

Docket: 2016-1657(IT)I

BETWEEN:

FORMADRAIN INC.,

Appellant,

and

HER MAJESTY THE QUEEN,

Respondent.

[OFFICIAL ENGLISH TRANSLATION]

Appeal heard on common evidence with the appeal of Formadrain Inc.,
2016-1658(IT)I, on December 8 and 9, 2016, at Montréal, Quebec.

Before: The Honourable Justice Johanne D'Auray

Appearances:

Agent for the appellant: Yves Hamelin
Counsel for the respondent: Gabriel Girouard

JUDGMENT

The appeal from the assessment made under the *Income Tax Act* for the 2013 taxation year is allowed and the assessment is referred back to the Minister of National Revenue so that the reassessment may be modified in accordance with the attached Reasons for Judgment.

Signed at Ottawa, Canada, this 15th day of March 2017.

“Johanne D'Auray”

D'Auray J.

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Signed at Ottawa, Canada, this 15th day of March 2017.

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D'Auray J.

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REASONS FOR JUDGMENT

D' Auray J.

I. INTRODCUTION

[1] This appeal concerns the scientific research and experimental development (SR&ED) tax credits claimed by Formadrain Inc. (the appellant), which were disallowed by the Minister of National Revenue (the Minister) for the 2012 and 2013 taxation years (periods at issue).

II. OVERVIEW

[2] The appellant operates a business in developing technologies for rehabilitation of underground pipes and industrial process pipes without digging. Formadrain sells its technology in Canada and in the United States.

[3] Founded in 1994, the appellant first developed a system that consists of pulling a pre-prepped fibreglass and epoxy liner through an existing pipe, using existing access points, to repair underground pipes without any digging. In other words, a new pipe is created inside the old one, with no excavation required.¹

¹ Formadrain's video watched at the hearing.

[4] To that end, underground pipes are lined with a cured-in-place system, better known as “Cured in Place Pipe”.²

[5] In 2012, the appellant’s team was working on two projects, which consisted in developing products for which SR&ED expenses and ITCs (investment tax credits) are claimed, namely,

(1) development of a latent resin (resin); and

(2) development of equipment to facilitate the installation of Formadrain’s liner, namely, a light single-use mandrel (mandrel) that makes it possible to complete the installation from one access point instead of two.

[6] The context of these two projects is as follows. It is difficult for certain clients of the appellant, namely, sewer repair contractors, to implement the appellant’s technology. Sewer pipes can often be up to 200 feet long. Small contractors often do not have the space required to unroll the liner and apply the resin solution to the surface.

[7] The appellant decided to develop a turn-key technology. The liner, including the mandrel, would be sold pre-prepped with the resin. The appellant’s clients—that is to say, contractors—would receive a product ready to repair a sewer.

[8] To reach that goal, the appellant had to develop a resin with an open time of 60 days that could be steam-cured in 60 minutes or less, whatever the ground conditions, such as water and varying temperatures. In 2012, the resin had an open time of only four hours. The appellant’s external chemist told the appellant that a resin with an open time of 30 days could not be developed, much less 60 days.

[9] Still with the goal of developing a turn-key technology to complement the resin, the appellant also wished to develop a new light single-use mandrel. The new mandrel would enable the appellant to repair underground pipes without digging, using the cleanout access point inside a building rather than the manhole access point in the street. A light mandrel would also allow the liner to be pushed into place, rather than pulled.

² Technology developed in England in the 1970s and patented in 1975 - SR&ED Review Report, December 11, 2013, page 4 (Exhibit I-1, tab 1, page 4).

[10] During the years at issue, the appellant used a mandrel that was not single-use, which was heavy and costly. In addition, the method used was to pull the mandrel, and to do so, two access points had to be used.

[11] If the appellant succeeded in developing these two products, which go hand-in-hand, it would be possible to sell the turn-key technology. The liner pre-prepped with resin with an open time of 30 to 60 days, including the new mandrel, could be sent to contractor-clients. Contractors would have to simply do the repairs. In addition, contractors would not need to return the mandrel once the sewer pipes are repaired. This technology would simplify contractors' work and open a new market to the appellant.

[12] The projects began in 2010; however, the technology was still not ready in 2013. Therefore, during the 2012 and 2013 taxation years, the appellant continued its research and development activities with respect to the resin and the light single-use mandrel.

[13] In 2013, a third project was added to the appellant's SR&ED activities: the development of equipment and a method for connecting service entrances to the main municipal sewer, including the development of a T-shaped mandrel.³

[14] In May 2013, the appellant was subject to an audit conducted by Eduardo Turcott, Research and Technology Advisor (RTA) for the Canada Revenue Agency (CRA), and Michelle Lamarre, Financial Reviewer (FR) for the CRA, for the 2012 taxation year.

[15] In November 2014, the appellant was also subject to an audit conducted by Eduardo Turcott, RTA, and Éline Jacques, FR, for the 2013 taxation year.

[16] During the audits, a document was submitted to the RTA for each of the projects at issue listing the tests performed, dates on which they took place, people who took part in them and duration of the tests, as well as photos. Following receipt of this information, the CRA asked for additional documents.

³ The mandrel is a tube used as a mould, which makes it possible to put in place the Formadrain liner in underground pipes. For the purposes of clarification, in 2012, the costs related to the project for the resin part and the mandrel part were in the amount of \$91,904, as shown in Exhibit A-1, tab 6, page 4. In 2013, the costs related to continuing the 2012 project were in the amount of \$34,587, while the costs related to the new project on the T-shaped mandrel were \$2,840, as shown in Exhibit A-1, tab 13, page 5. (Transcript, Volume 1, p. 88–89).

[17] To that end, on September 27, 2013, the appellant forwarded a document containing the following information regarding each project:

- Overall project objective
- Overall project hypothesis
- Technological obstacles and uncertainties of the project
- Project's technological advancement
- Scientific content of the project

That document also identifies the following for each of the trials conducted:

- Technological objective
- Technological advancement
- Scientific and technological uncertainty
- Hypothesis aimed at dispelling the scientific and technological uncertainty
- Relationship between the trials conducted and the targeted technological advancement
- Quantity and type of materials used
- Results of the trial
- Staff involved and nature of the work completed
- Photos

[18] In addition, on December 16, 2014, the appellant also forwarded for the 2013 taxation year a document containing the following information:

- List of trials and hand-made drawings

[19] The following things were also identified in this document for each of the trials conducted:

- Scientific and technological uncertainty

- Hypothesis aimed at dispelling the scientific and technological uncertainty
- Relationship between the trials conducted and the targeted technological advancement
- Quantity and type of materials used
- Trial results
- Staff involved and nature of the work completed
- Photos

[20] Following the audits by the CRA, reassessments were issued by the Minister disallowing the SR&ED expenses claimed by the appellant. The appellant duly objected to the reassessments. On April 12, 2016, a Notice of Confirmation was issued by the Minister, confirming that the projects relating to the resin and the mandrel did not constitute SR&ED, as defined in section 248 of the *Income Tax Act* (the Act), for the 2012 taxation year.

[21] No decision on the objection was made by the Minister for the 2013 taxation year since the appellant chose to use its right to appeal before this Court after 90 days elapsed after service of the Notice of Objection and the Minister had not notified the taxpayer that the Minister had vacated or confirmed the assessment or reassessed, in accordance with paragraph 169(1)(b) of the Act.

III. ISSUES

[22] At the hearing, the respondent conceded that the resin constitutes SR&ED within the meaning of section 248 of the Act for the 2012 and 2013 taxation years.

[23] Accordingly, the issues are as follows:

Do the appellant's research and development activities concerning the mandrel for the 2012 and 2013 taxation years constitute SR&ED within the meaning of section 248 of the Act?

Do the appellant's research and development activities concerning the development of a method/equipment that makes it possible to install the Formadrain liner from one access instead of two, the T-shaped mandrel, constitute SR&ED within the meaning of section 248 of the Act?

IV. EVIDENCE AT THE HEARING

[24] Mr. Therrien has been employed by the appellant since 1994. He became a partner in 1999, and since September 30, 2016, he has been the president of the appellant. He took over from Gérard Marc-Aurèle, the founder and former president of the appellant, who died in 2016.

[25] Mr. Therrien is a civil engineer. He testified regarding the research activities related to the development of a new light mandrel.

[26] Carl Marc-Aurèle is also employed by the appellant. He is vice-president of the appellant and is a chemical engineer. He testified regarding the resin development activities.

[27] The appellant was created in 1994 by Gérard Marc-Aurèle. Mr. Marc-Aurèle was not an engineer, but he had the spirit of an inventor with an avant-garde vision. It was after an unfortunate personal experience that he had the idea in the 1980s of developing a system that would make it possible to repair house and building sewers without having to excavate.

[28] The idea of repairing sewers without digging stewed in his mind for about ten years before Mr. Marc-Aurèle decided to partner with the engineering firm Deblois Engineering from l'Île d'Orléans in 1993.

[29] At the time, the [TRANSLATION] “no digging” system was already in use at the municipal level, but the idea of transposing this system to residential sewers was farfetched, given the degree of complexity of sewer pipe accesses and the changes in direction and in diameter of those pipes.

[30] Mr. Therrien indicated that, starting in 1994, the appellant's team did research and development in order to develop a functional technology. This was no easy task. In 1996–97, the technology was cumbersome.

[31] However, gradually, a manual containing the procedure was developed by the appellant with a view to having a better understanding of the terrain and to better mastering the very broad range of elements that cannot be controlled associated with it. The witness gave as an example water leakage and heat dissipation.

[32] It was not until 1998, however, that the appellant began allowing sewer repair contractors to use its technology through a licence throughout North America.

[33] The appellant is now an industry leader in repairing sewers without digging. In addition, 36 licences allowing the use of the technology developed by the appellant have been issued to contractors, including 6 in Quebec, 20 in the other provinces of Canada and 10 in the United States.⁴

[34] In 2012, the appellant had about twenty employees, including three engineers, and about \$1.75 million in sales.

A. The product

[35] The term “mandrel” designates a rubber tube, which serves as a mould and makes it possible to put in place the Formadrain liner in the underground pipes.

[36] The appellant undertook to develop and design a mandrel that would be pushed into place rather than pulled, thus enabling the installation of Formadrain’s technology from one access point instead of two.⁵

[37] The appellant wanted to be able not only to repair the underground pipes without digging, but also to do it by accessing the pipes only through the cleanout, that is, through the pipe access located inside the building, instead of through the streets, which are often busy and where work space is limited.

[38] In addition, the appellant wanted the mandrel to be as light as possible so that it could be easily transported and to be single-use. Thus, there would be no need for clients to return the mandrel after use.

[39] The installation process for the product that the appellant was attempting to develop could be summed up in three big steps:

First, the product already pre-prepped with resin including the mandrel is pushed inside a sewer pipe.

⁴ SR&ED review report, Exhibit I-1, tab 1, page 4.

⁵ Although no evidence was provided in this respect by the appellant’s representative, he maintained that the techniques known and practised in the industry were all to pull the mandrel (Transcript, Volume II, p. 177).

Second, a steam supply line is connected to the mandrel. The pressure in the mandrel inflates the repair to the size of the original pipe and the heat hardens the resin so that it becomes completely solid.

Third, once the liner is cured, the mandrel is removed from the sewer and can be discarded.⁶

B. The trials

[40] Mr. Therrien estimated that, to achieve a result in a given project, on average 20 trials per year are conducted in a workshop and about 20 trials are conducted in the field.

[41] The old version of the mandrel, which was used by the appellant, was made of reinforced rubber. It was flexible and adapted to the pipes' diameter when stretched. Incidentally, the mandrel was heavy.

[42] To develop its new mandrel, the appellant had to find materials that met its criteria for mechanical heat resistance, lightness and cost given that it was supposed to be single-use. To that end, several steps were taken to find a material that would meet those criteria.

(1) 2012 project: development of a method/equipment making it possible to install the Formadrain liner from one access point instead of two⁷

[43] The trials conducted by the appellant during its 2012 fiscal year are entered into its Laboratory Notebook, which is a 62-page document submitted to the Court containing photos and descriptions. Mr. Therrien testified that the notes in it were always entered in a timely manner.

[44] In 2012, the work was aimed at designing a mandrel that was

- thinner;
- more flexible;

⁶ Information taken from the presentation video of the Formadrain product, found on the USB key (Exhibit A-2).

⁷ The appellant's Laboratory Notebook for 2012 is in tab 8 of Exhibit A-1. Part 2 of the project relating to the mandrel starts on page 49.

- lighter;
- able to withstand the stress caused by the liner being pushed into place and by its extraction; and
- single-use, therefore less costly than a reusable mandrel.

[45] Several trials were first conducted with a new nylon mandrel designed to be full-diameter, which did not need any stress to stretch.

[46] However, deployment was not carried out uniformly throughout the trials. Some specific places were not lined, and, as a result, it inflated prematurely and disproportionately.

[47] The appellant's team modified several parameters in order to counter the liner deployment problems caused by the rupture of the release agent. For example, it attempted to modify inflation speed, to use various types of lubricants to reduce friction as well as to coat the mandrel with silicone.

[48] To that end, the nylon mandrel worked at the factory. The appellant thus decided to conduct an [TRANSLATION] "in situ" trial in the field. Mr. Therrien explained that the team tries to reproduce in the factory the conditions found in the field; however, it is very difficult to reproduce all of the variables provided by field trials. For the appellant, field trials are important and are part of experimental development. During those trials only the costs related to labour were billed to clients including equipment and the time needed for installation.

[49] The [TRANSLATION] "in situ" experiment with the nylon mandrel failed. The appellant had to resort to digging after that unsuccessful trial. A part of the liner was never deployed; the appellant could not take out the mandrel, which had been pushed into the pipe.⁸

[50] Despite that failure, the appellant conducted another field trial on November 16, 2012. Although several parameters had been modified and the mandrel was removed without any issues, an incident with the liner required a second excavation.⁹

⁸ See Exhibit A-1, tab 8, p. 67.

⁹ See Exhibit A-1, tab 6, p. 71 and pp. 67 and 68.

[51] Mr. Therrien testified that those factory and “in situ” trials made it possible to create technological advancement. It was thanks to that research and those trials that the appellant succeeded in developing a new mandrel, which it currently uses. The trials enabled the appellant to understand the inflating mechanism and the fact that it was impossible to develop a mandrel with the same diameter as the pipe.

[52] I must note that, according to Mr. Therrien’s testimony, which was not contradicted, the appellant is the only business that uses the pull-in-place lining method; its competitors use the inversion method. Therefore, the appellant could not use current studies or techniques and usual procedures. The turn-key technology for repairing sewers without digging that the appellant wanted to develop did not exist in 2012 and 2013.

(2) 2013 project: continuing the 2012 project and new project to develop a T-shaped mandrel¹⁰

[53] Following the unsuccessful trials undertaken towards the end of 2012, the appellant began its research and development work again by going back to the basics, that is, to finding a material with specific components.

[54] The appellant was already using reinforced rubber, which was heavy and costly. The appellant’s team agreed that it would be better to continue with rubber. Rubber was already working for the appellant. However, the appellant needed to develop rubber that was much thinner, could withstand mechanical stress and be less costly than reinforced rubber because the ultimate objective was a single-use mandrel.

[55] As explained by Mr. Therrien, thin rubber exists; however, in this case, the technological uncertainty was whether a thin rubber mandrel could withstand mechanical stress when it was inserted into and extracted from a pipe, whether the rubber could mould to different configurations and changes in direction up to 45 degrees and whether it could adapt to heat. In addition, the rubber had to have some resistance to tearing because the sewers to be repaired are not smooth; they are often very rusty and may contain significant abrasions and protrusions. Thus, the required rubber was not available on the market.

¹⁰ The appellant’s laboratory notebook for 2013 is at tab 14 of Exhibit A-1. Part 2 of the project related to the mandrel starts on page 16.

[56] The appellant hired the company Pro-Flex to produce rubber tubes that would be used as mandrels. Pro-Flex is an expert in manufacturing rubber products.

[57] Although the appellant specializes in research and development and Carl Marc-Aurèle is a chemical engineer, rubber has very complex chemical properties, which are beyond the field of expertise of the appellant's staff.

[58] The mandate given to Pro-Flex was not simple because the rubber tube in question had to be able to stand up to an impressive amount of constraints, the mandrel having to withstand multiple sources of stress while it was being installed.

[59] Pro-Flex first supplied two types of rubber to the appellant: one based on SVR and the other on EPDM.

[60] The difficulty encountered with moulding the EPDM-based mandrel lay in its ability to adapt to changes in pipe diameter.

[61] Typically, building sewer pipes, which are four inches in diameter, feed into exterior sewer pipes, which are six inches in diameter, hence the transition.

[62] Despite several workshop trials conducted by the appellant with mandrel prototypes provided by Pro-Flex, the mandrels were unable to adapt to various pipe diameters.

[63] In 2013, the appellant also launched its project to develop equipment for or a method of sealing the building sewer pipe from the municipal sewer by doing service entrances at the same time.¹¹

[64] That said, the project was still in its infancy. It was more fully developed during 2014 and 2015.

[65] Mr. Therrien indicated that, before starting a research and development project, the appellant's engineers always conducted Internet research to see whether a procedure had already been developed. For example, for choices of material for the mandrel, the appellant's engineers consulted material data sheets available on the Internet. They also used their experience to eliminate certain

¹¹ See Exhibit A-1, tab 13, pages 5 and 8.

materials, knowing in advance that they would not be appropriate for their intended use.

[66] In light of its expertise, the appellant did not get involved in the chemical formulation of the rubber. It was rather Pro-Flex who looked for the right chemical formulation based on the parameters provided by the appellant.

[67] All of the hypotheses, iterations and test results were noted in the appellant's Laboratory Notebook. Mr. Therrien explained that the initial hypotheses were made based on the overall objective to be achieved, namely, the turn-key technology. The other hypotheses were modulated based on other technological uncertainties that came out of the trials conducted. Once the hypotheses were made by the appellant's team, it proceeded to tests. The test results brought other technological uncertainties.

[68] The Laboratory Notebook shows that several tests had to be performed with respect to the thickness of the material used for the mandrel. The rubber had to be thin and to resist mechanical force; it had to not tear, but be flexible to adapt to different diameters of sewer pipes. The mandrel had to be single-use, thus the costs had to be proportional to that single use.

[69] Some tests documented in the appellant's laboratory notebook were [TRANSLATION] "intermediate tests", which were used more for collecting data than for verifying specific hypotheses. For example, on August 2, 2013, the appellant conducted an intermediate test to verify whether the mechanical link of vulcanized rubber¹² on nylon Oxford fabric could withstand the stress imposed by curing the liner.¹³

[70] Whether it be with a view to reducing production costs, to have a process that has less impact on the environment or to learn more about the behaviour of certain materials in specific conditions, the intermediate tests were an integral part of the appellant's research. These tests enabled the appellant to develop the new technology that it currently uses, namely, the T-shaped mandrel.

[71] Mr. Therrien indicated that the appellant did not have a detailed plan established in advance. However, the research and trials were always done based

¹² The witness defined "vulcanized" as being cured under pressure with steam in an autoclave (Transcript, Volume 1, p. 131, lines 12–13).

¹³ See Exhibit A-1, tab 14, page 18.

on their overall objective. In addition, each trial taken individually was planned before it was carried out, but the series of trials were not. The results obtained following each trial often led to other trials, which were impossible to predict. The appellant's objective was clear: to develop a single-use mandrel, capable of withstanding mechanical stress (pressure, heat, mechanical deformation) during both insertion and extraction and to mould to different sewer configurations.

[72] The respondent called as a witness Eduardo Turcott, the RTA assigned to the appellant's file.

[73] Mr. Turcott indicated that the SR&ED expenses were disallowed because he considered that the information gathered did not make it possible for him to determine whether the appellant's activities were SR&ED within the meaning of section 248 of the Act.

MR. TURCOTT: My conclusion in the report is that I don't have sufficient evidence to say that there is no project, nor to say that there is a project. And that is called a non-corroborated decision. My conclusion, it mentions that based on the information that I received and the discussions during the interview and the meeting, plus the study or analysis of the documentary information supplied, I was not able to pronounce myself if there was a project or there was not a project.

[74] In addition, Mr. Turcott was of the view that, in this case, there was no systematic investigation. In his testimony, he indicated that, after hearing the appellant's evidence at the hearing, he still could not find a logical sequence in the trials.

[75] According to Mr. Turcott, the appellant demonstrated that it had conducted trials, but not why it had conducted them, which variable it modified and what exact chemical formulas it used.

[76] In addition, Mr. Turcott indicated that, out of the expenses claimed, \$33,000 in 2012 did not constitute an SR&ED expense. That expense was incurred to pay for excavation expenses following the unsuccessful trials with the nylon mandrel. According to the respondent, that expense was not incurred for experimental development activities.

V. ANALYSIS OF THE LAW

[77] SR&ED is defined as follows in subsection 248(1) of the Act:

scientific research and experimental development means systematic investigation or search that is carried out in a field of science or technology by means of experiment or analysis and that is

- (a) basic research, namely, work undertaken for the advancement of scientific knowledge without a specific practical application in view,
- (b) applied research, namely, work undertaken for the advancement of scientific 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 new, or improving existing, materials, devices, products or processes, including incremental improvements thereto,

...

but does not include work with respect to

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

[78] In this case, the appellant argues that its activities constituted experimental development under paragraph (c), while the respondent relies on the exclusions described in paragraphs (f) to (i) of the same definition.

[79] To determine whether the activities undertaken by a taxpayer fall under the definition of SR&ED activities in the Act, it is necessary to answer yes to the following five questions:

1. Was there any scientific or technological uncertainty?
2. Were hypotheses formulated specifically to reduce or eliminate that technological uncertainty?

3. Was the overall approach adopted consistent with a systematic investigation or search including the formulation and verification of hypotheses by means of experiment or analysis?
4. Was the overall approach adopted aimed at achieving a scientific or technological advancement?
5. Was a record of the hypotheses tested and results kept as the work progressed?

[80] These five criteria were enshrined in 1998 by Chief Justice Bowman (as he then was), who relied on his interpretation of the concepts found in Information Circular 86-4R3 to render a decision in *Northwest Hydraulic Consultants Limited v Her Majesty the Queen*¹⁴ (*Northwest Hydraulic Consultants Ltd*). In doing so, he established the five questions approach, which was affirmed in *RIS-Christie*¹⁵ and *C.W. Agencies*.¹⁶

[81] Circular 86-4R3, which was first replaced by the circular dated December 19, 2012, and then by the circular dated April 24, 2015, has always been considered to be “a generally useful and reliable guide” given that that policy was the result of extensive consultations between the government and the scientific community in industry as well as at universities.

[82] In order to determine whether the appellant’s project in relation to the mandrel during the 2012 and 2013 taxation years was an SR&ED activity, the five questions above must be analyzed in light of the facts of this case.

(1) Was there any scientific or technological uncertainty?

[83] The parties have submitted conflicting arguments on the issue of whether there was technological uncertainty during the 2012 and 2013 taxation years with respect to the mandrel project.

[84] It is clear in the appellant’s mind that the multiple parameters that were at play in the development of its [TRANSLATION] “single-use mandrel that is pushed

¹⁴ *Northwest Hydraulic Consultants Ltd v R*, 1998 CarswellNat 3632, [1998] 3 CTC 2520, 98 DTC 1839, [1998] TCJ No. 340 (Tax Court of Canada).

¹⁵ *RIS-Christie v The Queen*, [1999] 1 CTC 132, 99 DTC 5087.

¹⁶ *C.W. Agencies Inc v The Queen*, 2001 FCA 393, [2002] 1 CTC 212, 2002 DTC 2740.

into place” did not constitute uncertainties that could be removed by routine engineering or standard procedures. That type of mandrel did not exist.

[85] The technological uncertainty lay in the fact that the selected material had to be thin and affordable and had to withstand mechanical stress during insertion and extraction. In addition, the material had to be flexible enough to mould to different configurations, that is, to changes in diameter and to changes in direction up to 45 degrees, as well as to adapt to heat.

[86] In addition, the material had to have a certain resistance to tearing since the sewers to be repaired are not smooth; they are often very rusty and may have significant abrasions and protrusions. As indicated by Mr. Therrien, there is no doubt that thin rubber existed on the market, but thin rubber capable of adapting to all of the constraints did not exist.

[87] In turn, the respondent attributed a great deal of importance to the fact that the appellant used Pro-Flex to develop the chemical formula for the rubber that was used to manufacture the mandrel.

[88] According to the respondent, the source of technological uncertainty of this project lay entirely in the chemical composition of the material, which was a task delegated to a rubber manufacturer.

[89] I have difficulty with the respondent’s argument because paragraph (d) of the definition of research and development activities in subsection 248(1) of the Act includes development activities undertaken in Canada on behalf of the taxpayer.

[90] In addition, the Contract Expenditures for SR&ED Performed on Behalf of a Claimant Policy dated December 2014 states that work performed under a contract on behalf of the performer is just as eligible as if the work was performed by the performer itself.

[91] I am of the view that the appellant has demonstrated that there was technological uncertainty. At paragraph 16 of his decision in *Northwest Hydraulic Consultants Ltd*, Chief Justice Bowman illustrated what, in his opinion, constituted technological uncertainty:

(a) Implicit in the term “technical risk or uncertainty” in this context is the requirement that it be a type of uncertainty that cannot be removed by routine engineering or standard procedures. I am not talking about the fact that whenever a problem is identified there may be some doubt concerning the way in which it will be solved. If the resolution of the problem is reasonably predictable using standard procedure or routine engineering there is no technological uncertainty as used in this context.

(b) What is “routine engineering”? It is this question, (as well as that relating to technological advancement) that appears to have divided the experts more than any other. Briefly it describes techniques, procedures and data that are generally accessible to competent professionals in the field.

[92] In the 2015 Policy, it is indicated:

Scientific or technological uncertainty means whether a given result or objective can be achieved or how to achieve it, is not known or determined on the basis of generally available scientific or technological knowledge or experience. Specifically, it is uncertain if the goals can be achieved at all or what alternatives (for example, paths, routes, approaches, equipment configurations, system architectures, or circuit techniques) will enable the goals to be met based on the existing scientific or technological knowledge base. . . .

Technological uncertainties may arise from shortcomings or limitations of the current state of technology that prevent a new or improved capability from being developed. In other words, the current state of technology may be insufficient to resolve a problem.

It is important to recognize that this question relates to more than simply identifying that how to achieve the objectives is unknown. One must be able to identify specifically what is lacking in the scientific or technological knowledge base that is creating this uncertainty.

[Emphasis added.]

[93] In other words, the lacking knowledge must really not exist in the base of scientific or technological knowledge, not simply be unknown to the claimant.

[94] In this Court's decision in *Abeilles Service De Conditionnement inc.*,¹⁷ Justice Jorré indicated the following regarding the technological uncertainty criterion:

142 . . . The first criteria, technological uncertainty, is one way of dealing with the technological advancement criteria; there can hardly be a technological advancement if one already knows how to achieve the end result [sic]

[95] In this case, the factors and parameters to be controlled by the appellant for the development of a single-use mandrel were in both the material composition of the mandrel and the process enabling it to push it into place from only one access point.

[96] It seems that reducing the appellant's entire project regarding the mandrel to the single aspect of searching for the chemical formula of the rubber is a simplistic view of the work that actually took place.

[97] Mr. Therrien's testimony was not contradicted when he argued that the techniques known on this subject and practised in the industry of building sewer repairs all consist in using the inversion method.

[98] That said, the new technique proposed by the appellant brought out new constraints, which could not be removed by routine engineering or standard procedures. Consequently, they qualify as technological uncertainty.

[99] The respondent seems to argue that I must analyze the project in isolation and that each manoeuvre taken individually must result in technological uncertainty. I do not agree with this approach.

[100] This is precisely the aspect that Justice Jorré ruled on in *Les Abeilles Service De Conditionnement inc.*, which rejected this notion:

128 Finally, project 2009-02, regarding printing finishings, was also uncertain. The fact that each separate element has the potential of achieving the intended objectives does not preclude uncertainty about the overall objective of having everything work together.

¹⁷ *Les Abeilles Service De Conditionnement inc v R*, 2014 CarswellNat 4174, 2014 TCC 313, 2015 DTC 1140 (Eng), 2014 CCI 313, 2014 DTC 1219 (Fr).

129 Mr. Gariépy stressed the fact that it is necessary to look at the projects [TRANSLATION] “from the highest level,” that is to say, that it is necessary to look at a project as a whole. To look at every little step would be tantamount to distorting the project. He noted that it is possible that a secondary objective does not represent uncertainty, which does not preclude the validation of the project as a whole. Later in his testimony, Mr. Gariépy stated that, according to his interpretation of the Canada Revenue Agency’s directives, it is necessary to look at the project in its entirety, not just in the fiscal year concerned.

135 Mr. Gariépy was critical of the report by Mr. Kooi, the respondent’s expert, on the grounds that he looked at the projects far too closely, instead of looking at them from the highest level. . . .

152 I fully agree that experimental development was required in the year in question. However, this does not mean that one cannot examine the history of a project that began in a previous year by considering whether, in the particular year at issue, “experimental development” was carried out within the meaning of the Act.

153 Furthermore, it is important to consider each project globally in the year and not each test individually.

[Emphasis added.]

[101] In this case, it is clear that the appellant did not know at the outset how it would develop and install a single-use mandrel by pushing it inside a pipe. Taken in its entirety, the appellant’s project contained multiple technological uncertainties, which lay in the chemical composition of the mandrel, its thickness, its length and the mechanical stress that allowed it to be inserted into and extracted from the pipe.

[102] The engineers who worked on the project had years of experience in no-dig sewer repairs. Considering that expertise and their knowledge in the field, it is clear that the factory and [TRANSLATION] “in situ” trials were conducted because of a real technological uncertainty.

(2) Were hypotheses formulated specifically to reduce or eliminate that technological uncertainty?

[103] Analysis of the second question is intrinsically linked to the first, because uncertainty is necessary for formulating a hypothesis.

[104] Numerous hypotheses made by the business's engineers before the trials are found in the appellant's Laboratory Notebook for each taxation year at issue.

[105] In *Northwest Hydraulic Consultants Ltd*, Chief Justice Bowman indicated the following regarding the second criterion at paragraph 16:

It is important to recognize that although a technological uncertainty must be identified at the outset an integral part of SRED is the identification of new technological uncertainties as the research progresses and the use of the scientific method, including intuition, creativity and sometimes genius in uncovering, recognizing and resolving the new uncertainties.

[106] The evidence has clearly shown that this criterion was met by the appellant.

(3) Was the overall approach adopted consistent with a systematic investigation or search including the formulation and verification of hypotheses by means of experiment or analysis?

[107] The respondent argued that the appellant conducted its research by [TRANSLATION] "trial and error" with the tests performed not being methodical based on a pre-established systematic plan.

[108] In the 2015 Policy, this approach is described as follows:

The objective in such a case is to resolve a functional problem rather than to address a problem in the underlying technology that may have caused this functional problem. The lesson learned in each attempt of trial and error is simply that "an option did not work." There is no further analysis of the reason why it did not work to make the lesson applicable in a broader sense. . . . [T]he process simply moves from attempt to attempt without trying to understand or address the problem associated with the underlying technology. Solving problems by trial and error is not experiment or analysis within the framework of a systematic investigation or search.

[Emphasis added.]

[109] The evidence reveals that the appellant's engineers clearly tried to understand the problems associated with the underlying technology by analyzing them in the context of the final product that they were trying to develop: a turn-key product.

[110] Furthermore, the way in which research was conducted for the "resin" portion of the project and for the "mandrel" portion was basically the same: the trials were described in the same Laboratory Notebook and structured in the same way.

[111] In consenting to judgment for the portion of the project related to the resin, the respondent admitted that the overall approach adopted by the appellant in its research met the third criterion, which is a systematic investigation or search.

[112] Thus, it would be inconsistent to reach a different conclusion for the portion related to the mandrel for the appellant's research project for its 2012 and 2013 taxation years.

(4) Was the overall approach adopted aimed at achieving a scientific or technological advancement?

[113] Although the appellant's project relative to the mandrel did not lead to a technology that was usable in 2013, the fact still remains that the research enabled the appellant to advance its scientific and technological knowledge.

[114] In the 2015 Policy, it is indicated:

By showing why a possible solution will not succeed or will not meet the desired objectives, advancement in science or technology is still possible. In some instances, the project's objectives might not have been achieved but, in the process, SR&ED was carried out to understand the reasons for the failure. Hence, scientific or technological advancement can be achieved even if the project's objectives are not met.

The rejection of a hypothesis is advancement because it eliminates a possible solution.

[115] At the end of 2012, the appellant conducted two field trials, which were unsuccessful. However, the research that it conducted following the trials enabled it to understand the inflation mechanism and that it would be impossible to develop a mandrel that already had a diameter.

[116] In 2013, the technology was still not developed, but it was better understood and better mastered by the appellant. For example, the appellant went back to rubber after testing nylon and silicone. The appellant knew, in light of the tests conducted, that rubber worked because its current mandrel worked. However, the appellant had used a different rubber formulation that is capable of withstanding numerous constraints. The thin rubber needed for the proper functioning of the mandrel did not exist on the market. A rubber formulation meeting all the criteria developed by the appellant had not been developed. All of the trials had been unsuccessful.

[117] At the hearing, Mr. Therrien indicated that the appellant had now succeeded in developing a light mandrel using thin rubber that can be used for some repairs by pushing it into place rather than pulling it. In addition, the T-shaped mandrel had also been developed by the appellant.

(5) Was a record of the hypotheses tested and results kept as the work progressed?

[118] This Court,¹⁸ as well as the Federal Court of Appeal,¹⁹ seem to have interpreted the fifth criterion in the same way, namely, that it is not mandatory that the evidence be documentary and that testimonial evidence may be presented. Although risks are associated with not adequately documenting a step in an SR&ED project, testimonial evidence is accepted.

[119] In this case, the appellant's Laboratory Notebook, that is, the complete record of the research with photos, proves that the appellant formulated hypotheses and used a systematic method during its 2012 and 2013 taxation years, the overall objective of which was to develop a turn-key technology for repairing sewers.

¹⁸ *Zeuter Development Corp v R*, 2006 TCC 597 (Tax Court of Canada [Informal Procedure]), para 28.

¹⁹ *RIS-Christie Ltd v R*, 1998 FCJ No 1890 (Federal Court of Appeal), paras 14-15.

VI. EXCAVATION EXPENSES OF \$33,000 - 2012 taxation year

[120] The respondent alleges that the appellant cannot claim an amount of \$33,000 incurred following two trials with the nylon mandrel, which proved unsuccessful. According to the respondent, that expense was not incurred for experimental development activities.

[121] The appellant argues that this excavation expense is connected to the trials related to experimental development. According to it, without [TRANSLATION] “in situ” trials, that expense would not have been incurred by the appellant.

[122] I am of the view that part of the expenses incurred fall under paragraph 2900(2)(c) of the *Income Tax Regulations* (the Regulations) since those expenses are directly related to the research and development activities of the appellant during its [TRANSLATION] “in situ” trials; for example, a portion of the excavation is related to the retrieval of the mandrel. However, I am of the view that the expenses incurred to repair sewers by using the traditional method do not fall under subsection 2900(2) of the Regulations as those expenses are not directly related to the research activities. At the hearing, the parties did not do a breakdown of those expenses. Given the amount at issue, I decided to allow half of the amount claimed, namely, \$16,500 as expenses directly attributable to the research and development activities for the 2012 taxation year. This approach is reasonable in my opinion, having regard to the facts presented at the hearing on this issue.

VII. DECISION

[123] Given that the respondent conceded that the appellant’s research and development activities regarding the resin were SR&ED activities for the 2012 and 2013 taxation years.

[124] Given that I found that the appellant’s research and development activities with respect to the new mandrel and the T-shaped mandrel were SR&ED activities for the 2012 and 2013 taxation years.

[125] Now therefore, the appeal in respect of the 2012 taxation year is allowed with respect to the amounts claimed for SR&ED activities concerning the resin and the mandrel, except that, by reason of my finding regarding the excavation expenses of \$33,000, an amount of \$16,500 does not qualify as an SR&ED expense.

[126] The appeal in respect of the 2013 taxation year is allowed.

[127] The appellant elected to proceed under the informal procedure. Accordingly, under section 18.1 of the *Tax Court of Canada Act*, cited below, the amounts at issue cannot be reduced by more than \$25,000 per taxation year.

18.1 Every judgment that allows an appeal referred to in subsection 18(1) is deemed to include a statement that the aggregate of all amounts in issue not be reduced by more than \$25,000 or that the amount of the loss in issue not be increased by more than \$50,000, as the case may be.

Signed at Ottawa, Canada, this 15th day of March, 2017.

“Johanne D’Auray”

D’Auray J.

CITATION: 2017 TCC 42

COURT FILE NO: 2016-1657(IT)I
2016-1658(IT)I

STYLE OF CAUSE: FORMADRAIN INC v. HER MAJESTY
THE QUEEN

PLACE OF HEARING: Montréal, Quebec

DATE OF HEARING: December 8 and 9, 2016

REASONS FOR JUDGMENT BY: The Honourable Justice Johanne D'Auray

DATE OF JUDGMENT: March 15, 2017

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