conducts. The tests demonstrated that the extraction/separation methods that Airzone hypothesized would work to obtain reliable analytical data and quantification data were not insufficient. Further experimentation was required to establish an effective identification and quantification protocol.

C. Project #3 Improving Detection of New Airborne Compounds

[66] Mr. Fellin testified that Airzone has been working with Environment Canada to monitor the level of airborne contaminants in the Canadian Arctic since 1987. Mr. Fellin testified that airborne contaminants make their way to the Arctic based on air flow. The process occurs over many years through wet or dry deposition. Ultimately, contaminants are deposited on the land and aquatic environments. The contaminants are then ingested by wildlife. Wildlife is a source of food for local populations, who often live off the land. As a result, monitoring in the Arctic is an essential service for the local population.

[67] The samples gathered in the Arctic over the last 30 years have been preserved. When the samples were re-analyzed, researchers found increasing concentrations of brominated and fluorinated organic compounds from flame retardants (from sources such as furniture and electronics) that were carried to the Arctic. Consequently, researchers wanted to identify both the spatial and temporal trends of these compounds. However, the detection methods that Airzone used in the late 1980s were not precise enough to quantify the spatial and temporal trends. Airzone was again hired by Environment Canada. This was a collaborative initiative. Airzone developed the extraction, sampling and concentration protocol, while Environ-

[69] Mr. Fellin testified that the challenge with brominated and fluorinated compounds in the laboratory is contamination since almost every tool in the laboratory has some level of contamination with brominated and fluorinated compounds. Consequently, Airzone developed a new isolation system because some of the compounds were polar and some were apolar, Airzone faced difficulty in reaching sufficient recovery from the sampling media with a single solvent. Following these experiments, Airzone established a sequential extraction procedure that uses different solvents to separate the new compounds that are required to be identified and quantified.

[70] I am satisfied by Mr. Fellin's testimony that Airzone achieved a technological breakthrough which consists of a novel two-step extraction procedure for contaminants that are found in air samples in the Canadian Arctic. Airzone achieved this result through systematic testing based on hypotheses that were formulated to achieve reliable extraction results.

[71] Mr. Fellin was subject to rigorous cross-examination. There is no evidence that contradicts Mr. Fellin's testimony that multiple tests were conducted by Airzone to validate this new extraction protocol for these new contaminants. How this project works corroborates Mr. Fellin's testimony that experimentation was required because Airzone did not know in advance how to accomplish this purpose. As noted earlier, Mr. Melnyk confirms that identification and quantification methods for contaminants are not always revealed in publicly available sources.

VI. 2015 TAXATION YEAR

A. Project #1 Solving Combustion Issues to Develop Artificial Smouldering

[72] During summer months, coal piles that were stored at a shipping terminal experienced spontaneous smouldering. Airzone was engaged to identify and measure the compounds released from the smouldering coal piles. The evidence shows that because of the risks associated with spontaneous combustion, neither Airzone nor its partner in this project could undertake sampling at the coal face using traditional monitoring to do so.

[73] Faced with this difficulty, Airzone decided that the identification and quantification of the compounds had to be measured in a testing device. Airzone designed a testing chamber that chamber to collect representative emissions from various types of stored coal. This chamber that was designed for this purpose allowed oxygen delivered into the chamber to be controlled so that the smouldering process could occur over a two-hour period following ignition of the coal. Oxygen levels were controlled to prevent full combustion of the coal. Mr. Fellin explained that burning coal releases fewer emissions than smouldering coal because the fire itself consumes the contaminants typically released by smouldering coal.

[75] In my opinion, a large part of the work undertaken in this project concerned the testing chamber and the use of the chamber to mimic smouldering coal. I am of the opinion that the testing chamber, although a little more sophisticated than a home use barbecue, was different from a home use barbecue. There was a heating coil that was in the chamber to provide sufficient heat to commence the smouldering process. There was a valve in the chamber to control the amount of oxygen that flowed into the chamber.

[76] Secondly, unlike the three projects undertaken in 2014, there is no evidence that shows that Airzone had difficulty establishing the identification and quantification of emissions generated from different types of coal once the smouldering process was undertaken. The smouldering process generated substantial water, which interfered with the measurement of other emissions by the continuous monitors. However, Airzone was nonetheless able to measure these emissions using different monitors, called integrated samplers. Once the compounds were measured, Airzone used an existing computer model developed by the United States Environmental Protection Agency to estimate the level of exposure at various locations around the terminal. I am of the opinion that Airzone has not demonstrated that the work undertaken in connection with this project was undertaken to achieve a technological advancement. Rather, I believe that Airzone knew what methods or processes could be used to mimic emissions from a smouldering coal pile and knew how to measure the emissions from the smouldering process was undertaken. What Airzone did was measure emissions using the methods and techniques typically employed when contaminants are released from a testing chamber.

[77] For all of these reasons, I conclude that the expenses incurred in connection with this project do not qualify as SR&ED.

B. Project #2 Measuring Phosphate Compounds at Low Concentration Levels

[78] Mr. Fellin testified that he was invited to attend a workshop sponsored by the United Nations to assist 12 African countries in looking at the process of eutrophication in large lakes of Lake Victoria. Eutrophication is the process by which the oxygen levels in lakes are depleted. The aquatic environment is enriched with minerals and nutrients, causing algae to grow. Fishing in Lake Victoria is an important source of protein for people living around the lake. The deposition of these compounds on agricultural land was also leading to lower crop production.

[79] Mr. Fellin surmised that the problem was linked to the deposition of airborne phosphorus and nitrate. According to Mr. Fellin, phosphate and other contaminants are released into the atmosphere because African farmers have adopted the practice of burning bio-mass

[80] Following the workshop, a project was launched to measure airborne phosphorus contaminants in the sub-Saharan region of Africa. Airzone hypothesized that if it was possible to collect particulate matter in the air containing phosphate, then it would be possible to measure the deposition to the ground based on wind field data collected over the sub-Saharan region. Airzone's role in this project was to engineer an appropriate system for collecting particulate matter in the harsh sub-Saharan environment.

[81] The work undertaken by Airzone in connection with the design of a new detection system included the following:

- Selecting and integrating components, including a control box, a power source, pumps, etc. that Airzone hypothesized would be reliable enough to work in harsh environments.
- Programming the system to allow for variable sampling detection. According to the design, the system had to allow for day-time and night-time sampling because of the difference in wind patterns during night and day.
- Conducting a set of tests to determine the air volumes required to achieve reliable detection.

[82] Airzone claimed the expenses associated with the above activities. The work undertaken in 2015 led to the production of three working prototypes that were employed in 10 African countries to allow for a one-year test period to determine the reliability of the system.

[83] The Respondent in her Reply acknowledged the automation and programming of the detection system designed and constructed by Airzone on its behalf by a programming subcontractor. The Respondent has alleged, however, that the technical challenges were overcome using established mechanical/electronic engineering knowledge and experience. The Respondent also alleged that the work undertaken by Airzone involved the optimization of existing sampling techniques under various conditions to achieve greater certainty.

[84] This is a borderline project. On the one hand, I have Mr. Fellin's testimony that Airzone struggled with a lot of unknowns in connection with this project. It had to design and build working prototypes from the ground up. While some components were commercially available, Airzone had to design and build the flow system, control system, and day-time and night-time sampling regime. Airzone also had to conduct tests to write the software for the detection of meteorological parameters, and the sampling protocol. Finally, I have the

also corroborated by the Respondent's concession that Airzone's work in connection with this project satisfied all of the "how factors".

[85] On the other hand, I have the Minister's factual assumption that the "why factors" were satisfied in connection with this project despite the Respondent's acknowledgment that experimentation was undertaken to resolve challenges encountered with this project.

[86] In the end, I am satisfied that the technical challenges encountered by Airzone in connection with this project were unique and not previously resolved. Mr. Fellin testified that since farmland burning is only practised in select regions, there have been very few studies measuring airborne phosphate compounds. Consequently, there was no standard method for measuring airborne phosphates. This presented a host of challenges. First, because it was the first time that airborne phosphates were being measured in sub-Saharan Africa, there was no pre-existing data on what the phosphate levels would be. Therefore, the system had to be able to allow for the measurement of low or varying concentration levels caused by seasonal variations in wind patterns. To this end, Airzone had to balance the system's detection limit against the risk of overloading the filters. For example, increasing the flow rate would improve the detection limit -- but also increase the risk of overloading the filters. This was particularly true in arid climates like the desert. Second, the sampling system had to withstand varying humidity levels. One system was placed in the quasi-deserts of Malawi and had to survive frequent rain. Another was placed in the rain forests of Ivory Coast where there were intense precipitation. Third, because of the remoteness of the sampling locations, the sampling systems had to be solar-powered and self-contained. The foregoing buttress Mr. Fellin's testimony that the technological advancement made by Airzone in connection with this project was unique. I conclude that Airzone has satisfied its factual evidentiary burden with respect to the "how factors".

C. Project #3 Measuring Unknown Emissions in Curing Environments

[87] Plastic extrusion is the process by which different oil-based materials are mixed with different activators and then baked under high temperature to create plastic products. When these materials are subject to high temperature, they undergo a reaction — which produces unknown emissions that are different than the underlying material. A plastics manufacturer and its employees were experiencing various allergic reactions. Airzone was retained to investigate the unknown emissions to determine whether the extrusion process was causing these reactions. At this end, Airzone sought to resolve two technological uncertainties:

1. Develop a test chamber and procedures for heating cured and uncured test materials at 250 degrees Celsius to produce quantitative estimates of unknown emissions. Volatile organic compounds ("VOCs") and aldehydes were presumed to be the primary

2. Experiment with the possibility of using a passive monitoring method to collect and analyze unknown emissions created in a paint curing environment during the baking process at automotive manufacturing plants. The baking conditions lead to formation of some degradation products. A comparison study was conducted using active and passive monitors under typical conditions.

[88] Mr. Fellin indicated that research into existing patents of similar technology, U.S. Patent 6,094,968 A, did not provide directly applicable solutions for Airzone's specific needs. Consequently, experimentation was necessary to overcome the aforementioned uncertainties.

[89] December 2014: Mr. Fellin indicated that standard chamber tests are typically conducted at ambient temperature (maximum 30 degrees Celsius) and the methods Airzone used to measure the unknown emissions are not used in high temperature situations. Most known emissions that increase exponentially under high temperatures and standard gaskets leak quickly under these conditions and emit compounds that interfere with compounds from the test component and thus their determination. Typically, components used to measure emissions use rubberized or foam gaskets. Airzone needed to experiment with several alternative gasket materials before emissions from gasket materials were significantly mitigated while maintaining operating integrity. Eventually, the use of Viton gaskets yielded sufficiently low emissions levels that Airzone was able to measure emissions from the testing materials.

[90] Mr. Fellin explained to the Court that Airzone would typically use active sampling devices. However, they are bulky and cumbersome, potentially interfering with the normal working movements of workers. As a result, they may yield unrepresentative exposure measurements. Consequently, working movements are modified to accommodate carrying the devices. Consequently, Airzone wanted to investigate the potential for using passive monitoring devices for the measurement of VOC exposures and for airborne degradation products in the oven baking environment. Airzone needed to determine their limitations in the determination of the VOCs and airborne degradation products. A comparison was devised between the passive and active devices under realistic working conditions to verify performance for workers in a variety of tasks. The comparison demonstrated results within experimental precision for the methods, indicating the feasibility of the approach and a more convenient method of undertaking exposure studies under realistic conditions.

[91] Mr. Fellin asserted that as a result of the work with the chamber, Airzone identified a method of undertaking viable chamber measurements at elevated temperatures comparable to manufacturing conditions for typical electronic components. This approach can allow for the assessment of emissions from components from other industries wherein higher temperatures are used in the manufacturing process.

alternative tool for assessing workplace breathing zone exposures while having impact on task performance for workers, thus making the results more representative.

[93] In my view, the work undertaken in this project constitutes routine engine project #2, the Respondent's argument that the work merely consisted of adjusting parameters, is not an oversimplification of the work undertaken. The Appellant tried different gaskets until it found one that did not degrade under the heat. There was no suggestion that Airzone faced difficulties in doing so. Mr. Fellin testified that while operating at high temperature is not part of standard procedure, they had an "inkling as to what [they] needed to pursue."^[12]—On cross-examination, he admitted that the Vitco is a commercial product that is known for its ability to withstand high temperature.

VII. CONCLUSION

[94] Considering the foregoing reasons, I have concluded that the Appellant's SR&ED claims with respect to projects 1, 2 and 3 for the 2014 taxation year and project 2 for the 2015 taxation year should be allowed. I have also concluded that the Appellant's SR&ED claims with respect to projects 1 and 3 for the 2015 taxation year were properly disallowed by the Minister.

[95] Therefore, the Appellant's appeal for the 2014 and 2015 taxation years is allowed in part. The matter is referred back to the Minister for reconsideration and reassessment in accordance with the above.

Signed at Ottawa, Canada, this 21st day of February 2022.

"Robert J. Hogan"

Hogan J.

CITATION: 2022 TCC 29

COURT FILE NO.: 2018-379(IT)G

STYLE OF CAUSE: AIRZONE ONE LTD. v HER MAJESTY THE QUEEN

PLACE OF HEARING: Toronto, Ontario

DATE OF HEARING: December 6, 7 and 8, 2021

REASONS FOR JUDGMENT BY: The Honourable Justice Robert J. Ho

DATE OF JUDGMENT: February 21, 2022

APPEARANCES:

Counsel for the Appellant: Mahyar Makki

Counsel for the Respondent: Robert Zsigo
Jason Winter

COUNSEL OF RECORD:

For the Appellant:

Name: Mahyar Makki

Firm: Quantum Business Law
60 Renfrew Drive, Suite 220
Markham, Ontario L3R 0E1

For the Respondent:

François Daigle
Deputy Attorney General of Canada
Ottawa, Canada

-
- [1] -*CW Agencies Inc v The Queen*, 2001 FCA 393 at para 17.
- [2] -*Northwest Hydraulic Consultants Ltd v R*, [1998] 3 CTC 2520 [*Northwest Hydraulic*], [1998] TCJ No 340; *Logitek Technology Ltd v R*, 2008 TCC 145; *Kam-Press Metal Products Ltd v The Queen*, 2019 TCC 246, aff'd 2021 FCA 88; *WRD Borger Construction Ltd v The Queen*, 2021 TCC 40; *Flavor Net Inc v The Queen*, 2017 TCC 179; *R&D Pro-Innovation Inc v The Queen*, 2015 TCC 186, aff'd 2016 FCA 152.
- [3] -Questions on Written Examination for Discovery of Nick Melnyk, Question 15.
- [4] -Answers on Written Examination for Discovery of Nick Melnyk, Question 15.
- [5] -Respondent's Reply to the Notice of Appeal at para 3(p).
- [6] -*Indusol Industrial Control Ltd v The Queen*, 2020 TCC 103 at para 61.
- [7] -*Northwest Hydraulic*, *supra* note 2 at para 16.
- [8] -"Scientific Research and Experimental Development ("SR&ED") Review Report with respect to the Appellant's tax years ended on September 20, 2014 and 2015, prepared by a CRA Research and Technology Advisor, dated August 10, 2016", Joint Book of Documents, Tab 19, p 6.
- [9] -Canada Revenue Agency, "Guidelines on the Eligibility of Work for Scientific Research and Experimental Development (SR&ED) Tax Incentives" (13 August 2021).
- [10] -*Northwest Hydraulic*, *supra* note 2 at para 11.
- [11] -*Northwest Hydraulic*, *supra* note 2 at para 10.
- [12] -Trial transcript, vol 2, p 21.