Dockets: 2015-3425(IT)G
2016-4491(IT)G

BETWEEN:

BÉTON MOBILE DU QUÉBEC INC.,

Appellant,

and

HER MAJESTY THE QUEEN,

Respondent.

[OFFICIAL ENGLISH TRANSLATION]

Appeals heard on common evidence
on April 8, 9, 10, 11 and 12, and May 29, 30 and 31, 2019,
at Montreal, Quebec.

Before: The Honourable Justice Dominique Lafleur

Appearances:

Counsel for the appellant:	M[e] Maude Piché M[e] Olivier Verdon
Counsel for the respondent:	Anne Poirier

JUDGMENT

In accordance with the attached reasons for judgment, the appeals against the reassessments made under the *Income Tax Act* (the Act) for the tax years ending on January 31, 2010, January 31, 2011, and January 31, 2012, are allowed. The reassessments are referred back to the Minister of National Revenue for reconsideration and reassessment on the basis that the activities carried out by the appellant under projects B-10-18, B-11-04, B-11-07, B-12-01, B-12-03 and B-12-07 fall under Scientific Research and Experimental Development (SR&ED) activities and that the following amounts are deductible as current expenditures under section 37 of the Act and expenditures that qualify for investment tax credits (ITCs) under subsection 127(5) of the Act:

i) For the tax year ending January 31, 2010: $3,521 for salaries, $427 for materials and $360 for subcontractor fees;

ii) For the tax year ending January 31, 2011: $37,668 for salaries, $2,520 for materials and $3,425 for subcontractor fees;

iii) For the tax year ending January 31, 2012: $44,192 for salaries, $4,433 for materials and $9,204 for subcontractor fees;

No costs are awarded.

Signed at Ottawa, Canada, this 11th day of December 2019.

"Dominique Lafleur"

Lafleur J.

Translation certified true
on this 4th day of March 2020.

François Brunet, Revisor

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REASONS FOR JUDGMENT

Lafleur J.

[1] Béton Mobile du Québec inc. ("BMQ" or the "appellant") is appealing against the reassessments made by the Minister of National Revenue (the Minister) under the *Income Tax Act*, R.S.C. 1985, c. 1 (5th Supp.), as amended) (the Act), for the tax years ending on January 31, 2010, ("2010 tax year"), January 31, 2011 ("2011 tax year") and January 31, 2012 ("2012 tax year"). The appeals for all the tax years at issue were heard on common evidence.

[2] In making these reassessments, the Minister refused to consider the activities exercised by BMQ under certain projects as scientific research and experimental development (SR&ED), refused to acknowledge the deductibility of the amounts BMQ deducted as SR&ED expenditures under section 37 of the Act and refused to allow the related investment tax credit (ITC). The deductibility of BMQ's expenditures beyond those under section 37 of the Act is not at issue in these appeals.

[3] As regards tax year 2010, the parties agree that SR&ED qualification of activities carried out by BMQ as part of seven projects is at issue (namely, projects B-10-03, B-10-05, B-10-07, B-10-08, B-10-09, B-10-12 and B-10-18). Similarly, the parties agreed that, had I found that the activities carried out as part of any of these seven projects could qualify as SR&ED, the deductibility under

section 37 of the Act for expenditures for salaries, materials and subcontractor fees totalling $140,614, and whether they qualified for ITCs, is in dispute. The appeal was initially based on twenty projects, but the appellant agreed to withdraw their appeal regarding all projects aside from those indicated above and in regard to those related expenditures.

[4] As regards tax year 2011, the parties agree that the qualification of activities carried out by BMQ as SR&ED under three projects is at issue (namely, projects B-11-01, B-11-04 and B-11-07). Similarly, the parties agree that, were I to find that the activities carried out as part of any of these three projects could qualify as SR&ED, the deductibility under section 37 of the Act for expenditures for salaries, materials and subcontractor fees totalling $27,338, and whether they qualified for ITCs, is in dispute. The appeal was initially based on seven projects, but the appellant agreed to withdraw their appeal regarding all the projects aside from those indicated above and in regard to those related expenditures.

[5] As regards tax year 2012, the parties agree that the qualification of activities carried out by BMQ as SR&ED under four projects is at issue (namely, projects B-12-01, B-12-02, B-12-03 and B-12-07). Similarly, the parties agree that, were I to find that the activities carried out as part of any of these four projects could qualify as SR&ED, the deductibility under section 37 of the Act for expenditures for salaries, materials and subcontractor fees totalling $49,338, and whether they qualified for ITCs, is in dispute. The appeal was initially based on seven projects, but the appellant agreed to withdraw their appeal regarding all projects aside from those indicated above and in regard to those related expenditures.

[6] Jacques Bertrand testified at the hearing. He is an engineer and also one of the founders of BMQ; he was the President of BMQ during the relevant periods. Gérard Dubé, an engineer at BMQ, also testified at the hearing.

[7] Research and Technology Advisors (RTAs) from the Canada Revenue Agency (CRA), namely, Cédric Durban, who examined the 2010 tax year projects, and Karim Mimoune, who examined the 2011 and 2012 tax year projects, also testified. Mr. Durban earned a doctorate in mechanical engineering in 1997. Mr. Durban began his career as a private SR&ED consultant; he joined the CRA in 2009, where he held the position of RTA at the time of the audit. Mr. Mimoune holds a PhD in mechanical engineering and has worked at the CRA as an RTA since 2002.

[8] The financial auditor who participated in the audits of the three tax years at issue did not testify. Also, no expert witnesses were called to testify as part of these appeals.

[9] Unless otherwise indicated, any statutory provision referred to in these reasons is a provision of the Act.

A. EVIDENCE – CONTEXT OF THE PROJECTS

1) Business carried on by BMQ

[10] Mr. Bertrand is an engineer by training and has been practising this profession since 1967. For many years, he worked in the civil engineering field on major projects, such as James Bay and Churchill Falls, in which concrete was widely used. He also worked on the construction of the Montreal metro station.

[11] Mr. Bertrand founded BMQ in 1979 together with two partners. Mr. Bertrand testified that, at the time, there was a lack of businesses capable of meeting the demand for smaller projects, or even more specific projects or repairs.

[12] BMQ carries on its activities, as a concrete supplier, in the ready-mix and specialized concrete domain. This company is a leader in this industry. Its clients are comprised of entrepreneurs who work for public or private worksites. The majority of BMQ's business stems from public-sector contracts. Usually, before a contract is awarded to BMQ, and particularly when a contract is awarded in the public sector, the concrete mix to be supplied to the entrepreneur by BMQ is pre-approved by the client and the entrepreneur, since the concrete must comply with the minimum industry standards.

[13] BMQ supplies freshly mixed concrete using mobile concrete mixers and not "drum concrete mixers" or classic concrete mixers, which allows it to offer innovative solutions and products to its clients to meet their various needs when completing and repairing concrete structures. A classic concrete mixer transports a concrete mix that was prepared at the factory and which must be delivered within an hour and a half after leaving the factory; otherwise, the concrete cannot be used for the purposes for which it was prepared. A mobile concrete mixer makes it possible to prepare a concrete mix directly at the site where the concrete must be poured, since the inputs are mixed on site by the concrete mixer. In addition, the mobile concrete mixer can deliver various types of concrete to different clients in a

single trip, i.e., without having to return to the business premises in between deliveries, since the concrete mixer can be calibrated based on the different needs. Mr. Bertrand testified that 99% of the concrete market was comprised of classic concrete mixers and 1% by mobile concrete mixers.

[14] Mr. Dubé completed his technical training in civil engineering at the Ahuntsic Cégep in 1986 and earned a diploma in the same field in 1990 at the École de technologie supérieure. He began working at BMQ in February 1991. During the tax years at issue, Mr. Dubé handled special projects and was responsible for quality control at BMQ. He directly participated in research projects.

[15] In addition, during the tax years at issue, BMQ employed three or four people who were ACI (American Concrete Institute) technicians and who were authorized to carry out concrete tests in laboratory and worksite settings. BMQ also employed experienced mobile concrete mixer operators; these operators assisted the engineer in conducting tests and prepared the mixes. BMQ also employed interns—all civil engineering students who apparently obtained their ACI technician qualification through working at BMQ.

2) The concrete

[16] Concrete is comprised of several inputs: cement, sand, stone and potable water. Various admixtures can be added to it, such as entrained air, superplasticizers, colloidal agents and latex. These admixtures are added to give certain characteristics to the concrete, such as greater strength or enhanced durability.

[17] BMQ has receipts for approximately 300 concrete mixes and develops 15 to 20 of them per year. According to Mr. Bertrand, the possible combinations of the various inputs are extremely vast, as there are six or seven types of cement, 100 types of stones, a very high number of soil types and from 500 to 1,000 different admixtures. Moreover, the mix proportion of each of these inputs can be subject to variations.

[18] A concrete mix must comply with certain standards to be used for public work sites. For example, standard 3101 of the Ministère des Transports du Québec (MTQ) Cahier des charges et devis généraux must be met. According to Mr. Bertrand, even when inputs are long-known, industry needs change and, as a

result, BMQ strives to create new mixes. Minimum standards also evolve. The 3101 standard is revised every year and the CSA standards (Canadian Standards Association) are revised every five years. For example, Mr. Bertrand explained that the compressive strength standards increased from 35 megapascals to 50 megapascals from the 1960s to today. Moreover, BMQ is not necessarily limited to complying with the standards and can strive to improve products even though they already comply with minimal standards. Each concrete mix must meet certain thresholds, and some twenty laboratory tests must be conducted for the mix to be approved for use at a public work site. These tests are designed, for example, to verify the compressive strength, scaling strength and chlorine ion permeability.

[19] In addition, other tests are done directly at a site before pouring the concrete. These tests are done when the concrete was still in the plastic state, that is, while it was still in liquid form. This consists of an air content test, a settlement test and a temperature test, which take approximately 10 minutes to complete, and a compression/density test, i.e., taking samples in cylinders, which requires approximately 15 minutes.

3) The research

[20] Mr. Bertrand testified that BMQ has been conducting research and development since the late 1980s, to create new products or to enhance existing products. New products are either developed at the request of clients, or because industry standards have changed. At times, a project may be initiated directly by the company, because it is always seeking to remain competitive. Both Mr. Bertrand and Mr. Dubé, as well as Mr. Fournier (BMQ's master mechanic) can decide to implement a project.

[21] In terms of BMQ's approach as part of various projects, Mr. Bertrand explained that the company regularly works with the MTQ and different universities. A project generally begins with bibliographic research and discussions with colleagues, people in the industry and university professors. However, the results of studies conducted in locations such as the United States cannot necessarily be transferred to Quebec, where winter must be taken into account to determine whether the concrete is durable; what also must be taken into account is the fact that the concrete mix is prepared in a mobile concrete mixer. The assumptions are then established: Mr. Bertrand's assumptions are the characteristics sought in a mix, whereas, according to Mr. Dubé, they involve the standards to be met.

[22] BMQ then begins conducting tests and pursues the project as it seems promising following the initial tests. BMQ has a laboratory that includes equipment—such as a scale, cones of subsidence, an air meter, cylinders, a concrete washout container, a cold chamber and a small concrete mixer—to conduct certain tests. In the laboratory, the concrete is prepared in a stand-alone concrete mixer. If a mix is satisfactory, the next requirement is to verify if the results are similar when the mix is prepared in a mobile concrete mixer, and whether the mix complies with the standards. To do this, BMQ uses its own concrete mixers. The durability tests, such as those for compressive strength, are carried out by independent laboratories.

[23] The direction the research takes will then depend on the desired characteristics. For example, a specific admixture may be considered at the start of the project to meet a certain standard. Mr. Dubé explained that, despite his expertise, he does not always find the solution to a problem on the first attempt. In addition, BMQ must redo the standard tests (air, settlement, temperature and density/compression) to verify whether the standards are still met each time an element is changed in the mix.

[24] Two steps must be successfully completed for BMQ to be satisfied with a mix. First, standard, the standard air, settlement, temperature and density/compression (cylinders) tests are done in the laboratory; if the results are acceptable, this is followed by chlorine ion permeability tests, scaling tests and freeze/thaw tests. If the first step of the results is not satisfactory, BMQ will try to determine the causes and reformulate the mix to then redo the tests.

[25] The second step consists of calibrating the mobile concrete mixer and pouring the mix to conduct the same tests again to ensure that the mixing in the mobile concrete mixer did not affect the characteristics of the mix. According to Mr. Dubé, three persons are required to conduct a test: one mobile concrete mixer operator, one technician qualified to take samples and himself. Mr. Dubé testified that approximately two to three hours are required to calibrate the mobile concrete mixer.

[26] The analysis of the results is largely carried out by Mr. Bertrand and Mr. Dubé. A meeting is called with the employees involved in a project, as well as the technicians who operate the mobile concrete mixer and take samples, when the results of tests are received by the company, because these employees may have an

idea about the causes of a test failure and should be kept informed of the project's evolution.

[27] A project ends either when the objective has been achieved, or when the objective has not been achieved and no solution is planned to overcome the problems.

[28] No report is prepared at the end of each project. However, Mr. Dubé completed form T661 *Scientific Research and Experimental Development (SR&ED) Expenditures Claim* (Form T661) and submitted it to the CRA. This form contains a description of the progress that BMQ tried to achieve, obstacles that had to be overcome and the steps taken to implement a project.

[29] Mr. Bertrand explained that, during the years at issue, he was directly involved in research activities related to the drafting, design and development of research plans and that he attended conferences relating to projects. He also directly participated in tests carried out in the field, in BMQ's laboratory, as well as at universities.

[30] With regard to expenditures, Mr. Dubé testified that, in general, the date, time and a brief description of the tests conducted as part of this project are written in a notebook. Mr. Dubé admitted that the notes retained will not necessarily be understandable for another civil engineer, but he can understand them and consult his computer files to determine what was done in a project.

[31] Each month, the documents related to a project, such as handwritten notes and emails, are submitted by the employees to Mr. Dubé, who compiles the work hours spent on each project in the BMQ computer system. The only employees who fill out time sheets are those paid based on hours worked, which excludes Mr. Bertrand, Mr. Dubé and Mr. Fournier. To calculate the hours spent working on a research project, Mr. Bertrand indicates the time he has spent on a project and submits it to Mr. Dubé, who compiles the hours. Mr. Dubé testified at the hearing that he rounded the hours indicated on the time sheets.

[32] Mr. Dubé also compiles the subcontractor invoices and equipment use hours. When an invoice contains both commercial and research elements, he himself separates the two types of elements.

[33] Mr. Bertrand testified that BMQ does not invoice its clients for tests conducted when a mix is changed, even if this change is done due to a client request. According to Mr. Bertrand, BMQ only charges for the concrete actually delivered, not the work time spent on delivery. Test costs are assumed by BMQ, unless the MTQ decides, for example, to be involved in a project and to assume a portion of these expenses. BMQ also has a quality control system that it excludes from its SR&ED claims.

B. ISSUES

[34] The issue is whether the activities carried out by BMQ as part of the 14 projects at issue fall under SR&ED, within the meaning of the Act. If I find that the activities carried out by BMQ as part of any of the projects can qualify as SR&ED, the issue is then whether the expenditures incurred by BMQ as part of the projects are deductible as SR&ED under section 37, as well as expenditures that qualify for ITCs under subsection 127(5).

C. THE ACT AND THE CASE LAW

[35] To answer the questions at issue, the Act sets out a two-pronged test. The first step is to determine whether the activities meet the definition of SR&ED under subsection 248(1). If this is not the case, the review will end at this step. However, if it is concluded that the activities meet the definition of SR&ED, the deductibility of an expenditure must then be determined under section 37 for SR&ED activities, given the facts specific to each project, and qualification of this expenditure for ITCs (*Zeuter Development Corporation v. The Queen*, 2006 TCC 597, at paragraph 20, 2007 DTC 41 (Zeuter Development)).

[36] BMQ has the burden of establishing, on a balance of probabilities, that the activities it carried out meet the definition of SR&ED. In addition, BMQ has the burden of establishing that the expenditures it incurred are deductible as SR&ED activities under section 37 and that the expenditures qualify for ITCs.

1) SR&ED activities according to the Act

[37] SR&ED activities are defined as follows under subsection 248(1):

"scientific research and experimental development" means systematic	« activités de recherche scientifique et de développement expérimental »

investigation or search that is carried out in a field of science or technology by means of experiment or analysis and that is

Investigation ou recherche systématique d'ordre scientifique ou technologique, effectuée par voie d'expérimentation ou d'analyse, c'est-à-dire :

a) basic research, namely, work undertaken for the advancement of scientific knowledge without a specific practical application in view,

a) la recherche pure, à savoir les travaux entrepris pour l'avancement de la science sans aucune application pratique en vue;

(b) applied research, namely, work undertaken for the advancement of scientific knowledge with a specific practical application in view, or

b) la recherche appliquée, à savoir les travaux entrepris pour l'avancement de la science avec application pratique en vue;

(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 improve-ments thereto,

c) le développement expérimental, à savoir les travaux entrepris dans l'intérêt du progrès technologique en vue de la création de nouveaux matériaux, dispositifs, produits ou procédés ou de l'amélioration, même légère, de ceux qui existent.

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

Pour l'application de la présente définition à un contribuable, sont compris parmi les activités de recherche scientifique et de développement expérimental :

(d) work undertaken by or on behalf of the taxpayer with respect to engineering, design, operations research, mathematic-cal analysis, computer program-ming, data collection, testing or psychological research, where the work is commensurate with the needs, and directly in support, of work described in paragraph (a), (b), or (c) that is undertaken in Canada by or on behalf of the

d) les travaux entrepris par le contribuable ou pour son compte relativement aux travaux de génie, à la conception, à la recherche opérationnelle, à l'analyse mathématique, à la programmation informatique, à la collecte de données, aux essais et à la recherche psychologique, lorsque ces travaux sont proportionnels aux besoins des travaux visés aux alinéas a), b) ou c) qui sont entrepris au Canada

taxpayer,	par le contribuable ou pour son compte et servent à les appuyer directement.
but does not include work with respect to	Ne constituent pas des activités de recherche scientifique et de développement expérimental les travaux relatifs aux activités suivantes :
(e) market research or sales promotion,	e) l'étude du marché et la promotion des ventes;
(f) quality control or routine testing of materials, devices, products or processes,	f) le contrôle de la qualité ou la mise à l'essai normale des matériaux, dispositifs, produits ou procédés;
(g) research in the social sciences or the humanities,	g) la recherche dans les sciences sociales ou humaines;
(h) prospecting, exploring or drilling for, or producing, minerals, petroleum or natural gas,	h) la prospection, l'exploration et le forage fait en vue de la découverte de minéraux, de pétrole ou de gaz naturel et leur production;
(i) the commercial production of a new or improved material, device or product or the commercial use of a new or improved process,	i) la production commerciale d'un matériau, d'un dispositif ou d'un produit nouveau ou amélioré, et l'utilisation commerciale d'un procédé nouveau ou amélioré;
(j) style changes, or	j) les modifications de style;
(k) routine data collection;	k) la collecte normale de données.

[Emphasis added.]

[38] In *Northwest Hydraulic Consultants Ltd. v. Canada*, [1998] TCJ. No. 340 (QL) (*Northwest Hydraulic*), Judge Bowman (as he then was) stated that legislation bearing on SR&ED tax incentives must be given "such fair, large and liberal construction and interpretation as best ensures the attainment of its objects," which is to encourage scientific research in Canada (paragraph 11).

[39] In that decision, based on Information Circular 86-4R3 dated May 24, 1994, published by the CRA (the Circular) and acknowledging that the Circular was a "useful and reliable" guide since it was the result of extensive consultations between government and the scientific community (paragraphs 13 and 15), Judge Bowman set out five criteria for determining whether work constitutes SR&ED activities (paragraph 16). These criteria, which must be met for the activities to qualify as SR&ED, were confirmed by the Federal Court of Appeal in *R I S - Christie Ltd. v. Canada*, [1998] FCJ No. 1890 (QL) (*R I S - Christie*) and reiterated in *C.W. Agencies Inc. v. Canada*, 2001 FCA 393, 2002 DTC 6740 (paragraph 17) as follows:

> 1. Was there a technological risk or uncertainty which could not be removed by routine engineering or standard procedures?
>
> 2. Did the person claiming to be doing SRED formulate hypotheses specifically aimed at 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?

[40] All of these cases involved paragraph (c) of the definition of SR&ED activities in subsection 248(1), namely, experimental development, i.e., work undertaken for the purpose of achieving technological advancement. Paragraphs (a) and (b), which relate to basic and applied research, respectively, instead relate to the advancement of scientific knowledge. Thus, as Judge Boyle concluded in *Life Choice Ltd. v. The Queen*, 2017 TCC 21 (paragraph 16) (*Life Choice*), in cases challenging paragraphs (a) and (b), the criteria set out above, involving technological risk, uncertainty and advancement, should therefore be considered as references to scientific risk and uncertainty, and the advancement of scientific knowledge.

1.1 Technological or scientific uncertainty

[41] In *Northwest Hydraulic*, above, Judge Bowman stated the following about technological uncertainty (paragraph 16):

> [16] . . .
>
> (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.
>
> . . .
>
> [Emphasis added]

[42] The Circular states:

> 4.2 . . . Standard Practice refers to directly adapting a known engineering or technological practice to a new situation when there is a high degree of certainty that the known technology or practice will achieve the desired objective. . . .

[43] Therefore, creating a new product using techniques, procedures and data that are generally accessible to competent professionals in the field is not SR&ED even if there is doubt concerning the way in which the objective will be achieved. In other words, the mere fact that a product does not exist does not necessarily support the inference that its development involves technological or scientific uncertainty (*Flavor Net Inc. v. The Queen*, 2017 TCC 179 (*Flavor Net*), paragraph 38).

[44] In *Zeuter Development*, above, Justice Little specified that resolving uncertainties associated with a project is not necessarily resolving technological uncertainties if competent professionals in the field can resolve these issues with predictability using standard and established techniques (paragraph 22).

[45] In addition, in *R&D PRO-innovation Inc. v. The Queen*, 2015 TCC 186 (affirmed by the Federal Court of Appeal, 2016 FCA 152), Justice Masse concluded that there was no technological uncertainty within the meaning of the

definition of SR&ED in that specific case, because the uncertainty was removed by standard procedures or routine engineering.

[46] Moreover, in *Formadrain Inc. v. The Queen*, 2017 TCC 42, 2017 DTC 1022 (*Formadrain*), Justice D'Auray concluded that creating a product that could stand up to specific constraints (specifically, thin, resistant and flexible rubber) met the technological uncertainty criterion because the lacking knowledge truly did not exist in the base of scientific or technological knowledge and was not simply unknown to the appellant, Formadrain (paragraph 93).

1.2 Hypotheses

[47] Judge Bowman set out a five-stage process to meet the second criterion: (a) the observation of the subject matter of the problem; (b) the formulation of a clear objective; (c) the identification and articulation of the technological uncertainty; (d) the formulation of an hypothesis or hypotheses designed to reduce or eliminate the uncertainty; and (e) the methodical and systematic testing of the hypotheses (*Northwest Hydraulic*, above, at paragraph 16).

[48] Justice Sommerfeldt revisited the concept of hypothesis for SR&ED purposes in *Joel Theatrical Rigging Contractors (1980) Ltd. v. The Queen*, 2017 TCC 6: ". . . a hypothesis is a statement to be tested by an experiment or a trial" (paragraph 26).

1.3 Scientific method

[49] As Judge Bowman stated in *Northwest Hydraulic*, above, "the procedures adopted" must "accord with established and objective principles of scientific method, characterized by trained and systematic observation, measurement and experiment, and the formulation, testing and modification of hypotheses" (paragraph 16).

[50] It can be inferred from Judge Bowman's comments that trial and error does not come within the scientific method if used alone. This principle was also affirmed by this Court in *Flavor Net*, above (at paragraphs 53 and 54).

1.4 Technological or scientific advancement

[51] The technological or scientific uncertainty and technological or scientific advancement criteria are interrelated.

[52] Regarding the technological advancement criterion, Judge Bowman wrote the following (*Northwest Hydraulic*, above, at paragraph 16):

> [16] . . .
>
> 4. Did the process result in a technological advance, that is to say an advancement in the general understanding?
>
> (a) By general I mean something that is known to, or, at all events, available to persons knowledgeable in the field. I am not referring to a piece of knowledge that may be known to someone somewhere. The scientific community is large, and publishes in many languages. A technological advance in Canada does not cease to be one merely because there is a theoretical possibility that a researcher in, say, China, may have made the same advance but his or her work is not generally known.
>
> (b) The rejection after testing of an hypothesis is nonetheless an advance in that it eliminates one hitherto untested hypothesis. Much scientific research involves doing just that. The fact that the initial objective is not achieved invalidates neither the hypothesis formed nor the methods used. On the contrary it is possible that the very failure reinforces the measure of the technological uncertainty.
>
> . . .

[53] The Circular states:

> 4.1 . . . A technological advance is incorporating, by means of experimental development, a characteristic or capability not previously existing or available in standard practice, into a new or existing process or product that enhances a product's performance. Novelty, uniqueness, or innovation alone do not indicate a technological advance.
>
> . . .
>
> 4.3 Adapting a known technology or practice to new situations is ineligible when the routes for the progression of work that will lead to successful solutions to a technological or engineering problem can be identified in standard practice. In other words, if the project involves directly adapting a known technology to a new situation, when it is reasonably certain that the approach will work, it is ineligible.

> If a technological uncertainty is present, however, then experimental development will occur . . . . . .

1.5 Detailed record

[54] The scientific method normally requires the preparation of a detailed record or at least the taking of notes throughout the process of testing the hypotheses previously formulated. However, as stated by this Court in *Formadrain*, above (paragraph 118), and by the Federal Court of Appeal (*RIS-Christie*, paragraphs 14 and 15), it is not mandatory that the evidence be documentary; testimonial evidence may be presented (see also *Abeilles Service de Conditionnement Inc. v. The Queen*, 2014 TCC 313, paragraph 94).

[55] Therefore, although risks are associated with not adequately documenting a step in an SR&ED project, testimonial evidence may be used to meet this criterion.

2) SR&ED expenditures deductible under section 37 and expenditures that qualify for ITCs

[56] Taxpayers engaged in SR&ED within the meaning of subsection 248(1) may, under section 37, deduct from their business income certain expenditures they made for SR&ED, and may be entitled to the related ITCs. Whether expenditures qualify will depend on whether taxpayers elect to use the so-called "proxy method" under clause 37(8)(a)(ii)(B).

[57] In this case, BMQ elected to use the proxy method for all the taxation years at issue. In such a case, under paragraph 37(1)(a) and clause 37(8)(a)(ii)(B), as they read in the taxation years at issue (attached as a schedule to these Reasons), expenditures that are deductible under paragraph 37(1)(a) are expenditures of a current nature made by the taxpayer in the year and that are, specifically:

- expenditures in respect of the prosecution of SR&ED in Canada directly undertaken on behalf of the taxpayer;

- that portion of an expenditure made in respect of an expense incurred for salary or wages of an employee who is directly engaged in SR&ED that can reasonably be considered to relate to the SR&ED;

– the cost of materials consumed or transformed in the prosecution of SR&ED in Canada.

[58] In addition, paragraph 37(1)(b) and clause 37(8)(a)(ii)(B), as they read in the taxation years at issue (attached as a schedule to these Reasons), provide for the deductibility of a certain portion of expenditures of a capital nature that were for the provision of premises, facilities or equipment, where it was intended that it would be used during all or substantially all of its operating time in its useful life for, or that all or substantially all of its value would be consumed in, the prosecution of SR&ED in Canada. In this case, the lesser of the cost of the depreciable property acquired for SR&ED (subparagraph 37(1)(b)(i)) and the undepreciated capital cost of the property (subparagraph 37(1)(b)(ii)) will be deductible.

[59] The ITC is a function of the "SR&ED qualified expenditure pool", which includes any "qualified expenditure" made by the taxpayer in the year, according to the definition of these expressions in subsection 127(9) (attached as a schedule to these Reasons).

[60] Qualified expenditures include expenditures of a current nature under paragraph 37(1)(a), expenditures of a capital nature under subparagraph 37(1)(b)(i), expenditures for shared-use-equipment (that is, capital property mainly used for SR&ED without necessarily being almost exclusively consumed or used for this purpose) and, when the taxpayer elects to use the proxy method, the prescribed proxy amount (subsection 2900(4) of the *Income Tax Regulations*, C.R.C., c. 945 (the Regulations), attached as a schedule to these Reasons).

[61] The prescribed proxy amount is 65% of the amounts incurred in respect of salary or wages of an employee who is directly engaged in SR&ED that can reasonably be considered to relate to the SR&ED.[1]

[62] Therefore, when the taxpayer elects to use the proxy method, expenses incurred for salary or wages of employees directly engaged in SR&ED will be

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[1] The English versions of subsection 2900(4) of the Regulations and of subclause 37(8)(a)(ii)(B)(IV) both use the phrase "directly engaged", while in French, subsection 2900(4) of the Regulations uses "participe directement" and subclause 37(8)(a)(ii)(B)(IV) uses "exerçant directement". In my opinion, these phrases have the same meaning; I will use "exerçant directement" in these Reasons.

included in the qualified expenditure pool for the purposes of calculating the ITC, whereas expenses for salary or wages of employees not directly engaged in SR&ED, as well as overhead (such as telephone or administrative staff costs), will not be included in the qualified expenditure pool, but rather, will be replaced by the proxy amount.

[63] Whether an employee is directly engaged in SR&ED is based, in particular, on the tasks that are performed. It is clear that an employee who directly performs SR&ED work and experiments will be considered to be directly engaged in SR&ED.

[64] To determine whether an activity qualifies as SR&ED, it is also necessary to consider paragraph (d) of the definition of SR&ED, which states that SR&ED includes work with respect to engineering, design, data collection and testing, if the work is commensurate with the needs, and directly in support, of work described in paragraph (a), (b) or (c) of that definition.

[65] But what about the supervisor, the manager or the person who analyzes results? Can one conclude that these people are "directly engaged in [SR&ED]"?

[66] As Judge Bowman noted in *Northwest Hydraulic*, the provisions bearing on incentives for SR&ED must be given large and liberal interpretation.

[67] The Act does not define the phrase "directly engaged in [SR&ED]".

[68] The February 1994 explanatory notes relating to the amendments to the Act introducing the proxy method state (pages 5, 7 and 8):

> New clause 37(8)(a)(ii)(B) of the Act contains the new alternative method for determining SR&ED expenditures. . . .
>
> In determining the portion of any employee's salary that relates to SR&ED, a reasonable allocation must be made of the time spent by the employee in the execution of SR&ED activities. The time spent by an employee, such as a supervisor or a manager, directing the course of ongoing SR&ED activities will generally be considered, for these purposes, to be time in which the employee was directly engaged in SR&ED. Consequently, this time may be included in determining the portion of the employee's salary to be taken into account in calculating the proxy amount. . . .

[69] Based on the various dictionary definitions of the words “directement”, “direct” and “directly”, the phrase in question implies the lack of an intermediary between the activity and the person.

[70] I therefore conclude that managers or supervisors who direct the course of the SR&ED work, as well as employees who analyze results, will be considered to be directly engaged in SR&ED. The same goes for such managers or supervisors regarding the time spent by them on different tasks that directly influence the SR&ED, such as planning experiments and researching the information needed for the SR&ED project to go smoothly. However, more general supervisory or management activities as well as second- or third-line management or supervision generally cannot be considered in this regard.

D. THE PROJECTS

[71] Keeping in mind the principles described above, I will examine the 14 projects at issue to decide, for each of them, whether the activities carried out as part of the projects qualify as SR&ED, and I will determine the total expenditures that are deductible under section 37 and qualify for ITCs.[2] In this regard, the parties filed Exhibit AI-1, which is a table outlining the expenditures incurred for each project. The parties indicated the expenditures challenged by the respondent, as well as those not challenged, should I conclude that the activities qualify as SR&ED.

1) Project B-10-03: Determining moisture in latex concrete

1.1 Project description

[72] A BMQ client wanted to use a 15% latex concrete mix containing quick-setting cement and apply an oil-based membrane to it after a maximum of 24 to 36 hours of drying. According to Mr. Bertrand, since fresh concrete contains water and the membrane is oil-based, it is important that the moisture content of the concrete be 5% or less before the membrane is applied to it, so that it adheres properly to the concrete. BMQ had been using quick-setting cement since 2001. However, according to Mr. Bertrand, membranes were not applied to it. Thus, it was necessary to determine whether long-lasting adhesion was possible when

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[2] For all projects except project B-10-12, the disputed expenditures are of a current nature. I mention this here rather than later, to simplify matters.

applying the membrane to this concrete. The project therefore consisted in measuring the moisture content of 15% latex quick-setting concrete at different ages to determine when the concrete would be dry enough to apply a membrane to it.

[73] The tests consisted in constructing 15% latex concrete cylinders, letting them dry for a certain number of hours, unmoulding them, weighing them, placing them in an oven for 24 hours, and weighing them again, in that order. The difference in weight between the two weighings helped to determine water loss and, consequently, the residual moisture content in the cylinder. A single 15% latex concrete formulation was used for the tests. The activities carried out as part of the project took place over the course of six days.

[74] According to the time sheets submitted by BMQ, two curing periods for the concrete were tested: 36 and 60 hours.

[75] The project did not yield the expected results, because the residual moisture contents of the cylinders showed that the concrete was not dry enough after the maximum drying time sought by the client. The project was therefore discontinued.

[76] Should the activities carried out by BMQ as part of this project qualify as SR&ED, only a portion of the expenditures incurred in respect of salaries would be at issue, specifically expenditures totalling $947 corresponding to 29 hours, as the respondent concedes that an amount of $944 is deductible as a salary expenditure under section 37 and qualifies for ITCs. The respondent challenges the time spent on discussions between BMQ and its client and on bibliographical research to find a way to determine the relative moisture of concrete. The respondent concedes that expenditures of $944 for salaries and $446 for materials would be deductible under section 37 and would qualify for ITCs.

1.2 Positions of the parties

[77] According to the appellant, gaps in available data on the drying time of latex concrete made it necessary to collect information on the subject. The tests performed led to the knowledge that it was impossible to achieve a low enough moisture content within 24 hours. The activities are SR&ED activities because they involve applied research, namely, work undertaken for the advancement of scientific knowledge with a specific practical application in view.

[78] According to the respondent, the activities carried out by BMQ as part of this project cannot qualify as SR&ED. The fact that the moisture content of concrete is lower after a certain curing period does not involve technological uncertainty. According to Mr. Durban, BMQ used a standard method to determine the residual moisture content of concrete after a certain period of time. In addition, BMQ did not attempt to apply a membrane to the concrete to run adherence tests.

1.3 Discussion

a) Qualification of the project

[79] BMQ has not satisfied me, on a balance of probabilities, that this project involved scientific or technological uncertainty or that the results led to any scientific or technological advancement. BMQ's goal for this project was to determine the moisture content of 15% latex concrete at different ages for the purpose of applying a membrane to this concrete.

[80] The case law holds that an activity qualifies as SR&ED if, among other things, there is a scientific or technological uncertainty, that is, uncertainty that cannot be removed by standard procedures or routine engineering. Therefore, if the resolution of the problem is reasonably predictable through the use of routine engineering, there is no scientific or technological uncertainty.

[81] The evidence shows that the MTQ carried out a study in 2002 on the minimum drying time of a quick-setting mortar mix by Ambex Technologies de Béton Inc. (Ambex), a subsidiary of BMQ. A mortar mix and concrete are similar, but mortar does not contain rocks. Membrane adherence to the mortar was also tested. The study found that a membrane can be applied after the mortar has cured for eight hours. According to Mr. Bertrand, the study did not provide the answers he sought, because the MTQ had performed its tests with a mix that did not contain latex, hence the uncertainty, since the mix in his case contained latex. However, according to the documentary evidence, the mix tested by the MTQ contained latex. As a result, I cannot accept this portion of Mr. Bertrand's testimony. I therefore conclude that studies had previously been done on this topic and that the results of those studies were known to BMQ.

[82] The evidence also shows that tests concerning the minimum drying time of latex concrete needed in order to apply a membrane to it had previously been conducted in the United States. According to the results of those tests, the

membrane could be applied one hour after concrete placement. Even if Mr. Bertrand considered these results implausible, the fact remains that tests had previously been carried out in that regard.

[83] In this case, I see no uncertainty as to whether concrete contains less moisture after a certain period of time, because, in my view, this is accepted as scientific knowledge.

[84] I consider that, as part of this project, BMQ carried out routine collection of data on the moisture content of 15% latex concrete at different ages, and this data collection cannot be considered SR&ED, because it was not commensurate with the needs of the SR&ED work, given my conclusion as to the absence of such work.

[85] BMQ did not attempt to determine the reasons why latex concrete was drying that way. BMQ did not conduct any studies of membrane adherence to concrete at different ages, which could have constituted an advancement of scientific knowledge. Similarly, BMQ ran tests on only one concrete mix. BMQ did not attempt to determine the reasons why this mix did not dry at the speed sought by its client; BMQ merely noted the moisture content of latex concrete at different ages using standard scientific methods or techniques.

[86] In addition, neither the evidence adduced at the hearing nor the testimony heard at the hearing clearly shows that BMQ formulated a hypothesis. I consider that no hypothesis was formulated by BMQ at the start of the project. Moreover, the record filed by BMQ at the hearing is rather sketchy, though Form T661 and the time sheets filed in evidence show the project phases.

[87] For all these reasons, the activities carried out by BMQ as part of this project do not qualify as SR&ED.

b) The expenditures

[88] While it is not necessary to address the issue of whether the expenditures are deductible under section 37 and qualify for ITCs, given my conclusion that the activities do not qualify as SR&ED, I find that, if the activities had qualified as SR&ED, the respondent’s position at the hearing should be accepted.

[89] First, I note that two versions of the time sheets were filed in evidence in the appellant's book of documents. These two time sheets list different information regarding the hours spent on conducting bibliographic research; also, additional employees are listed in one of the versions. The evidence filed by BMQ lacks credibility. Moreover, the hours indicated for bibliographic research to search for methods for determining the relative moisture of latex concrete totals 19 hours for three people. However, the evidence shows that known methods were used to make this determination. These expenditures cannot be considered related to a portion of the salary paid to an employee directly engaged in SR&ED activities. If the activities carried out as part of this project qualified as SR&ED, the expenditure amounts of $944 for salaries and $446 for materials would be deductible under section 37 and would qualify for ITCs, as the respondent conceded.

2) Project B-10-05: Development of a self-placing Ter-C^3concrete

2.1 Project description

[90] This project is part of a series of steps BMQ undertook to improve its concrete mixes containing ternary cement, which pose several problems, particularly related to their compressive strength. According to Mr. Dubé, BMQ had provided concrete made with ternary cement supplied by the cement manufacturer Lafarge to carry out repairs on the Champlain Bridge; this repair work was very problematic in that there was segregation of the inputs, causing problems with adherence of the concrete. The client thus required that BMQ supply the concrete to redo the problematic repairs on the Champlain Bridge.

[91] According to BMQ, this project began by changing a self-placing concrete mix in which the ternary cement from cement manufacturer Lafarge was replaced by Ter-C^3 ternary cement from the cement manufacturer Holcim.

[92] According to Mr. Dubé, the obstacle encountered in this project lay in the use of a cement that was new to BMQ and in the use of a concrete pump, necessary for concrete pouring.

[93] Five test strips were conducted on the Champlain Bridge between March 19 and April 14, 2009. The same mix formula was used, but with different parameters. The quantity of the different inputs varied from one test to another to improve the mix while reducing the "variations" during its placement.

[94] The concrete mix supplied in one of the five test strips posed problems in terms of its adherence to the surface on which it was poured and its homogeneity. That test was demolished.

[95] BMQ redid the tests on the laboratory-prepared mix. Samples taken in the field were also tested by an independent laboratory, which conducted a series of tests to verify compliance with the standards. This revealed that replacing the ternary cement had not solved the problems BMQ encountered with its mixes containing the cement previously used.

[96] Mr. Dubé then changed the quantity of the colloidal agent in the mix, because he presumed that this colloidal agent could result in an increase of the viscosity of a concrete mix and, thus, limiting separation of the inputs would also have this effect on the mix tested.

[97] Tests were subsequently conducted on mix samples to test the effect of vibrations and the impact of the pouring process (due to gravity or tamping) on the mix homogeneity. To recreate the concrete placement conditions in the field, BMQ's client's pump was used to pour the concrete, since BMQ did not have one. The appellant had to pay for this usage. Segregation still occurred in the concrete on the tested samples, which led Mr. Dubé to conclude that using a pump to place the concrete affected the effectiveness of the admixtures in the mix, which caused segregation. He also noted that the compressive strength of the concrete decreased with the use of new cement. In the end, BMQ succeeded in decreasing segregation of the inputs in the mix, without, however, perfectly stabilizing the new mix. However, this mix was nevertheless used to do the repairs on the Champlain Bridge. According to Mr. Dubé, the technological advancement achieved as part of this project is the improvement of a product that was lacking in terms of segregation.

[98] In the event that the activities carried out by BMQ as part of this project were to qualify as SR&ED, all of the expenditures claimed by BMQ under section 37 and taken into account to calculate ITCs for salaries, materials and subcontractors are challenged by the respondent. These expenditures total $18,991, i.e., $7,705 for salaries, $1,569 for materials and $9,717 for subcontractor fees.

2.2 Positions of the parties

[99] According to the appellant, uncertainty was caused by the unanticipated defect of a product combined with the difficulty of recreating the reality of a worksite in a laboratory. The work made it possible to improve the defective product and study the impact of using a pump and vibrations on the mix. The activities fall under SR&ED because they can qualify as experimental development work undertaken for the purpose of achieving technological advancement.

[100] Moreover, the appellant explained that this project must be analyzed on a global level with projects B-10-07, B-10-08 and B-10-09, the shared objective of which is to resolve problems caused by ternary cement. Global progress in the case of these projects lies in understanding, based on the years at issue, that the quantity of fly ash present in its suppliers' ternary cement was too high, and in the subsequent change of its cement by cement manufacturer Holcim to reflect this information.

[101] According to the respondent, there was no technological uncertainty because BMQ delivered the concrete to worksites the same day it took samples, which indicates that the product complied with the standards. Furthermore, the first test strip was conducted barely ten days after discussions began on reformulating the mix. No trace of changes in mix proportions is found aside from in Mr. Dubé's testimony, and it is impossible to determine whether such an activity took place when the same mix number appears on different dates. According to Mr. Durban, under this project, BMQ strove to find a solution to the problem of a defective mix. For these reasons, the activities carried out by BMQ cannot qualify as SR&ED.

2.3 Discussion

a) Qualification of the project

[102] BMQ has not convinced me that, on a balance of probabilities, the activities carried out by BMQ as part of this project can qualify as SR&ED.

[103] The evidence filed by BMQ did not show any specific technological uncertainty that could not be resolved by the usual procedures or routine engineering. The evidence revealed that a problem had occurred during earlier repairs carried out on the Champlain Bridge involving concrete supplied by BMQ.

However, based on the evidence, I cannot conclude that this problem could not be resolved through standard procedures or routine engineering.

[104] In this case, by changing suppliers and adding inputs to the concrete mix designed to reduce segregation, more specifically, a colloidal agent to increase the suspension of the inputs in the concrete, BMQ tried to improve a mix that was segregating. The work involved the use of existing processes and inputs to improve the concrete mix. It would seem to me that the resolution of the problem was predictable under standard procedures and routine engineering. A fine-tuning activity will not be considered an SR&ED activity if its goal is not to advance technological knowledge. In this case, BMQ has not convinced me that it advanced technological knowledge as part of this project.

[105] Also, BMQ has not convinced me that the vibration tests and tests conducted with the pump differed from standard practice. There is nothing in the evidence as to whether these tests were simply aimed at eliminating a cause of error.

[106] Moreover, the commercial placement of the concrete the same day as the sample-taking raises doubts as to whether BMQ was truly uncertain about achieving the targeted objectives or the desired results. Indeed, the mix had to be qualified in advance by the MTQ. Consequently, it is difficult to claim that there was technological uncertainty in this regard.

[107] However, one cannot deny that BMQ acquired new knowledge about the interaction between the pump and admixtures and eliminated an assumption regarding the cause of the poor performance of its ternary cement-based concretes. However, the acquisition of new knowledge is not sufficient to qualify activities as SR&ED when routine practices and engineering are used, as in this case.

[108] The assumptions were not expressly formulated by BMQ, but the following may be inferred: (1) adding a colloidal agent will reduce segregation of the mix; and, (2) a pump and vibrations cause segregation in a mix. On a more global level, as regards the ternary cement, an assumption was put forth whereby ternary cement from a specific supplier would improve the mix. BMQ has not convinced me that it had followed the scientific method under this project, given the use of a certain methodology form based on trial and error to find the causes of the defect on the test strips.

[109] Just as in other projects, aside from Form T661, no detailed report was prepared by BMQ. Based on reading the time sheets, handwritten notes and invoices filed in evidence, I can, however, infer that BMQ nevertheless submitted some sort of record.

[110] For all these reasons, the activities carried out by BMQ as part of this project do not qualify as SR&ED. I reach the same conclusion by analyzing this project globally with projects B-10-07 and B-10-08. However, I fail to see how Project B-10-09 would be part of this group of projects. I will come back to this below.

b) The expenditures

[111] While it is not necessary for me to address the issue of whether the expenditures are deductible under section 37 and qualify for ITCs, given my conclusion that the activities do not qualify as SR&ED, I find that, if the activities could have qualified as SR&ED, the expenditures indicated below would be deductible under section 37 and would qualify for ITCs.

[112] As regards materials, the amount of $1,569 in materials used through SR&ED activities would be a deductible expenditure under section 37 and would qualify for ITCs.

[113] As for subcontractor fees, the $7,500 invoice established by the BMQ client for the use of the concrete pump contains a reference to [translation] “work dated December 1, 2009,” which would imply that it took the client several months to submit the invoice to BMQ, since the work under this project ended on August 27, 2009. According to Mr. Dubé, the company had waited until the completion of its own work on the Champlain Bridge before sending him its invoice, even though BMQ’s work had ceased a few months prior. I do not find this explanation provided by Mr. Dubé very plausible. The only subcontractor fees that would be deductible under section 37 and qualify for ITCs are laboratory fees totalling $2,216.80.

[114] As regards the amounts for salary expenditures, under the Act, the amount of wages or salary of employees directly engaged in SR&ED activities that it is reasonable to consider applicable thereto is deductible under section 37 and qualifies for ITCs.

[115] First, Mr. Dubé, who was responsible for completing and collecting all time sheet information, testified that he rounded the hours. Indeed, there are no partial hours on the time sheets filed in evidence by the appellant.

[116] The respondent questioned the accuracy of many entries on the time sheets and took the position that BMQ estimated the time rather than indicating the actual time spent carrying out the actual activities. The respondent challenged several hours allocated to analyzing test results and for which a salary amount deduction was claimed. In addition, the respondent argues that it is odd that the hours spent conducting the test strips vary from one test to another, to which Mr. Dubé replied that access to the worksite was sometimes restricted and could be delayed. Also, the respondent questioned the fact that, on March 19, 2009, three people spent eight hours conducting tests in the field, when a pouring had been done using a commercial process that same day at 1:00 p.m.

[117] Under this project, 293 hours were recorded and, at the hearing, the appellant agreed to reduce its claim to 276 hours, which reflects salary expenditures totalling $7,705.

[118] Of this number of hours, 58 were recorded for bibliographic research and discussions with the client, as well as with the cement supplier. I find that the salary expenditures for hours spent by Mr. Bertrand and Mr. Dubé conducting bibliographic research and discussions with the client and the cement supplier would be considered salary expenditures for employees directly engaged in SR&ED activities.

[119] These discussions and this bibliographic research have a direct impact on SR&ED activities, dictating how the tests are conducted and how the tested mixes are formulated. The hours spent on discussions with clients and suppliers would be considered as management of the course of SR&ED activities and, therefore, directly related to SR&ED activities. Mr. Bertrand testified that he often undertook a project by having a discussion with one of his clients or one of his suppliers. Mr. Bertrand and Mr. Dubé also indicated that time spent on the commercial aspect was not included in BMQ's SR&ED claims. Since these hours are directly related to the course of SR&ED activities, the related salary expenditures would therefore be deductible under section 37 and would qualify for ITCs.

[120] As regards the 96 hours spent conducting test strips, I have doubts as to whether the hours spent on test strips varied from one day to another. I do not find

the explanation provided by Mr. Dubé very plausible. In the same vein, it is doubtful that three people spent eight hours conducting tests on March 19, 2009, at a worksite where commercial pouring had been done the same day as of 1:00 p.m. Thus, it is reasonable to attribute a total of 70 hours, i.e., 14 hours per test, to this element, and the salary amounts for these hours would therefore be deductible under section 37 and would qualify for ITCs. The claim should be reduced by $597.06.

[121] As for the hours spent by interns (who will earn their ACI certification during their internship) and ACI technicians participating in the results analysis, which, according to the respondent, should not be considered in relation to the issue of the amounts deductible under section 37, Mr. Dubé testified that, when the results are received, a meeting is called with the employees involved in the project, including the ACI technicians, to discuss the potential causes of a failure; if the results are satisfactory, a meeting is also called to update the employees involved in the project. I find that the interns and ACI technicians are employees directly engaged in SR&ED activities as they are participating in the analysis of various results. However, the question also arises as to whether Mr. Dubé actually recorded their real hours or instead estimated them. I find that, given Mr. Dubé's testimony to the effect that he rounded the hours, it is more likely that the number of hours indicated was overestimated.

[122] Given my finding about the hours spent on test strips, the amount of deductible salary expenditures under section 37 and which qualify for ITCs would therefore total $7,108. However, in my opinion, it is reasonable to conclude that 10% of the remaining hours recorded regarding the project are excessive given that Mr. Dubé acknowledged that he rounded the hours on the time sheets. I find that, accordingly, the salary expenditures must be reduced by 10%. Thus, the salary expenditures totalling $6,397 would be deductible under section 37 and would qualify for ITCs.

3) Project B-10-07: Characterization of Ter-C^3 cement

3.1 Project description

[123] This project began in March 2009, along with project B-10-05. As mentioned above, BMQ decided to change ternary cement suppliers to use Ter-C^3 cement from the cement manufacturer Holcim; the motivation behind this change was due to compressive strength problems in the case of ternary cement used by

BMQ in the past. As a result of this change in supplier, BMQ had to test its mixes containing ternary cement (aside from those tested as part of project B-10-05) to determine whether they met industry standards and to verify their compatibility with the mobile concrete mixer. BMQ also reformulated its concrete mixes based on numerous discussions with the Ter-C^3 cement supplier. Moreover, the latter conducted its own tests on concrete mixes that contained inputs supplied by BMQ and which were poured using a BMQ mobile concrete mixer.

[124] BMQ's objective was therefore to redevelop new mixes with the Ter-C^3 cement and to test different formulations to verify whether they met the applicable standards.

[125] BMQ conducted tests on two occasions at the worksites of two different clients. The first test was done on June 2, 2009, using a mix of self-placing mortar, and the second was done on June 18, 2009, with a 5% latex concrete.

[126] The mixes tested on these dates were also installed at clients' worksites the same day, since the clients had asked BMQ to supply concrete for a repair at the worksites. Mr. Dubé testified that the clients were unaware that BMQ was conducting tests on the mixes. BMQ benefitted from the fact that the equipment (pump supplied by clients) was on-site to conduct the tests. Mr. Dubé admitted that the concrete to be installed had been pre-approved a few months prior for the repair. Mr. Dubé also indicated that the use of a pump was a parameter that BMQ wanted to test on its proposed concrete mixes—i.e., mixes that are placed using a pump—but the company did not have a pump; given that the clients' pump was already at the worksites, BMQ had the opportunity to do the tests in this regard.

[127] Based on the tests conducted, the concrete strengths were affected by the use of this new cement, as in the case of the ternary cement used previously, when changing suppliers. The tests also showed that the superplasticizing admixture used by BMQ did not perform as well as in the past.

[128] The T661 form prepared by BMQ indicates that the reformulation of its mixes using a binary cement is a possible solution, but BMQ has not conducted tests in this regard. The modified description of BMQ projects explains that progress in this project relates to the assumption whereby the cement add-ons in the cement affect the stability of mixes and that changing these add-ons may fix the problem.

[129] Should the activities carried out by BMQ as part of this project qualify as SR&ED, the respondent challenges the eligibility of a portion of the salary expenditures ($2,573) and the cost of materials ($344), which deduction is claimed as SR&ED activities expenditures. The appellant did not admit to these expenditures. The respondent concedes that the expenditure amounts of $9,692 for salaries, $1,079 for materials and $3,844 for subcontractor fees would be deductible under section 37 and would qualify for ITCs.

3.2 Positions of the parties

[130] According to the appellant, the project made it possible to test several assumptions regarding the unsatisfactory results of a mix and to determine that substituting a ternary cement with another would not necessarily improve the results. The uncertainty lies in identifying the cement as a potential source of defects in the concrete. The progress made by BMQ consists of the fact that the new ternary cement has a better performance in the laboratory than that previously used. Moreover, as mentioned above, the appellant considers that the development activities of ternary cement must be examined in conjunction with projects B-10-05, B-10-08 and B-10-09. These constitute SR&ED activities as they consist of experimental development work undertaken for the purpose of achieving technological advancement.

[131] According to Mr. Durban’s report, the work carried out is standard and only consists of a performance evaluation of existing products. Apparently, no progress was made, since the effects of the cement add-ons on the concrete properties is relevant knowledge in the public domain. According to the respondent, the activities carried out by BMQ as part of this project consist of specification-testing to meet the standards, and such tests do not constitute SR&ED activities. It is standard practice that adjustments are made to mixes when there is a change in supplier.

3.3 Discussion

a) Qualification of the project

[132] The fact that a change in supplier was made for an input could create uncertainty with respect to the performance of the mixes thus changed, but the activities carried out by BMQ in this case are limited to standard tests and to a few adjustments, which, to me, seems to be standard procedure in the industry; thus,

this uncertainty is not a technological uncertainty for the purposes of the Act. Moreover, BMQ has not convinced me that technological uncertainty existed in this specific case, since BMQ installed the mixes tested at its clients' worksites before it even received the complete results of the laboratory tests; likewise, Mr. Dubé agreed that the mixes thus tested had been pre-approved for installation at the worksite a few months before.

[133] I am of the opinion that the work done as part of this project constitutes development of various mixes. According to the Circular, development work is not eligible in terms of scientific research and experimental development activities unless it seeks to advance technological knowledge (paragraph 2.13). According to the case law, there must be technological advancement for an activity to quality as SR&ED. As part of this project, BMQ learned that the use of the new ternary cement in its mixes resulted in a reduction in the strength of its mixes, but this knowledge does not advance technology. BMQ did not determine the exact cause of the decline in the strength of its concrete mixes. The company did formulate a hypothesis regarding the composition of cement, but formulating a hypothesis without conducting tests as a consequence does not constitute technological advancement (*Life Choice*, above, paragraph 49).

[134] Also, we cannot make a finding of technological advancement, since BMQ did not incorporate into its mixes an input having a new or unknown characteristic according to standard practice. Ternary cement was a known product, the characteristics of which were not new or unknown to experts in this field.

[135] As part of this project, tests were performed in a scientific manner by independent laboratories, but the evidence has not convinced me that the subsequent activities to reformulate mixes consisted in a systematic investigation; these activities seem instead to have been undertaken by the trial-and-error method. However, BMQ provided the test results as well as a description of the chronology of activities.

[136] For all these reasons, the activities carried out by BMQ as part of this project do not qualify as SR&ED. I come to the same conclusion by analyzing this project on a global level with projects B-10-05 and B-10-08. I will come back to it below.

b) The expenditures

[137] While it is not necessary for me to address the issue of whether the expenditures are deductible under section 37 and qualify for ITCs, given my conclusion that the activities do not qualify as SR&ED, I conclude that, if the activities could qualify as SR&ED, the expenditures indicated below would be deductible under section 37 and would qualify for ITCs.

[138] Firstly, concerning the cost of materials ($344) for tests on clients' work sites, contested by the respondent, I am of the opinion that this amount would reflect materials used as part of SR&ED activities and that would therefore be deductible under section 37 and would qualify for ITCs. Indeed, Mr. Bertrand and Mr. Dubé testified that the cost of materials indicated for the SR&ED expenditure deduction claim did not include that of materials delivered to clients. They also indicated having taken advantage of their clients' facilities to conduct tests. Their testimony was credible in this regard.

[139] Concerning salary expenditures (planning of work, tests, taking of samples and analysis of results) incurred in relation to the tests performed on the clients' worksites, as well as the salaries paid to the interns and ACI technicians related to results analysis, these expenditures would be considered as expenditures incurred for the wages or salaries of employees directly engaged in SR&ED. Indeed, the planning of tests, the tests themselves, the taking of samples and the results analysis are an integral part of any SR&ED exercise. An SR&ED project could not be carried out without planning tests. These activities do not concern the non-technological aspect of the activities, since it is the very essence of SR&ED to conduct tests and to plan these tests beforehand. Similarly, the participation of interns and ACI technicians in these activities, as well as in the results analysis, seems reasonable. As a result, these amounts would be deductibles under section 37 and would qualify for ITCs.

[140] However, the question also arises concerning whether Mr. Dubé recorded the actual hours, or instead, estimated the hours. Given Mr. Dubé's testimony that he rounded the time, I consider it more likely that the number of hours (446 hours), corresponding to a total of $12,265, was indeed overestimated. I conclude that it would be reasonable to reduce the amount of the requested deduction by 10%.

[141] Thus, salary expenditures totalling $11,039 would be deductible under section 37 and would qualify for ITCs, as well as expenditures totalling $1,423 for

materials. In addition, given the concession made by the respondent, an amount of $3,844 for subcontractor fees would be deductible under section 37 and would qualify for ITCs.

4) Project B-10-08: Development of a Type V Ter-C^3concrete

4.1 Project description

[142] Project B-10-08 was launched in April 2009 by BMQ after projects B-10-05 and B-10-07 were started. BMQ tried to redevelop its Type V concrete mix set out in MTQ standard 3101—a concrete with 35 megapascals of resistance containing ternary cement for the repair of structures—by replacing the ternary cement of its existing mix with Ter-C^3 ternary cement from the cement manufacturer Holcim. The purpose of the project was to validate the mixes to attain CSA standards.

[143] BMQ first replaced the cement of its existing mix with Ter-C^3 cement, without changing the proportions, to determine if there would be any similarity in the performance of the mixes. In the laboratory, the test results were satisfactory. BMQ proceeded with large-scale tests on the Champlain Bridge worksites at the time of deliveries for its client Aecon, and on the Berthier roads worksite for its client Chagnon, to determine if the mix prepared in the mobile concrete mixer would behave in the same way as that made in the laboratory mixer. Thus, samples were taken the same day that BMQ delivered the concrete to its clients. Problems with weak compressive strength appeared on these work sites.

[144] BMQ wanted to study the causes of low resistance. A granulometric test was conducted to determine if the stone contained in the mix was the cause, which, it appears, was not the case. Core sampling was done on the Berthier worksite to confirm the results and study the causes of the low resistance. Eight cores of the concrete installed were analyzed by an independent laboratory. Following these tests, Mr. Dubé reformulated the mix by increasing the proportion of cement, since a larger quantity of cement generally increases the resistance of a concrete. However, even with these modifications, according to Mr. Dubé's testimony, the compressive strength of the concrete remained weak or else the mix became too costly to produce.

[145] Mr. Dubé testified that he conducted laboratory tests before conducting large-scale tests. After the attempt to modify the proportion of the cement, Mr. Dubé modified another aspect of his mix: the admixtures. He decided to

perform tests, replacing his plasticizing admixture with a new-generation admixture, which led to a certain improvement in the mix without, however, making it possible to attain the desired results.

[146] Mr. Dubé also mentioned having tried to compare the effect of ternary cement in his Type V mix with its effect in latex concrete and self-placing concrete mixes. No expenditure for salary or materials is claimed in relation to these tests.

[147] For its part, the cement manufacturer Holcim did its own tests on three mixes to observe the evolution of the compressive strength over time. The mixtures included proportion variations of several elements, particularly the cement, the air-entraining admixture and the superplasticizing admixture. The superplasticizing admixture was also replaced by the new-generation one in these tests.

[148] Mr. Dubé explained that BMQ worked in collaboration with Holcim as part of this project, since the supplier itself had an interest in developing high-performance cement products. However, Holcim's work was not conducted on behalf of BMQ, (there is no invoice for materials or tests related to this project), therefore they are not part of BMQ's project.

[149] BMQ was not in a position to determine if the performance of its Type V concrete was affected by the cement or by the admixtures used. However, the tests enabled BMQ to note that the air content of the concrete was normal in the plastic state, but increased during its hardening. High air content negatively affects the compressive strength of a concrete.

[150] Should the activities carried out by BMQ as part of this project qualify as SR&ED projects, the respondent contests the vast majority of expenditures incurred by the appellant for salaries, materials and subcontractors. The respondent is of the opinion that such expenditures are not expenditures deductible under section 37 and that qualify for ITCs. A few expenditures have been withdrawn by the appellant, so that the amounts in dispute are the following: $11,741 in salaries, $1,425 in materials and $5,876 paid to subcontractors. The respondent concedes that the amounts of $1,417 for salaries, $101 for materials and $755 for subcontractor fees would be deductible expenditures under section 37 and would qualify for ITCs.

4.2 Positions of the parties

[151] According to the appellant, the work done as part of this project, that is, the worksite tests of mixes that performed well in the laboratory, made it possible to eliminate several hypotheses that could explain the poor performance of mixes containing ternary cement, such as the influence of the cement proportion and the effect of the plasticizer on the mix, although the work did not immediately bear fruit. The appellant claims that the advancement is the knowledge that it acquired that the increase in the cement concentration and the use of a new-generation plasticizer did not make it possible to increase the strength of the mixes.

[152] As mentioned above, the appellant considers that the development activities of Type V concrete with Ter-C^3 cement must be examined in conjunction with projects B-10-05, B-10-07 and B-10-09. These activities are therefore SR&ED activities as they constitute experimental development work undertaken for the purpose of achieving technological advancement.

[153] According to the respondent, the activities carried out by BMQ as part of this project do not constitute SR&ED activities. Since the products installed on a worksite must be approved in advance, BMQ must be quite certain that a mix is compliant before supplying it for repairs to be carried out. Also, the installation of the concrete before it was tested in the laboratory shows that it was ordinary work. BMQ was only adapting its mixes and conducting tests. The tests are a continuation of repair work on worksites done based on contracts and not for the purposes of a systematic investigation.

4.3 Discussion

a) Qualification of the project

[154] As part of this project, the mix formula was developed on April 22, 2009; large-scale tests were conducted on the Champlain Bridge on May 13, 2009, and laboratory tests were performed on May 22, 2009. Between May 13 and 22, 2009, the concrete installed on the Champlain Bridge was analyzed. The evidence shows that the concrete was installed by BMQ before the results of the laboratory tests were known. According to the time sheets filed as evidence by the appellant and to the T661 form, the first tests conducted on the worksite took place before the laboratory tests. To explain the installation of the concrete before the confirmation of its performance through the results obtained in the laboratory, Mr. Dubé

explained that BMQ wanted to develop the new mix quickly, given the issue with its mixes at the time. However, Mr. Dubé testified that he conducted laboratory tests before conducting large-scale tests. Mr. Dubé's testimony is not clear and is not in accordance with the documentary evidence filed at the hearing; therefore, I grant it no credibility.

[155] Thus, I am not convinced that, on a balance of probabilities, technological uncertainty that could not be resolved by standard procedures or routine engineering existed as part of this project. Indeed, BMQ modified one of the inputs of its concrete, that is, ternary cement, and proceeded with large-scale tests before having the results of the laboratory tests. This approach shows an absence of technological uncertainty in this specific case. The modifications made to the mix also seem to have been done according to known methods, that is: to increase the quantity of cement to increase compressive strength, to discuss with the concrete supplier to identify problems encountered and solutions contemplated, and to modify a plasticizer. The tests demonstrated that a phenomenon of an increase in the concrete's air content took place during the hardening, but BMQ did not determine the cause of it and, especially, BMQ did not seek to determine the cause for it. I, therefore, conclude that no technological advancement resulted from this project.

[156] For these reasons as well as those stated in relation to project B-10-07, the activities carried out by BMQ as part of this project do not constitute SR&ED. I come to the same conclusion by analyzing this project on a global level with projects B-10-05 and B-10-07.

[157] Overall, the activities carried out by BMQ as part of projects B-10-05, B-10-07 and B-10-08 are the consequence of a change of ternary cement supplier. Even if I examine the three projects overall, the presence of uncertainty going beyond what is determinable by routine engineering or standard procedures was not demonstrated by BMQ on a balance of probabilities. Indeed, I conclude that it was a question of updating or developing products by means of standardized tests and worksite tests. According to the Circular, a development activity will be eligible if it seeks to advance the taxpayer's technological knowledge (paragraph 2.13). In this case, BMQ has not convinced me that the activities advanced their technological knowledge. BMQ used routine techniques or processes generally accessible to competent specialists in the concrete field to develop their mixes. Also, the progress described by BMQ, that is, the modification of ternary cement

supplied by Holcim, was not demonstrated in a sufficiently convincing manner so that I am able to determine whether it is an advance made by BMQ or by Holcim.

[158] Concerning the project B-10-09, which I will examine below, I conclude that there is no connection to projects B-10-05, B-10-07 and B-10-08, since the cement used in the mixes tested as part of project B-10-09 is not ternary cement.

b) The expenditures

[159] While it is not necessary for me to address the issue of whether the expenditures are deductible under section 37 and qualify for ITCs, given my conclusion that the activities do not qualify as SR&ED, I conclude that, if the activities could qualify as SR&ED, the expenditures indicated below would be deductible under section 37 and would qualify for ITCs.

[160] The only expenditures admitted by the respondent are a part of those incurred as part of the collaboration with the cement supplier Holcim to develop the mix, conduct tests, take laboratory samples and analyze the results. According to the respondent, all of the expenses in connection with the large-scale tests on the Champlain Bridge and on the roads at Berthier (including those for salaries, materials and subcontractor fees) are therefore not considered to be deductible under section 37 or to qualify for ITCs.

[161] Given the fact that the evidence showed that large-scale tests were conducted before the results of the laboratory tests were known, I conclude that the expenditures denied by the respondent were denied correctly. The activities are rather commercial activities for BMQ and should not be included in the SR&ED claim. Also, I consider that, in the case of this project, the hours are overestimated in certain respects. For example, on May 13, 2009, three persons indicated that they each spent eight hours doing tests in the morning whereas the commercial pouring took place at 1 p.m.

[162] For these reasons, given the concession made by the respondent, expenditures totalling $1,417 for salaries, $101 for materials and $755 for subcontractor fees would be deductible expenditures under section 37 and would qualify for ITCs.

5) Project B-10-09: Characterization of a new-generation plasticizer

5.1 Project description

[163] Having noted as part of project B-10-08 that the new-generation superplasticizing admixture increased the strength of a deficient concrete mix, BMQ decided to modify certain of its standard concrete mixes (that is, not containing ternary cement) by replacing the superplasticizing admixture found in it by the new generation one. The decision was also motivated by the fact that BMQ had noticed a decline in the compressive strength of its standard concretes, although that does not affect its ability to supply concrete meeting standards.

[164] Tests were carried out on three mixes during five trials to verify if these mixes still met the standards after the change in the superplasticizing admixture. One mix was adjusted once, but tested three times before satisfactory results were attained. The two other mixes were only tested once since they immediately met industry standards.

[165] A first test was conducted in the laboratory on a mix on June 30, 2009. The results of the test were unsatisfactory and the proportion of the inputs was modified. A sample of this modified mix was taken on July 31, 2009, when concrete was poured at a BMQ client's premises. This mix was also tested on October 6, 2009, at another client's since the cooler autumn temperatures generally make it possible to obtain better results, given that the concrete takes more time to hydrate, according to Mr. Dubé. The tests did, in fact, yield better results at the time of this third trial.

[166] Two other mixes were sampled once each when they were placed at the premises of clients on August 20, 2009, and October 6, 2009, and immediately yielded satisfactory results.

[167] Should the activities carried out by BMQ as part of this project qualify as SR&ED, the respondent does not contest any of the expenditures for which the deduction is claimed by BMQ, that is, the salary expenditures ($3,002), the expenditures for materials ($494) and subcontractor fees ($1,115). Thus, these expenditures would be deductible under section 37 and would qualify for ITCs.

5.2 Positions of the parties

[168] According to the appellant, the tests carried out as part of this project made it possible to document the positive impact of the new-generation superplasticizer in relation to the product then used by BMQ and to improve the existing mixes. The lack of improvement in the case of the concrete with a ternary cement base led BMQ to return to the hypothesis that the problems resulted from the composition of this cement.

[169] As mentioned in the analysis of project B-10-05, the appellant considers that the activities to characterize a new-generation superplasticizing admixture must be examined in conjunction with projects B-10-05, B-10-07 and B-10-08. According to the appellant, these activities constitute SR&ED activities as they constitute experimental development work undertaken for the purpose of achieving technological advancement.

[170] According to the respondent, the activities carried out by BMQ as part of this project only aim to characterize products and demonstrate no technological uncertainty or technological advancement. The work undertaken by BMQ as part of this project is standard formulation work and work to evaluate the performance of existing commercial products, and in the case of this work, there were neither technological obstacles nor technological advancement. Thus, the activities cannot qualify as SR&ED.

5.3 Discussion

a) Qualification of the project

[171] The evidence showed that BMQ was not certain of what effect replacing the superplasticizing admixture with the new-generation superplasticizing admixture would have on standard concrete mixes. This new superplasticizing admixture had never been used by BMQ, except as part of project B-10-08. The goal sought by BMQ was to optimize its standard concrete formulations so that, in the various tests, they presented the characteristics and attained the performance required by industry standards. BMQ therefore had to look for the right proportion of inputs, including the admixtures in its mixes.

[172] However, BMQ has not convinced me that, on a balance of probabilities, technological uncertainty existed as to the effect of the use of the new-generation

superplasticizing admixture on its standard concrete mixes. Formerly, BMQ was using a superplasticizing admixture, the effect of which had begun to leave something to be desired. BMQ therefore turned to a new-generation superplasticizing admixture, the effect of which was known and documented in the industry, except that the proportions required for this input in the various mixes had to be verified. Thus, I conclude that the resolution of the proportioning problems was reasonably predictable under standard procedures and routine engineering.

[173] The appellant also submits that there was no data available as to the compatibility of the new superplasticizing admixture with the different types of cement. However, I conclude that, as part of this project, BMQ gathered data that cannot qualify as SR&ED since it was not done in support of activities otherwise constituting SR&ED (subsection 248(1) – paragraph (d) of the definition of SR&ED). BMQ reformulated its various standard concrete mixes by replacing the old-generation superplasticizing admixture by a new-generation superplasticizing admixture, the chemical effect of which was known. I am convinced that BMQ was quite certain that the use of the new-generation superplasticizing admixture was going to make it possible to achieve the set objectives. BMQ did not seek to understand why the old superplasticizing admixture no longer had the desired effect, or else to know the causes of the difference in performance between the two products. I am not convinced that a technological advance was achieved as part of this project.

[174] Paragraph (f) of the definition of SR&ED in subsection 248(1) explicitly provides that quality control or routine testing of materials or products does not constitute SR&ED. The evidence showed that this project consisted of validating standard concretes by using a new superplasticizing admixture. I do not see any technological advance that was achieved as part of this project, given that BMQ only changed in its concrete an input, the effect of which was known and documented. BMQ only had to determine what quantity of this input was required in its various concrete mixes.

[175] However, I accept that BMQ formulated a hypothesis, that is, that the new-generation superplasticizing admixture made it possible to obtain better performance from BMQ concrete mixes, and that, through tests performed in a scientific manner by independent laboratories, the scientific method was followed. Similarly, certain variables of the mixes were modified according to the results

obtained, although the evidence was not clear as to the quantity of the various inputs used. Also, the evidence showed that various tests were performed.

[176] The activities carried out by BMQ therefore consisted of validating its mixes for the purposes of industry standards and fine-tuning them, which in this case, does not constitute SR&ED.

b) The expenditures

[177] Since the respondent does not contest the amount of expenditures claimed by the appellant, had I concluded that the activities carried out by BMQ as part of this project could qualify as SR&ED, the salary expenditures totalling $3,002 and materials totalling $494 as well as subcontractor fees totalling $1,115 would be deductible under section 37 and qualify for ITCs.

6) Project B-10-12: Development of a no-fines concrete with a high void content

6.1 Project description

[178] The activities for this project were carried out in conjunction with the activities for two other projects, namely, project B-10-1 (pervious concrete), accepted, in part, during the verification, and project B-10-10 (roller-compacted concrete or RCC), rejected during the verification stage. The appellant withdrew its appeal regarding this project during the hearing.

[179] For several years, the City of Laval, where BMQ's premises are located, has been asking that the business's parking lot be paved. Also, in accordance with city requests, stormwater discharge into the sewers had to be limited.

[180] BMQ therefore undertook to have part of its lot located in front of its business paved with two types of concrete, namely RCC and pervious concrete, under which a layer of no-fines concrete with a void content of 35% was installed. The no-fines concrete also includes a water drainage system designed by BMQ, specifically, a network of perforated drains for collecting stormwater. Thus, the sublayer of no-fines concrete installed over the entire surface of the parking lot acted as a water retention basin.

[181] No-fines concrete is also called "popcorn concrete" because of its very porous appearance. The higher the no-fines concrete's void content, the greater its ability to hold a large quantity of water. According to Mr. Bertrand, no-fines concrete is a product that existed in the literature but was not subject to any standards. However, the void content percentage for this type of concrete was limited: between 12% and 30%. BMQ chose to use a no-fines concrete with a void content of 35% to be able to use a thinner, and therefore more cost-effective, layer that would hold the same quantity of water.

[182] According to Mr. Bertrand, the drainage system installed in the no-fines concrete is innovative because it retains water instead of merely draining it; the system also allows water to be returned to the soil instead of draining into municipal sewers. This system could not be tested in the laboratory and testing had to be done under real climate conditions. According to Mr. Bertrand, the system worked.

[183] As stated above, this type of concrete, although known, was not subject to any standards. Nonetheless, according to Mr. Bertrand, tests were apparently conducted on the concrete around July 15, 2009, to obtain a mix with a void content of 35%, although there was no mention of these tests on the time sheets.

[184] As part of project B-10-11 (pervious concrete), the University of Waterloo installed probes to measure moisture in the pervious concrete; these probes were installed in the surface concrete (pervious concrete), in the no-fines concrete under the pervious concrete and in the loose ground under the no-fines concrete. The probes made it possible to measure water percolation in these three layers. According to Mr. Bertrand, the parking lot surface used for the pervious concrete experiment was approximately 3,000 to 4,000 square feet (out of approximately 20,000 square feet).

[185] The excavation of BMQ's lot before the concrete was installed was done by subcontractors. BMQ provided the no-fines concrete, but the concrete and drainage system were installed by a subcontractor, Demix Construction. This work was done in two phases to avoid impeding BMQ's activities. The first phase took place on July 22 and 23, 2009, and the second phase on August 13, 2009.

[186] Should the activities carried out by BMQ as part of this project qualify as SR&ED, the respondent makes no admission regarding the eligibility of salary and material expenditures and subcontractor fees incurred for this project. The

appellant decreased the amount of its claim, notably, by removing salaries paid to its employees with respect to discussions with City of Laval representatives. The appellant is claiming, under section 37 and for ITCs, an expenditure deduction totalling $97,007, broken down as follows: $20,340 for salaries, $18,159 for materials and $58,508 for subcontractor fees.

6.2 Positions of the parties

[187] According to the appellant, the project made it possible to develop a no-fines concrete with a void content of 35%, which did not exist before. This product was created to retain water instead of simply allowing it to drain, as was usually the case. This project is an integral part of the pervious concrete project.

[188] The appellant referred to a report prepared by a doctoral candidate at the University of Waterloo (Vimy Henderson) who undertook the pervious concrete project (Exhibit I-1, Tab 8). According to this report, maintaining a void content of 35% in the no-fines concrete was essential to this project.

[189] For the appellant, the activities constitute SR&ED because they comprise experimental development undertaken for the purpose of achieving technological advancement, as well as applied research undertaken for the advancement of scientific knowledge.

[190] According to the respondent, no-fines concrete is not a concrete that can be installed with a mobile concrete mixer. Thus, BMQ had no interest in developing such a product. The void content percentage of 35% instead of 30% would have been chosen simply to be able to apply a thinner layer, thereby decreasing costs. Moreover, no real progress or advancement is achieved by simply increasing the void content percentage of an existing product. Also, it is not reasonable to consider BMQ’s entire parking lot as a test area. Only a small part of the no-fines concrete was instrumented, that is, the part installed under the pervious concrete, which only covered a small part of the parking lot (15% to 20% of the area). According to Mr. Durban, the instruments installed as part of the pervious concrete project were intended to verify the effectiveness and behaviour of the pervious concrete, not the no-fines concrete. Instrumentation of the no-fines concrete was only necessary to ensure that the water passing through the pervious concrete was measured correctly. Lastly, the absence of technological uncertainty is also demonstrated by the fact that the City of Laval accepted the plans provided by an engineer that indicated, even before the work was performed, that the work would

comply with the city's water retention requirements, and this engineer also confirmed that the work was compliant after the parking lot was repaired. Thus, the activities cannot qualify as SR&ED.

6.3 Discussion

a) Qualification of the project

[191] BMQ has not convinced me , on a balance of probabilities, that there was technological or scientific uncertainty in the case of this project because existing scientific or technological knowledge allowed BMQ to achieve the project objectives. Likewise, BMQ has not convinced me that there was scientific or technological progress.

[192] The absence of technological or scientific uncertainty is demonstrated by the fact that the parking lot plan proposed by BMQ was approved by an engineer and by the City of Laval even before the work was undertaken and without any other steps on the part of BMQ. Thus, BMQ must have been convinced that the objectives would be met and that the no-fines concrete solution was viable. Also, I conclude that the likelihood of BMQ achieving its objectives was predictable in this case, given common industry practices.

[193] Furthermore, I conclude that the creation of no-fines concrete with a void content of 35% was the result of common industry practices. Mr. Bertrand testified that testing had been conducted to create the 35% no-fines concrete. However, the documentary evidence produced at the hearing made no reference to any testing or analysis. Also, form T661 referred to a 30% no-fines concrete. When he was asked about this during the hearing, Mr. Bertrand said that the project had changed over time. However, this answer is not plausible because form T661 is filed with the CRA after the work is completed. Moreover, the report prepared by the University of Waterloo doctoral candidate (Vimy Henderson) who undertook the pervious concrete project, (Exhibit I-1, Tab 8) indicated that no-fines concrete, usually, has a porosity of 30% to 40%. The evidence does not show an improvement of the characteristics of the no-fines concrete in this project. This product already existed in the industry.

[194] In its argument, the appellant referred to the report prepared by Vimy Henderson, which said that maintaining a void content of 35% in the no-fines concrete was essential to this project, to show that the activities

constituted SR&ED. However, in my opinion, the passage in question from the report seems, instead, to be referring to the fact that the pervious concrete data could have been distorted by a malfunction of the no-fines concrete and, therefore, it does not support the appellant's argument.

[195] According to BMQ, the progress or advancement in the context of this project consisted of understanding the performance of no-fines concrete when it is accompanied by other concretes and used in different configurations. Form T661 mentioned improvement of the stormwater infiltration rate in the originating soil, the reduction of the maximum rate and volume of stormwater sent to the municipal network or, through run-off, to rivers, the installation of a foundation using a "paver" to allow for the installation of the no-fines concrete with void content of 30%, and installation of pervious concrete, also using a "paver". However, the instrumentation installed by the University of Waterloo was intended to measure the permeability of the pervious concrete and was only installed in the part of the parking lot where the surface was made of pervious concrete, that is, 15% to 20% of the total area. BMQ has not convinced me that it was able to increase its knowledge of no-fines concrete in the course of this project.

[196] BMQ also had to have been convinced that the objectives would be achieved because the no-fines concrete sublayer was installed under the pervious concrete and the RCC, where it would be inaccessible.

[197] I am not convinced that the scientific method was followed in this project. A large-scale test was conducted directly without prior testing on a smaller scale. Observations were made based on instrumentation installed by the University of Waterloo, but only on the part of the parking lot covered with pervious concrete. For the rest, the observations seem to have mainly been made visually. Likewise, the documentation produced by BMQ mainly concerns the approval of work by the city and the steps for installing concrete. BMQ agreed to withdraw its deduction claim for all expenditures related to time spent analyzing results, which seems to indicate that the analysis of the performance of the drainage system was mainly visual.

[198] Thus, for these reasons, BMQ's activities cannot qualify as SR&ED, in part because the scientific or technological uncertainty and scientific or technological advancement criteria were not met.

[199] The appellant's argument whereby I should consider this project to be part of the pervious concrete project does not change my conclusion. BMQ has not successfully shown, on a balance of probabilities, how the combination of pervious concrete and no-fines concrete created a technological or scientific uncertainty and how there would have been scientific or technological advancement in this regard. Indeed, the new knowledge described in Vimy Henderson's report relates, almost exclusively, to pervious concrete.

b) The expenditures

[200] While it is not necessary for me to address the issue of whether the expenditures are deductible under section 37 and qualify for ITCs, given my conclusion that the activities do not qualify as SR&ED, I conclude that, if the activities could qualify as SR&ED, the expenditures indicated below would be deductible under section 37 and would qualify for ITCs.

[201] The expenditures at issue include salaries totalling $20,340 for the time employees spent designing the drainage system, preparing plans, excavating and levelling the ground, inspecting and monitoring the work and installing the no-fines concrete and the rest of the drainage system. Material expenditures for which the deduction was claimed total $18,159, and subcontractor fees total $58,508.

[202] According to the respondent, BMQ's $97,007 deduction claim is neither a SR&ED current expenditure under paragraph 37(1)(a) nor a SR&ED capital expenditure under paragraph 37(1)(b). BMQ used no-fines concrete every day for purposes other than SR&ED activities, in that it allowed the company to have a parking and driving area that complied with municipal requirements. Also, this expenditure is not a current expenditure, but rather, a capital expenditure providing BMQ with a lasting benefit. According to the respondent, the conditions required for SR&ED capital expenditures to qualify for deduction are not met in this case.

[203] The expenditures of $20,340 in relation to employee salaries for designing the drainage system, preparing plans, excavating and levelling the ground, inspecting and monitoring the work, as well as installing the no-fines concrete and the drainage system qualify as current expenditures referred to in paragraph 37(1)(a) and subclause 37(8)(a)(ii)(B)(IV) because this work would be considered SR&ED activities commensurate with the SR&ED project and directly in support of the work, under paragraph (d) of the definition of SR&ED activities

in subsection 248(1) These salary expenditures can also qualify for ITCs. However, given Mr. Dubé's testimony that he rounded the time, I consider it more likely that the number of hours was indeed overestimated. I conclude that it would therefore be reasonable to reduce the claim for salaries by 10%. Thus, salary expenditures totalling $18,306 would be deductible under section 37 and qualify for ITCs.

[204] Cost of materials totalling $18,159, including no-fines concrete ($11,061), concrete to repair the existing slab ($1,578), aggregates ($3,865), concrete to reinforce the retaining wall ($405), steel framing ($170) and other amounts totalling $1,080. I agree with the respondent that materials consumed in the prosecution of SR&ED activities (subclause 37(8)(a)(ii)(B)(V)) would not be current expenditures. This material cannot be considered to have been consumed in the prosecution of SR&ED activities and the related expenditures cannot be deducted under paragraph 37(1)(a).

[205] However, I must determine whether the cost of materials can be considered a capital expenditure under paragraph 37(1)(b) that qualifies for ITCs if it falls under subparagraph 37(1)(b)(i). I will come back to this below.

[206] Subcontractor fees totalling $58,508 include Dessau's fees for the design ($6,361), Demix's fees for excavation and installation of the concrete and drains ($48,398), Construction 2000's laboratory fees ($630), Paramount's fees for raising the retaining wall ($2,304) and Filiatrault McNeil's consulting fees ($815). The respondent's position is that these are not current expenditures for SR&ED activities. I agree with the respondent because the parking lot development provides BMQ with a lasting benefit and therefore cannot be considered to have entailed expenditures of a current nature. However, I must determine whether the subcontractor fees can be considered capital expenditures under paragraph 37(1)(b) and qualify for ITCs.

[207] First, paragraph 37(1)(b) provides that amounts deductible as capital expenditures are those which constitute "an expenditure of a capital nature . . . made . . . in respect of property . . . that would be . . . depreciable property of the taxpayer". Expenditures are qualified under section 37 according to general principles intended to distinguish current expenditures from capital expenditures.

[208] In this case, the evidence shows that BMQ's parking lot was not paved when the no-fines concrete sublayer was laid. The lasting improvement of a property is

normally considered to entail a capital expenditure. Thus, I am of the view that the subcontractor fees and the cost of materials can qualify as capital expenditures under the applicable general principles.

[209] Since BMQ selected the replacement method, the capital expenditure referred to in paragraph 37(1)(b) is limited to a capital expenditure described in subclause 37(8)(a)(ii)(B)(III). This subclause provides that a capital expenditure is an expenditure of a capital nature that at the time it was incurred was for the provision of premises, facilities or equipment, where at that time it was intended

1. that it would be used during all or substantially all of its operating time in its useful life for, or

2. that all or substantially all of its value would be consumed in, the prosecution of scientific research and experimental development.

[210] According to the respondent, since BMQ used the no-fines concrete every day in operating its business, as a sublayer in a parking lot and aisle and since the no-fines concrete was not rendered unusable by the SR&ED, these conditions are not met. I agree with the respondent. BMQ can therefore not deduct these expenditures as SR&ED capital expenditures under paragraph 37(1)(b).

[211] Also, the respondent is of the opinion that these amounts cannot be included in the SR&ED qualified expenditure pool (paragraph 127(9) for ITCs. I agree with the respondent. First, as was concluded above, these amounts are not deductible under paragraph 37(1)(b). Also, they are expenditures that cannot qualify as SR&ED expenditures and expenditures for shared-use equipment because the parking lot is not a depreciable property used primarily for SR&ED. As previously mentioned, the no-fines concrete is used every day as a sublayer for BMQ’s parking lot.

[212] For these reasons, only the salary expenditures totalling $18,306 would be deductible expenditures under section 37 and qualify for ITCs.

7) Project B-10-18: Develop a light self-placing mortar for mobile concrete mixer

7.1 Project description

[213] This project is BMQ's attempt to develop a light self-placing mortar for mobile concrete mixer. This product already existed for traditional concrete mixers. However, given the greater flexibility of the mobile concrete mixer, one of BMQ's clients asked the company to develop such a product for mobile concrete mixers. Thus, BMQ had to develop a mortar that could be poured between existing storm sewer pipes and new pipes without deforming them.

[214] Mortar differs from concrete in that it does not contain rock. The word "self-placing" implies significant flowability—in other words, the capacity to spread itself under the effect of gravity alone—whereas the term "light" means a low density, that is, a high air content in the mix. The desired air content for the mix in this project was 20%, but the mortar also needed a compression resistance of 20 megapascals.

[215] This project began on November 2 and ended on December 7, 2009. As part of this project, BMQ did not conduct laboratory tests before conducting tests in the mobile concrete mixer because, as Mr. Dubé explained, the mixer used in the BMQ's laboratory works according to the same principle as the one in the traditional concrete mixer. It was therefore clear to Mr. Dubé that, as far the laboratory tests were concerned, the mix would satisfy the client's requirement because this product already existed for traditional concrete mixers.

[216] BMQ tested several mixes in an attempt to successively modify the admixture (air entrainer and foaming agent already on the market) and the cement content of a standard mortar mix. Air content, temperature, spreading and compression resistance tests were performed on the mix as part of this project. Test results showed air content varying from 12% to 15%; these results were therefore below the client's requirements.

[217] Faced with these unsuccessful tests, BMQ employees worked on designing a piece of equipment to make the mix foam more by injecting compressed air. They based it on a piece of equipment designed for traditional concrete mixers but which could not be installed on a mobile concrete mixer. BMQ repeated the tests but with no more success than before.

[218] The project was unsuccessful because BMQ was unable to obtain 20% air content for the mix. Despite the adjustments to the mix and the use of equipment designed by the two BMQ employees, it was not possible to increase the air content of the mix.

[219] The product BMQ tried to design still does not exist. This project has not been resumed since then.

[220] If the activities carried out by BMQ as part of this project qualified as SR&ED, the only remaining disagreement between the parties would concern the salaries for which BMQ claimed a deduction totalling $1,710, essentially for 34 hours spent on bibliographic research to find foaming products and equipment, as well as for certain discussions between Mr. Bertrand and Mr. Dubé regarding the development of mixes, which took place between November 7 and 20, 2009. The respondent concedes that expenditures of $2,202 for salaries, $427 for materials and $360 for subcontractor fees would be deductible under section 37 and would qualify for ITCs.

7.2 Positions of the parties

[221] According to the appellant, the existing products and equipment were not designed for a mobile concrete mixer. The uncertainty consisted of the lack of existing data regarding the capacity of the mobile concrete mixer to produce the mortar in question and the absence of foaming equipment suited to a mobile concrete mixer. The work allowed BMQ to acquire new knowledge about the limitations in terms of the capacity of foaming admixtures and a mobile concrete mixer to produce high-air-content mixes. The project also made it possible to determine that the source of these limitations was the mobile concrete mixer's mixing process. These activities are therefore SR&ED because they qualify as experimental development work undertaken for the purpose of achieving technological advancement.

[222] According to the respondent, BMQ's activities cannot qualify as SR&ED as none of it seems complicated. The equipment was designed and the mix produced in less than three weeks. According to Mr. Durban, BMQ did not depart from standard methods by using a foaming admixture and an air entrainer admixture, specifically intended to generate air in the mix. The addition of air using this equipment that was designed to add air also had a predictable result: the increase in air content.

7.3 Discussion

a) Qualification of the project

[223] In this case, the evidence shows that BMQ's activities were not standard development work because what its client was asking for could only be produced with a traditional concrete mixer rather than a mobile concrete mixer.

[224] The evidence shows, on a balance of probabilities, that there was technological uncertainty in the case of this project. It was impossible for BMQ to predict whether the experience or knowledge generally available or common practices would allow them to satisfy their client's requirements. The objectives set by the client were achievable through a traditional concrete mixer, but it was impossible for BMQ to predict whether they would be achieved through a mobile concrete mixer. The uncertainty existed in relation to the manufacture of very light mortar with 20% air that could be installed in storm sewer pipes without deforming the old pipes. The evidence shows that no data exists regarding the capacity of the mobile concrete mixer to produce such a mortar. The evidence also shows that a mobile concrete mixer mixes the inputs for a shorter time and with less force than traditional concrete mixers, which makes it more difficult to obtain a high air content in the mix.

[225] BMQ also sought to obtain a technological advancement, even though it was unable to satisfy its client's requirements. Indeed, the advancement would have consisted of using a mobile concrete mixer to incorporate a product—the 20% air content—into a mortar mix, which, up to that time, had been difficult, if not impossible, to achieve. The fact that this project did not produce the desired product does not exclude the activities from the definition of SR&ED. As Mr. Dubé indicated, BMQ acquired certain knowledge regarding the limitation of the mobile concrete mixer's mixing energy and the effects of the limited mixing time on concrete/mortar mixes.

[226] According to the respondent, given that BMQ employees spent only a few hours adapting for the mobile concrete mixer a piece of equipment designed for traditional concrete mixers, it could not have been that complicated, which shows that the activities cannot qualify as SR&ED. I fail to see how the difficulty criteria or the ease of doing something can be relevant for the purposes of qualifying activities as SR&ED. The evidence shows that the two BMQ employees designed a piece of equipment for a mobile concrete mixer based on a piece of equipment

designed for traditional concrete mixers. These employees were unable to adapt the equipment designed for the traditional concrete mixer directly to the mobile concrete mixer; thus, I conclude that the activities do not constitute common practice.

[227] The evidence also shows that Mr. Dubé systematically studied the issue raised by the low percentage of air in the mixes tested and conducted experiments to determine the reasons for these results. Tests were conducted by an independent laboratory. The hypothesis put forward was that the addition of a foaming admixture and an air entrainer admixture and the injection of air would increase the air content of the mortar mix. I consider that BMQ followed the scientific method. Even though there was not a detailed contemporaneous report of the tests, the documentation produced at the hearing and the testimonial evidence, particularly Mr. Dubé's testimony, made it possible to detail the activities undertaken as part of this project.

[228] For these reasons, the activities carried out by BMQ as part of this project constitute SR&ED activities.

b) The expenditures

[229] I will now examine the nature of the contested salary expenditures. These relate to the 34 hours that Mr. Bertrand and Mr. Dubé spent on bibliographic research to find foaming products and equipment to foam the mixes. They also relate to discussions between Mr. Bertrand and Mr. Dubé regarding development of the mix.

[230] I conclude, on a balance of probabilities, that the time Mr. Bertrand and Mr. Dubé spent on bibliographic research and conferring about the formulation of the mix had a direct impact on the SR&ED activities in this project, in that these activities determined how testing would be conducted and the formulation of the mixes tested. Thus, Mr. Bertrand and Mr. Dubé were directly engaged in SR&ED activities. I therefore consider that this time was directly related to the course of the SR&ED activities and is therefore deductible under section 37 and qualifies for ITCs.

[231] However, given Mr. Dubé's testimony that he rounded the time, I consider it more likely that the number of hours was indeed overestimated. I conclude that it

would therefore be reasonable to reduce the claim for salaries by 10%. Thus, salary expenditures totalling $3,521 are deductible under section 37 and qualify for ITCs.

[232] In addition, given the respondent's concession, expenditures totalling $427 for materials and $360 for subcontractor fees are deductible under section 37 and qualify for ITCs.

8) Project B-11-01: Permeability study on chlorine ions and durability with various pozzolanic add-ons and cements

8.1 Project description

[233] In 2009–2010, the MTQ and the Canadian Standards Association (CSA) added a new requirement to concrete standards, namely, a permeability threshold on chlorine ions (maximum conductivity of 1000 coulombs at 56 days). This standard was implemented because the chlorine ions passing through the concrete can cause the steel reinforcements on concrete structures to rust, something sought to be avoided. Mr. Bertrand testified that, to ensure that the concrete meets the standards, twenty-two tests must be conducted, to which the new chlorine ion permeability test has now been added.

[234] A grace period of a few months was granted to businesses to give them time to conduct the necessary tests to demonstrate that their concrete mixes complied with the new standard.

[235] According to Mr. Bertrand, the new standard blindsided everyone in the industry. BMQ was not measuring the penetration rate of chlorine ions in its mixes before the standards were amended, as it was not required. However, a standardized test existed in the industry to do so.

[236] This project began on February 8, 2010, and was scheduled to end on December 21, 2010. BMQ therefore undertook to verify whether its concrete mixes complied with the new standard. The objective of the project was to reformulate and optimize the concrete mixes based on the new standard. Mixes with five different types of cement were tested. According to Mr. Bertrand, the information available on each type of cement—for example, their data sheets—did not allow for determining the chlorine ion permeability in advance. For example, GU cement (general use cement) had a chlorine ion permeability of 3,500 coulombs, which exceeded the new standard.

[237] The assumptions put forth by BMQ included questions as to whether the different cements complied with the standard, whether the BMQ mixes were able to comply with the standard and, if the new standard were not met, what changes had to be made to the mixes. According to Mr. Bertrand, the uncertainty stemmed from the fact that BMQ did not know if the concrete mixes would comply with the new standard.

[238] BMQ conducted tests on fifteen mixes. Five mixes underwent more than one test. Mr. Bertrand submits that, when a mix does not meet expectations, it is either discarded or reformulated. Moreover, when a mix was changed to meet the new standard, it then became necessary to verify whether the other standards were still met. Thus, tests had to be conducted to verify the compressive strength, scaling strength and the freeze/thaw cycle, and to verify the stability of the distribution of the air void system.

[239] Following an initial series of tests that led to the conclusion that no mix met the new standard, BMQ changed the quantity of cement and changed the mixing sequence and how admixtures were introduced; this second series of tests was conclusive for certain mixes. BMQ then decided to substitute pozzolanic mineral add-ons to a certain quantity of cement to improve compression results. For six mixes, these changes met the new standard and all of the applicable standards.

[240] Mr. Bertrand also indicated that adding latex to a mix containing general use cement had increased chlorine ion permeability.

[241] Should the activities carried out by BMQ under this project qualify as SR&ED activities, the sole controversy would bear on salaries totalling $6,885, for which the deduction is claimed by BMQ, i.e., essentially, the salaries paid for the hours spent by interns and ACI technicians on discussions and results analyses. The respondent concedes that expenditures of $28,876 for salaries, $3,432 for materials and $26,270 for subcontractor fees would be deductible under section 37 and would qualify for ITCs.

8.2 Positions of the parties

[242] The appellant explained that data were missing and that it had gathered them after the change in the standards, as part of this project. Based on the information, BMQ was then able to reformulate and improve its mixes in terms of chlorine ion permeability. According to the appellant, the definition of SR&ED in no way

requires businesses to make their data public and the fact that only BMQ products were improved thanks to research projects does not prevent BMQ from meeting the criteria established by the case law. These activities therefore fall under SR&ED, as they constitute applied research work undertaken in the interests of achieving scientific advancement.

[243] According to the respondent, BMQ's activities under this project are only an attempt to validate existing products given applicable industry standards and, therefore, they cannot qualify as SR&ED activities. According to Mr. Mimoune, existing mixes containing known components underwent tests. The techniques used by BMQ to adapt the mixes also fall within standard engineering techniques. The scientific method was apparently also not respected as there are no links between the mixes tested, i.e., they do not follow a logical sequence and some were simply abandoned when they did not meet the standard, instead of trying to understand the reasons as to why they failed. In cases in which the mix was not abandoned, it was adjusted by trial and error.

8.3 Discussion

a) Qualification of the project

[244] Based on a balance of probabilities, I am not convinced that BMQ tried to resolve the scientific uncertainties through a systematic investigation to achieve scientific advancement or progress. Instead, the evidence shows that BMQ collected data on the mixes used in operating its business. BMQ essentially undertook activities to control the compliance of its products with the new chlorine ion permeability standard. These activities consisted of collecting data on activities that do not qualify as SR&ED activities, since the evidence did not show that the data collection was done to support SR&ED activities. BMQ conducted an inventory of its products, verified which ones met the standards, changed the mixing sequence and how admixtures were introduced, balanced the cement and mineral content such as pozzolana, to reformulate the products and, after receiving the laboratory test results, selected the mixes that complied with the standards. BMQ did not seek reasons as to why some of these mixes did not meet the standards.

[245] Even if BMQ submits that it was not certain that it was capable of having its mixes meet the standards, BMQ indicated in the reply to the review report that the work consisted of gathering information on BMQ products (Exhibit I-3, Tab 10,

p. 5). This statement was also mentioned during the arguments. These data were collected through known industry methods. Moreover, BMQ changed some of its mixes using standard industry practices. In my view, BMQ was fairly certain that it could meet the standards.

[246] BMQ essentially validated its products given the new chlorine ion permeability standard, which does not constitute SR&ED activities.

[247] First, BMQ conducted tests to characterize its various existing concrete mixes made with different types of cement. The time sheets offered in evidence describe mix validation activities with respect to different tests, to determine whether the types of concrete met the standards. The time sheets do not indicate any time spent on reformulating mixes, but they list many hours spent on discussing and analyzing the results, as well as hours spent on validating mixes. I also note that the mixes were tested directly, without being reformulated in any way. This therefore shows that the activities consisted of normal data collection carried out within BMQ to validate the mixes against the standards, such that they are not SR&ED activities.

[248] In addition, BMQ conducted tests to verify the effect of pozzolana on cements, as well as the effect of changing the mixing method. According to Mr. Mimoune, pozzolana is a known material and its effects on porosity have also been well known and documented in the scientific literature for many years. In the response to the review report (Exhibit I-3, Tab 10, p. 5), BMQ admitted that adding pozzolana and changing the mixing method are known industry techniques, specifying, however, that the use of a mobile concrete mixer makes the results unpredictable. However, BMQ failed to convince me that using a mobile concrete mixer causes a degree of scientific uncertainty that would justify that the activities qualify as SR&ED activities.

[249] Although I accept that the chlorine ion permeability standard took industry players by surprise, I do not see how the MTQ could have implemented such a standard, knowing that companies subjected to this standard could not comply. Therefore, this also demonstrates a lack of scientific or technological uncertainty in this regard.

[250] In addition, BMQ has not convinced me that it followed the scientific method under this project. Indeed, although the tests were conducted scientifically by an independent laboratory, to a certain extent, trial and error can be detected

through the passage of one mix to another without particularly thorough analysis of the reasons as to why a mix did or did not meet the standards.

[251] Lastly, as regards the existence of a detailed report, the tests conducted by BMQ can be partially reconstructed from the documentation prepared at the hearing and from testimonies from BMQ representatives.

[252] Thus, for these reasons, BMQ's activities carried out under this project should not qualify as SR&ED activities as they consist of normal product specification tests that did not cause scientific uncertainty.

b) The expenditures

[253] While it is not necessary for me to address the issue of whether the expenditures are deductible under section 37 and qualify for ITCs, given my conclusion that the activities do not qualify as SR&ED, I find that, if the activities could have qualified as SR&ED, the expenditures indicated below would be deductible under section 37 and would qualify for ITCs.

[254] As mentioned above, as regards the expenditures, the sole controversy that would remain would bear on the part of the salaries for which the deduction was claimed by BMQ. The amount in question is $6,885 and essentially relates to salaries for hours spent by interns and ACI technicians on discussions and results analyses. Some hours spent by mobile concrete mixer operators, as well as ACI technicians, on analyzing the results were also called into question. Salaries related to discussions and taking samples as part of a large-scale test on July 27, 2010, were challenged. Lastly, according to the respondent, four hours spent by Mr. Bertrand and Mr. Dubé on March 25, 2010, to analyze the results, as well as the some thirty hours they and technicians spent having discussions with Holcim, the cement manufacturer, and clients would not qualify.

[255] As regards the hours that the interns and ACI technicians spent on discussions and analyzing the results, Mr. Dubé testified that the ACI technicians can be helpful in analyzing the results and that the technicians and interns were invited to meetings in this regard when the results were available. Mr. Dubé indicated that, under this project, more people were required to conduct the tests and analyses, since a higher number of samples had to be taken. Mr. Bertrand also testified that ACI technicians are authorized to take samples and run certain tests. As mentioned above, I find that the interns and ACI technicians are employees

directly engaged in SR&ED activities when they participate in discussions and analyze various test results, as well as when they conduct tests.

[256] However, it is difficult to reconcile these testimonies with the considerable number of hours spent on discussion and analysis of the results indicated on the time sheets filed in evidence. For example, the time sheets regularly show two hours spent by three people, the same day, on analyzing reports a few pages long. Also, in several cases, the time entered for interns and ACI technicians regarding discussions and analyzing results exceeds the time recorded by Mr. Bertrand and Mr. Dubé for these same tasks. I find that the hours for the interns and technicians have been overestimated. The hours spent on the tasks in question by interns and technicians should therefore be reduced by 90 hours (i.e., 28 hours in the case of A. Labbé-Thibault, 28 hours in the case of Mr. Lauzon and 34 hours in the case of Mr. Lettre), which represents a total amount of $1,392.86.

[257] As for the four hours analyzing the results spent by Mr. Dubé and Mr. Bertrand, it is unclear how these hours differ from the others written in exactly the same manner, which were not called into question by the respondent. Thus, I consider these hours to represent expenditures incurred for the salaries of employees directly engaged in SR&ED, because conducting results analyses of tests done on mixes is an integral part of steps to be taken under SR&ED activities.

[258] As for the salary expenditures for the hours Mr. Bertrand and Mr. Dubé spent discussing tests and results, or planning large-scale tests with the cement manufacturer, Holcim, clients and the independent laboratory, they should also be considered as being incurred for the salaries of people directly engaged in SR&ED, because the scientific method does not hinder the teamwork, and the test planning affects the course of BMQ’s activities and thus has a direct impact on the course of SR&ED activities.

[259] For these reasons, I find that an amount totalling $34,368 could qualify as salary expenditures. However, given Mr. Dubé’s testimony that he rounded the time, I consider it more likely that the number of hours was indeed overestimated. I find that it would therefore be reasonable to reduce the claim for salaries by 10%. Thus, the salary expenditures totalling $30,931 would be deductible under section 37 and would qualify for ITCs.

[260] In addition, given the respondent's concession, the expenditures of $3,432 for materials and $26,270 for subcontractor fees would be deductible under section 37 and would qualify for ITCs.

9) Project B-11-04: Analysis of the impact of binders and admixtures on self-placing concrete performance

9.1 Project description

[261] This project was implemented by BMQ following a request made by Hydro-Québec. Hydro-Québec required concrete with certain characteristics to be used to repair dam gate valves on the Paugan Hydroelectric Generating Station. It was important that the gates not move while the concrete was poured; thus, the concrete had to dry very quickly without deforming the valves. The concrete also had to comply with very precise compressive strength standards, i.e., resistance of 10 megapascals 24 hours after placement and 50 megapascals seven days after placement. According to Mr. Dubé, this type of concrete did not exist at the time; what did exist was a concrete with a resistance of 10 megapascals 48 hours after placement and 50 megapascals 28 days after placement. As well, companies using a stand-alone mixer did not produce this type of concrete.

[262] Mr. Dubé began by doing visual tests of the setting time of a standard BMQ concrete mix made from ternary cement. He then tried to increase the quantity of the set accelerating admixture in the mix. This change allowed for faster setting, but it was not enough to achieve high compressive strength after a short time. To improve the results, BMQ's supplier, the cement manufacturer Holcim, changed the formulation of its ternary cement several times.

[263] Mr. Dubé also carried out tests on mixes containing "HE" cement and general use cement to compare their early-age strength to that of the mix used in the initial tests. He then tried to increase the proportion of cement in the mix to increase the compressive strength.

[264] Mr. Dubé ended up changing course and opted for a binary cement that had not been used in about ten years, instead of the ternary cement initially used. Mr. Dubé also replaced the superplasticizing admixture in the mix with another one that he knew was less efficient, but which would reduce the setting time, thereby increasing the early-age concrete strength.

[265] According to the time sheets offered in evidence, to validate the mix, tests were apparently conducted with the mobile concrete mixer and a pump, along with large-scale tests. The tests were completed over the span of about 10 months.

[266] The results of the tests conducted did not at all conform with Hydro-Québec's requirements, since the mix only achieved 43 megapascals of strength instead of 50 after seven days of setting time. However, the mix was nevertheless approved and used by Hydro-Québec.

[267] Should the activities carried out by BMQ as part of this project qualify as SR&ED, the parties would remain in disagreement only with respect to the $17,146 in salary expenditures claimed by BMQ. The respondent concedes that expenditures of $26,743 for salaries, $2,126 for materials and $3,425 for subcontractor fees would be deductible under section 37 and would qualify for ITCs.

9.2 Positions of the parties

[268] According to the appellant, this project meets the definition of SR&ED activities as it consisted of creating a product that did not previously exist and which had to present characteristics beyond the standards. The success of formulating a mix to achieve the targeted objectives thus constitutes technological progress. Consequently, these activities fall under SR&ED because they can qualify as experimental development work undertaken in the interests of achieving technological advancement.

[269] The respondent's position is that the activities do not qualify as SR&ED. According to Mr. Mimoune, it is known that adding a set accelerating admixture achieves better strength more quickly. Moreover, no systematic research has been conducted under this project, since BMQ used a method relying on trial and error and available knowledge.

9.3 Discussion

a) Qualification of the project

[270] In the case of this project, BMQ succeeded in demonstrating that, on a balance of probabilities, the technological uncertainties related to Hydro-Québec's requests could not be eliminated via the usual procedures or current technical

studies. Indeed, the evidence shows that this type of concrete did not exist. Industries using a stand-alone mixer did not produce this type of concrete. The evidence shows that BMQ was the first player in the concrete industry to create such a mix. The objective was to achieve a mix providing compressive strength beyond 10 megapascals after 24 hours, while preserving the other properties of the self-placing concrete. The technological uncertainty pertained to the creation of such a cement, which had never before been created.

[271] In addition, in the response to the review report (Exhibit I-3, Tab 10, p. 6), Mr. Bertrand stated: [TRANSLATION] "We are well aware that studies have been done on the characteristics and potential effect(s) of the binders and admixtures incorporated into the formulations. However, what has not been documented or undergone specific studies is the combination of all these components within the framework of self-placing concrete and mobile concrete mixers with their mixing capacity; hence, the presence of technological uncertainty around integrating and combining these elements."

[272] I also find that technological advancement was achieved—a requirement for activities to qualify as SR&ED. BMQ incorporated a characteristic into a product—self-placing concrete—i.e., a quick-setting feature that was not readily available in standard practice, thereby enhancing the product in question. One could also assume that, had certainty existed that the characteristics requested by Hydro-Québec could be achieved, BMQ would allegedly not have been the only company to provide such a product. This project allowed BMQ to acquire new knowledge on the effects of ternary cement and HE cement on early-age concrete compressive strength.

[273] I am not of the opinion that BMQ simply qualified products under this project, as Mr. Mimoune concluded. On the contrary, BMQ created a quick-setting, self-placing concrete—a concrete that had not previously existed. Mr. Dubé had no way of knowing that he would achieve the characteristics required because he had no current technical study to rely on in this regard.

[274] The evidence showed that BMQ followed the scientific method. Numerous tests were conducted by independent laboratories, and many laboratory reports were filed in evidence. Assumptions were also put forth. Even though BMQ did not keep a detailed record contemporaneous with the tests, the documentation produced at the hearing and the testimonial evidence, particularly Mr. Dubé's testimony, showed the course of the activities.

[275] For these reasons, the activities carried out by BMQ as part of this project constitute SR&ED activities.

b) The expenditures

[276] The respondent challenged the eligibility of certain hours spent on discussions between BMQ and a representative from cement manufacturer Holcim, between BMQ and a representative from the independent laboratory Qualitas following tests done on samples and between BMQ and an MTQ representative about amending a standard preventing the use of binary cement in self-placing repair concrete. The respondent also challenged the hours spent on employee discussions even within BMQ to plan tests. The other salary expenditures at issue related to hours spent analyzing the results of certain tests, work hours incurred due to a cement supply error on the part of Holcim, certain hours spent preparing for the large-scale tests and hours spent on reformulation following these tests, and some activities to improve a self-placing mortar for another BMQ client. Lastly, the respondent raised a general doubt as to the accounting reliability of the hours indicated by BMQ on the time sheets created as part of this project.

[277] I find that the time spent on discussions within BMQ, or discussions between BMQ and the cement manufacturer Holcim or the independent laboratory is directly related to the creation of mix formulations, test planning and analyses of the results, and should also be considered as expenditures incurred by people directly engaged in SR&ED, since the scientific method does not hinder the team work and the direct planning of a test has an impact on the activities carried out by BMQ and, therefore, has a direct impact on the course of SR&ED activities.

[278] However, the hours shown for these activities seem high in some cases and are sometimes related to tests that did not take place. For example, on February 6, 2010, three people spent two hours discussing the possibility of conducting a test by mixing cements, but this test subsequently never occurred. Also, two identical time entries were made on October 20, 2010, and October 27, 2010. Moreover, the results analysis hours are difficult to justify at times: for example, a total of 11 hours spent by six people analyzing results on August 20, 2010, or the hours spent by five or six people on analyses in June 2010. It should also be noted that the analysis hours vary widely from one sample to another, which raises doubt about the reliability of the hours indicated on the time sheets. Also, in several cases, the time entered for interns and ACI technicians regarding discussions and analyzing results exceeds the time recorded by Mr. Bertrand and Mr. Dubé for

these same tasks. Consequently, I find that the hours for interns and ACI technicians have been overestimated.

[279] I find that the salaries for hours spent on discussions with an MTQ representative to have the standards changed cannot be included in the salary expenditures deductible under section 37, nor do they qualify for ITCs, as BMQ has not convinced me that there was a link between these salaries and the SR&ED activities.

[280] As regards the error in the cement supply (May 12 and 14, 2010), BMQ indicated that it spent six hours amending this error, which, to me, does not seem reasonable. The salary expenditure for these hours is not deductible under section 37 and does not qualify for ITCs.

[281] As regards the hours from July 6 to 8, 2010, spent on tests which required maintaining the concrete at a low temperature after its placement, BMQ did not explain the reasons behind these tests and how they related to the project. Thus, the salary expenditures for these hours are not deductible under section 37 and do not qualify for ITCs. The same finding applies with respect to the hours regarding tests on the self-placing mortar carried out for another BMQ client, since BMQ did not show any connection at all between these tests and the project.

[282] The claim for salaries must be reduced in the light of the elements described above. Therefore, it is necessary to subtract 37 hours in the case of Mr. Bertrand, 33 hours in the case of Mr. Dubé, 26 hours in the case of S. Fournier, four hours in the case of C. Lockhead, 26 hours in the case of A. Labbé-Thibault, 15 hours in the case of Mr. Lauzon and 36 hours in the case of Mr. Lettre, which represents a total sum of $5,346.

[283] In addition, given Mr. Dubé's testimony whereby the time shown on the time sheets is rounded, it is reasonable to conclude that 10% of the time logged on the project is excessive.

[284] Thus, the salary expenditures claimed by BMQ should be reduced by a total amount of $9,200, representing salaries for non-eligible activities ($5,346) and the 10% salary expenditure reduction ($3,854). The salary expenditures deductible under section 37, and which qualify for ITCs, therefore total $34,689.

[285] In addition, given the respondent's concession, expenditures totalling $2,126 for materials and $3,425 for subcontractor fees are deductible under section 37 and qualify for ITCs.

10) Project B-11-07: Develop a quick-setting mortar for installation in a marine environment

10.1 Project description

[286] This project began when BMQ received a client request for a quick-setting cement-based mortar mix that could be used to plug rock underwater and be used as a bridge pier. A mortar mix intended for underwater installation contains an anti-washout admixture so that it can stay in place without segregating. The client required that the mortar be very quick-setting to be able to begin the mortar placement work the following day, whereas a waiting period of 21 days following placement is usually required.

[287] The portions of the activities preceding September 8, 2010, are no longer included in the expenditures deduction claim for SR&ED activities. The objective of these activities was to improve the air content of certain mixes, without affecting the mix properties. However, at the hearing, BMQ agreed that the claim to deduct SR&ED expenditures apparently only applied to activities that began on September 8, 2010, via formulation of a new quick-setting anti-washout mortar mix, and which ended on October 27, 2010.

[288] To ensure quick-setting of the mortar, BMQ had to add a set accelerating admixture to its mix. According to the time sheets in evidence, the superplasticizing admixture was also changed to improve the air content of the mix. This formulation was tested at BMQ to verify whether the mortar could be poured using a mobile concrete mixer and would spread well in the rock grooves. Samples taken during this test revealed that adding the superplasticizing admixture negatively affected the early-age compressive strength of the mix.

[289] Many reformulations were conducted following the test to optimize the air content as well as the compressive strength of the mix. BMQ was successful in creating the mix sought and the client was thus able to complete their project using the mortar mix created by BMQ.

[290] Should the activities carried out by BMQ as part of this project qualify as SR&ED, the sole controversy that would remain would bear on the $1,390 in salary expenditures claimed by BMQ, as well as $1,917 in fees paid to subcontractors. The respondent concedes that expenditures of $1,920 for salaries and $394 for materials would be deductible under section 37 and would qualify for ITCs.

10.2 Positions of the parties

[291] According to the appellant, the project allowed BMQ to create a new product that did not exist beforehand. As this product was non-existent, there was no data regarding it. In his analysis, Mr. Mimoune failed to consider the need to apply the mortar under water. These activities are therefore SR&ED activities as they constitute experimental development work undertaken for the purpose of achieving technological advancement.

[292] According to the respondent, the activities do not qualify as SR&ED, because the project does not present any technological uncertainty. According to Mr. Mimoune, the work was carried out using basic knowledge in the field. Thus, if a set accelerator is used (as with quick-setting mortar), it is clear that the mix will contain less air and that it will therefore be necessary to compensate with an admixture conducive to the creation of air bubbles. As well, large-scale testing was performed the week after the mix was developed, which shows that there was no technological uncertainty.

10.3 Discussion

a) Qualification of the project

[293] For this project, BMQ succeeded in establishing, on a balance of probabilities, that its client’s requests involved technological uncertainty.

[294] In this case, the evidence shows that this project resulted in the creation of a new product (mix 907), specifically anti-washout quick-setting mortar; this product did not previously exist on the market.

[295] However, the evidence also shows that BMQ knew that adding an accelerator would have a negative impact on the air content of a mix. This is clear from the project description found in Form T661: [TRANSLATION] “The objectives

of this project are to optimize and obtain strong air content in quick-setting concrete mixes. The presence of a set accelerator in an air-entrained concrete formulation significantly affects air content as well as the air void system." In addition, according to the form, in order to optimize certain mixes, some admixtures had to be replaced with others; this act of replacing superplasticizing admixtures with other superplasticizing admixtures involved certain uncertainty factors that resulted in certain proportions having to be re-evaluated. Similarly, Mr. Bertrand indicated that BMQ had been using quick-setting cement since 2001 and that it had been in use in the United States since the 1990s.

[296] However, while BMQ used existing technological knowledge or standard practices as part of the project to create the new product, BMQ could not predict whether the objectives could be achieved, or at least, BMQ could be fairly confident that it could achieve them, but without knowing with certainty which solution would be applicable. The uncertainty concerned the creation of a product that can be applied under water, that sets extremely quickly, and that contains an anti-washout admixture so that it can stay in place without segregating. This project involves neither fine-tuning a product, because the evidence shows that such a product did not exist, nor the collection of data, because only the activities that commenced on September 8, 2010, are taken into account.

[297] Additionally, the scientific advancement in this case consists in the advancement of BMQ's knowledge regarding the various proportions and properties of the inputs used. Specifically, BMQ learned that the new superplasticizing admixture affected the early-age compressive strength of its mix, and BMQ ruled out a few proportioning options for the admixtures tested to arrive at a solution.

[298] The fact that only a week passed between the formulation of the mix and the start of testing in no way shows that there was no technological uncertainty.

[299] BMQ demonstrated that, for this project, it had formulated the hypothesis that the air content of its mix would improve through the modification of the superplasticizing admixture and that early-age strength would improve overall through other changes in admixture proportioning. Regarding the use of the scientific method, given that tests were performed in a scientific manner and that the changes made to adjust the proportions were in response to the results obtained, I conclude that the scientific method was followed.

[300] As with the other projects, BMQ's tests can be partially reconstructed based on its documentation, but a report compiling the tests and tracking BMQ's thinking throughout the project was not prepared. However, even though BMQ did not keep a detailed record contemporaneous with the tests, the documentation produced at the hearing and the testimonial evidence, particularly Mr. Bertrand's testimony, show the course of the activities.

[301] For these reasons, the activities carried out by BMQ as part of this project constitute SR&ED activities.

b) The expenditures

[302] As indicated above, the respondent challenges certain salary expenditures totalling $1,390 and all expenditures relating to subcontractor fees, totalling $1,917.

[303] The disputed salary expenditures are those relating to discussions with a representative of BMQ's client (Simard Beaudry), with Joseph Viola from Ambex, and with Jean Paquette, as well as those relating to the time spent in the compilation of results. The time spent by an ACI intern and technician helping to formulate a new mix is also challenged.

[304] I consider that the time spent conferring with a client or supplier to go forward with testing or to try to formulate a mix relates to planning tests or modifying mixes; these are activities that directly influence the course of the SR&ED. Thus, these expenditures would be deductible under section 37 and would qualify for ITCs.

[305] As for an intern's involvement in mix reformulation and the compilation of results, as mentioned earlier, Mr. Dubé testified that the interns will become ACI-certified during their internships with BMQ. As also mentioned earlier, Mr. Dubé also testified that ACI technicians can be helpful in analyzing results and that interns and technicians are called to meetings for this purpose when results are received. Mr. Bertrand testified that ACI technicians are authorized to take samples and run certain tests. Thus, the activities carried out by ACI interns and technicians directly influence the course of the SR&ED, and, as a result, the expenditures incurred for the salaries of these individuals would be deductible under section 37 and would qualify for ITCs.

[306] However, as mentioned above, given Mr. Dubé's testimony that he rounded the time, I consider it more likely that the number of hours was indeed overestimated. I conclude that it would be reasonable to reduce the claim for salaries by 10%. Thus, the salary expenditures claimed by BMQ in relation to this project must be reduced by $331. The salary expenditures deductible under section 37 and that qualify for ITCs therefore total $2,979.

[307] Regarding the expenditures incurred by BMQ for subcontractor fees, the evidence shows that all of these expenditures relate to activities predating September 8, 2010, activities that are no longer the subject of an SR&ED claim by BMQ. Thus, these expenditures are not deductible under section 37 and do not qualify for ITCs.

[308] In addition, given the respondent's concession, expenditures totalling $394 for materials are deductible under section 37 and qualify for ITCs.

11) Project B-12-01: Development of quick-setting concrete without latex

11.1 Project description

[309] This project began after BMQ received a request from Transport Canada for the provision of concrete to be used in repairing taxiways at Montreal-Trudeau airport.

[310] These repairs required the use of quick-setting concrete so that the taxiways would be operational as soon as possible. In addition, the latex in BMQ's mix had to be removed. The modified mix not only had to make it possible to achieve good compressive strengths quickly, but also had to be durable and meet industry standards. Furthermore, the concretes used for aircraft taxiways must also meet certain flexural strength standards.

[311] A few years earlier, BMQ had tried to develop a quick-setting concrete mix without latex but was unable to meet scaling resistance standards while achieving a good compressive strength quickly enough. According to Mr. Bertrand, the difficulty lay in the need to find admixtures compatible with quick-setting cement (CSA cement) and with effects that made it possible to use them in place of latex.

[312] Despite its previous failures, BMQ found superplasticizing admixtures that could potentially improve the performance of quick-setting concrete without latex.

The project began with discussions that led to the formulation of two mixes. The mixes were subjected to laboratory testing to, among other things, determine their early-age compressive strength.

[313] Mr. Bertrand explained that BMQ's initial tests involved a mix containing powdered admixtures, and then it tried mixes incorporating liquid admixtures. According to Mr. Bertrand, liquid admixtures are safer and more convenient for employees than powdered admixtures. The first test performed with a powdered admixture provided a useful benchmark for the use of liquid admixtures. In addition, according to BMQ, the admixture identified as having the potential to improve performance existed only in solid form in Canada and was not compatible with the use of a mobile concrete mixer, given its specific mixing conditions, hence the attempt to develop a mix with liquid admixtures (letter dated November 12, 2013, Exhibit I-3, Tab 10).

[314] Mr. Bertrand also explained that a test strip was constructed at BMQ before a first large-scale test was conducted on the premises of one of its clients. A second large-scale test was then carried out at the airport.

[315] The list of materials on the time sheets indicates that BMQ ran tests on two mixes. The first mix was subjected to three tests, and the second mix was tested four times.

[316] On Form T661, BMQ explains that in its latest tests, scaling resistance and the air void system were still insufficient, though the other standards were met. BMQ is therefore of the view that it has acquired new knowledge about the effects of certain admixtures in a quick-setting cement-based concrete mix. BMQ still seeks to understand how admixtures interact to define their compatibility with quick-setting cement, and the evidence shows that the literature on the subject is virtually non-existent (Exhibit I-3, Tab 23). BMQ explained that in 2015, the behaviour of the test strip at Montreal-Trudeau airport was still under observation.

[317] Should the activities carried out by BMQ as part of this project qualify as SR&ED, the sole controversy that would remain would bear on the $10,370 in salary expenditures claimed by BMQ as well as $3,116 in fees paid to subcontractors (the Qualitas laboratory). The respondent concedes that expenditures of $11,629 for salaries, $1,964 for materials and $3,128 for subcontractor fees would be deductible under section 37 and would qualify for ITCs.

11.2 Positions of the parties

[318] According to the appellant, the project meets the definition of SR&ED because it allowed BMQ to study the possibility of using liquid admixtures in a mobile concrete mixer when the standard practice is to use solid inputs in mobile concrete mixers. It also considers that modifying a mix based on an analysis of the results obtained is not trial and error. These activities are therefore SR&ED activities because they qualify as experimental development work undertaken for the purpose of achieving technological advancement.

[319] According to the respondent, the purpose of this project was to make emergency repairs with a mix that was approved prior to installation. Therefore, it qualifies as a commercial project, not SR&ED. Most of the steps taken as part of this project were discussions with BMQ's partners and experts, which shows that the information was available. Mr. Mimoune's report also emphasizes that this approach is routine and that the tests performed by BMQ are trial and error based on available knowledge and BMQ's experience. The problems encountered are routine and solvable by standard practice in the field.

11.3 Discussion

a) Qualification of the project

[320] The evidence shows, on a balance of probabilities, that there was technological uncertainty in the case of this project because BMQ could not predict whether Transport Canada's objectives could be achieved using standard procedure or routine engineering. BMQ's objective for this project was to develop a new product: quick-setting concrete without latex that would be as durable and effective as quick-setting concrete with latex. The goal was to find an admixture reacting with CSA cement to replace latex. BMQ still seeks to understand how admixtures interact to define their compatibility with quick-setting cement, and the literature on the subject is virtually non-existent (Exhibit I-3, Tab 23). Therefore, the evidence is clear that the activities carried out by BMQ were not based on industry standard practices, given the lack of literature on the subject.

[321] The technological advancement achieved by BMQ in the course of this project involves acquiring new knowledge about the performance of certain superplasticizing admixtures in its mixes. BMQ formulated the hypothesis that

certain superplasticizing admixtures may give a concrete mix the same property as would latex.

[322] Regarding the use of the scientific method, given that tests were performed in a scientific manner and that the changes made to adjust the proportions were in response to the results obtained, I conclude that the scientific method was followed. Contrary to the respondent's submission, the trial-and-error method was not used on this project.

[323] As with the other projects, BMQ's tests can be partially reconstructed based on its documentation, but a report compiling the tests and tracking BMQ's thinking throughout the project was not prepared. However, even though BMQ did not keep a detailed record contemporaneous with the tests, the documentation produced at the hearing and the testimonial evidence, particularly Mr. Bertrand's testimony, show the course of the activities.

[324] According to the respondent, the purpose of this project was to make emergency repairs at the airport with a mix that was approved prior to installation. Therefore, according to the respondent, it qualifies as a commercial project, not SR&ED. But this is not what the evidence shows. Indeed, the evidence shows that the activities carried out by BMQ as part of this project did not involve repairs, but rather, tests that were followed by large-scale testing. I cannot accept the respondent's argument.

[325] For these reasons, the activities carried out by BMQ as part of this project constitute SR&ED activities.

b) The expenditures

[326] The respondent challenges, among other things, most of the salary expenditures for time spent conferring with BMQ's partners and clients to develop the mix and plan tests. The same goes for the time spent in training to be able to move around the airport facilities safely. According to the respondent, these salaries would be taken into account through the proxy method. In addition, the respondent takes the position that the time spent doing bibliographical research does not count, nor does the time spent by ACI interns and technicians participating in discussions and analyzing results. The respondent also cites the fact that the number of hours seems to have been overestimated for this project, given the many hours recorded sometimes for a single day of work.

[327] The expenditures related to the time spent conferring with BMQ's partners and clients about planning tests or modifying mixes are expenditures for the salaries of employees directly engaged in SR&ED, since these activities affect the course of the SR&ED. The same is true of the expenditures relating to the time spent doing bibliographical research that helped support the development of the mix by BMQ, thereby supporting the SR&ED. Thus, these expenditures would be deductible under section 37 and would qualify for ITCs.

[328] As noted above, I consider that the time spent by ACI interns and technicians conferring and analyzing results directly influences the course of the SR&ED. As a result, the related salary expenditures would be expenditures incurred for the salaries of employees directly engaged in SR&ED, would be deductible under section 37 and would qualify for ITCs.

[329] However, I do not find that the 24 hours that six individuals spent being trained on how to move around the airport safely must be considered as time devoted directly to SR&ED. Thus, these expenditures are not deductible under section 37 and do not qualify for ITCs. The $21,999 in salary expenditures claimed by BMQ must therefore be reduced by $924.

[330] In addition, given Mr. Dubé's testimony that he rounded the time, I consider it more likely that the number of hours was indeed overestimated. I conclude that it would be reasonable to reduce the deduction claimed for salary expenditures by 10%. Thus, the salary expenditures claimed by BMQ should be reduced by $2,108. The salary expenditures deductible under section 37 and that qualify for ITCs therefore total $18,968.

[331] Lastly, concerning the amount allowed as expenditures for subcontractor fees, this amount corresponds to all expenditures incurred on the project, excluding an amount of $3,116 related to tests performed on May 18 by the Qualitas laboratory. Since BMQ did not introduce into evidence any invoices relating to these fees, the respondent's position is justified. This amount is not deductible under section 37 and does not qualify for ITCs.

[332] In addition, given the respondent's concession, expenditures totalling $1,964 for materials and $3,128 for subcontractor fees are deductible under section 37 and qualify for ITCs.

12) Project B-12-02: Improvement of quick-setting self-placing concrete

12.1 Project description

[333] According to Mr. Dubé, a contractor working for Hydro-Québec used the mix developed as part of project B-11-04 to make repairs to the Manouane C dam. However, the inputs contained in the mix would segregate.

[334] According to BMQ, project B-12-02 is a continuation of project B-11-04. Upon testing its mix again, BMQ saw that the test results remained satisfactory and were inconsistent with the problems encountered by its client.

[335] Mr. Dubé tried to increase the proportion of the colloidal agent in the mix, thereby increasing the viscosity of the mix so that the various inputs remain suspended and do not separate. However, this addition made the mix too fluid. The mix was therefore reformulated, and other tests were performed, with varying degrees of success.

[336] After analyzing various factors that could cause mix segregation, such as the weather or the presence of vibrations, Mr. Dubé concluded that the only variable was the local water used in preparing the mix. In principle, concrete is made with potable water; the literature indicates that water should have no impact on a mix unless it contains organic matter. However, after running the tests again with a water sample from the site, Mr. Dubé discovered that, while potable, the water used at the site in question was problematic, but he was unable to specify what in the water could have had this effect.

[337] According to Mr. Dubé's testimony, water was therefore delivered to the site so that the work could be completed. Now, when a project is carried out in a remote area, BMQ asks that the water to be used in the mix be sent to it beforehand so that it can run some tests to make sure that the mix will not be affected.

[338] Should the activities carried out by BMQ as part of this project qualify as SR&ED, the sole controversy that would remain would bear on the $17,105 in salary expenditures claimed by BMQ. The respondent concedes that expenditures of $16,325 for salaries, $1,270 for materials and $1,921 for subcontractor fees would be deductible under section 37 and would qualify for ITCs.

12.2 Positions of the parties

[339] According to the appellant, the activities carried out by BMQ as part of this project constitute SR&ED because they are intended to determine the factors that could affect in the field a mix that met standards when tested in a laboratory. New knowledge about the impact of water on concrete was acquired in the course of this project. The activities are therefore SR&ED activities because they qualify as experimental development work undertaken for the purpose of achieving technological advancement.

[340] The respondent's position is that the activities do not qualify as SR&ED. According to Mr. Mimoune, the mix used was already known to BMQ, though adjustments were made in terms of the proportioning of inputs. The steps taken by BMQ were intended to resolve a technical problem, and this was done by trial and error, since BMQ used public data and the experience of its staff and associates to resolve the problem. In addition, the problems encountered in developing the mix are routine problems, the solutions to which are part of standard practice. In this case, BMQ combined existing technologies, which was feasible with some effort and reasonable expertise.

12.3 Discussion

a) Qualification of the project

[341] The evidence does not satisfy me, on a balance of probabilities, that there was technological uncertainty that could not be resolved by routine engineering or standard practices and that the process resulted in technological advancement.

[342] Indeed, BMQ used existing technological knowledge to improve the product developed as part of project B-11-04, which does not necessarily show technological uncertainty. There would have been technological uncertainty if BMQ had satisfied me that whether the objectives could be achieved or how to achieve them could not be known or determined on the basis of generally available technological knowledge or experience. BMQ was faced with uncertainty regarding the causes of the unsatisfactory results of a mix that had previously proven effective. In my opinion, adding a colloidal agent to reduce mix segregation and analyzing the weather and vibrations are standard industry techniques.

[343] In addition, the documentary evidence does not support the project explanation given by Mr. Dubé at the hearing. In his testimony, Mr. Dubé indicated that the advancement in this project is the fact that BMQ acquired the knowledge that water, even potable, can affect the results of a mix. However, the only reference to water on Form T661 is where it says that the water was analyzed because the only variable in the field compared with the laboratory tests is the water-to-binder ratio. Form T661 indicates that the technological advancement lies in the acquisition of knowledge related to the effect of certain admixtures—the VMA 362 colloidal agent, the Glenium 7500 plasticizer, and the Pozzutec 20+ set accelerator—in the formulation of the mix, and knowledge about how these elements affect fluidity. Water is not mentioned as an element that could have an impact on the mix. Similarly, in BMQ's letter to the CRA dated November 12, 2013 (Exhibit I-3, Tab 10), BMQ indicated that the technological advancement for this project involved understanding the causes of the instability of the mix and developing a solution in terms of the formulation or mixing; the technological uncertainty lay in what the synergy of the admixtures used (colloidal agent, plasticizer and set accelerator) would be in reaction with cement. According to this letter, the tests showed that the effect produced by one admixture could affect the effect sought by means of another admixture present in the formulation. The letter makes no mention of the effect of water on the mix.

[344] I conclude that Mr. Dubé's testimony is inconsistent with the contents of Form T661 and what BMQ claims in the letter of November 12, 2013. Similarly, the time sheets in evidence indicate that the water used in this project was tested and found conform. There is no reference to the tests performed with different water mentioned by Mr. Dubé.

[345] A number of laboratory tests were conducted, but overall, BMQ used the trial-and-error method to determine the cause of the problems with its mix rather than the scientific method, even though BMQ had formulated several hypotheses, which were not explicitly stated at the hearing, however.

[346] Lastly, as with the other projects, BMQ's tests can be partially reconstructed based on its documentation, but a report compiling the tests and tracking BMQ's thinking throughout the project was not prepared. In addition, as noted above, Mr. Dubé's testimony is inconsistent with Form T661 and BMQ's letter of November 12, 2013.

[347] For these reasons, the activities carried out by BMQ as part of this project do not qualify as SR&ED, because, among other things, the technological uncertainty and technological advancement criteria are not met.

b) The expenditures

[348] While it is not necessary for me to address the issue of whether the expenditures are deductible under section 37 and qualify for ITCs given my conclusion that the activities do not qualify as SR&ED, I conclude that, had the activities qualified as SR&ED, the expenditures indicated below would have been deductible under section 37 and would qualify for ITCs.

[349] The respondent challenges the eligibility of all expenditures pertaining to discussions between BMQ and its clients and to discussions between BMQ and Qualitas employees concerning tests results. The discussions relate to the reformulation of the mix, the planning of the tests and the follow-ups on the results. In addition, the respondent challenges some of the time spent by ACI interns and technicians conferring and analyzing results.

[350] The evidence shows that the discussion time is related to the project itself; it does not seem to involve business discussions or general management activities. The time spent conferring with BMQ's partners and clients relates to the planning of tests or the modifications of the mixes. The expenditures related to the time spent conferring with BMQ's partners and clients to plan tests or modify mixes are therefore expenditures for the salaries of employees directly engaged in SR&ED, since these activities affect the course of the SR&ED. The same is true of the expenditures for time spent by ACI interns and technicians participating in discussions and analyzing results. Thus, these expenditures would be deductible under section 37 and would qualify for ITCs.

[351] However, a review of the various time entries shows some instances of time being entered twice; that is, the same task is repeated in part on different dates, for example, on July 8 and 12, 2011; July 18, 19, 20 and 21, 2011; August 16 and 17, 2011; and December 19, 2011, and January 23, 2012. In addition, I consider that, sometimes, too many hours are logged for similar activities, for example, on September 12 and 13, 2011, and on September 19, 21 and 23, 2011.

[352] The deduction claimed for salaries must be reduced in the light of the elements described above. Therefore, it is necessary to subtract two hours in the

case of Mr. Bertrand, 29 hours in the case of Mr. Dubé, 27 hours in the case of A. Labbé-Thibault and 17 hours in the case of J. Moreau, which amounts to $2,302.

[353] In addition, given Mr. Dubé's testimony that the time shown on time sheets is rounded, it is reasonable to conclude that 10% of the time logged on the project is excessive.

[354] Thus, the salary expenditures claimed by BMQ should be reduced by a total of $5,415, representing salaries for non-eligible activities ($2,302) and the 10% expenditure reduction ($3,113). The salary expenditures deductible under section 37 and that qualify for ITCs would, therefore, total $28,015.

[355] Given the respondent's concession, expenditures totalling $1,270 for materials and $1,921 for subcontractor fees would be deductible under section 37 and would qualify for ITCs.

13) Project-B-12-03: Development of quick-setting concrete topping without latex

13.1 Project description

[356] The project started when the MTQ became interested in the possibility of using quick-setting latex concrete as a running surface, whereas this product is normally used as a repair product. The MTQ wanted to study the question of whether running surfaces composed of asphalt on the surface and conventional concrete as the under-layer on the Pierre Laporte Bridge, which must be replaced every three to five years, could be replaced by quick-setting latex concrete, given the greater durability of this concrete. This type of concrete also reduces the penetration of chlorine ions because it is more watertight than conventional concrete, which should contribute to the sustainable development of concrete structures. This involved the concrete adhering well to the concrete structure that was already in place, despite the vibrations and movements of the bridge. The MTQ saw definite advantages in this, particularly the longer durability of this concrete in relation to conventional concrete and its better permeability to chlorine ions.

[357] The mix used as part of this project was developed in a project from the 2011 tax year (project B-11-06). It was a project intended to develop a

quick-setting latex concrete that had a durable running surface, and this project had been considered to partly qualify during the CRA audit. According to Mr. Bertrand, BMQ was familiar with this type of product; however, BMQ did not know how this concrete would react as a running slab. The MTQ was very interested by the product and wanted to make it "a prototype."

[358] Mr. Bertrand explained that a study on the placement of latex concrete slabs on existing concrete structures had led to positive results in the United States, but no information was available for a mix including quick-setting concrete. Also, according to an American researcher contacted by Mr. Bertrand, latex concrete had never been installed on a suspended bridge.

[359] On June 17, 2011, BMQ therefore undertook to carry out a trial (suitability test) in an area under the bridge where samples had been taken. According to the T661 Form, the mix poured contained a setting retarder to leave more time for placement and finishing. An air-entraining admixture was also added to comply with the MTQ's air content standards. This trial made it possible to test a method for placing concrete. Since it was a quick-setting concrete, they were able to obtain certain compressive strength results quickly.

[360] The next day, a test on the bridge itself took place over twenty metres. Samples were taken again. The results were satisfactory except regarding the network of air bubbles in the concrete, which affected the watertightness of the concrete and its permeability to chlorine ions.

[361] Following the adjustment of the air-entraining admixture in the mix to improve the network of air bubbles, a test was done on the Dubuc Bridge in Saguenay on August 28, 2011. BMQ had doubts about the surface preparation, which was not adequate and risked having a detrimental effect on the tests. However, the MTQ agreed to do the tests to verify the adherence in extreme conditions. The slab cracked after a few days. BMQ believed that there had been problems with curing the concrete and preparing the surface on which it was poured. The samples taken also showed that the network of air bubbles remained unsatisfactory.

[362] The air-entraining admixture was therefore adjusted a second time to correct the network of air bubbles before a new test was undertaken on another section of the Dubuc Bridge.

[363] The two test areas of the Dubuc Bridge showed large cracks, although the network of air bubbles finally met standards. BMQ verified the evaporation rate of its mixture to exclude this variable. The MTQ then proceeded with core sampling of the test areas, and the tests carried out on the cores confirmed that there was a problem with the adherence of the concrete to the surface in place. Mr. Dubé testified that he had noticed the poor results in the first phase of tests on the Dubuc Bridge and had suspected an adherence problem, but nevertheless proceeded with the second test.

[364] The analysis of the results led to the conclusion that the surface had been poorly prepared before the cement was poured. The two test strips had to be demolished.

[365] The test strip installed on the Pierre Laporte Bridge was also removed a few months after it was installed because of the poor adherence to the existing surface. According to Mr. Bertrand, the bridge's thermal stress generated this problem.

[366] Since the large-scale trials were unfruitful, the project to design a running surface on the bridges that would be made with quick-setting latex concrete was abandoned by BMQ for the time being.

[367] According to Mr. Bertrand, BMQ did not repair the bridges as part of this project. BMQ provided materials to do the test strips because the MTQ was looking for innovative solutions to recurrent problems with respect to repairing the running surfaces of bridges. Thus, BMQ proceeded with a suitability test under the bridge first of all, before doing the test on the bridge slab.

[368] Should the activities carried out by BMQ as part of this project qualify as SR&ED, the sole controversy that would remain would bear on the $4,340 in salary expenditures for which the deduction is claimed by BMQ. The respondent concedes that expenditures of $13,731 for salaries, $1,975 for materials and $4,159 for subcontractor fees would be deductible under section 37 and would qualify for ITCs.

13.2 Positions of the parties

[369] The appellant submitted that this project was a continuation of project B-11-06, which was considered to partly qualify during the audit. The activities undertaken by BMQ as part of this project are SR&ED since BMQ was

seeking to develop a new way of using latex concrete. These activities are therefore SR&ED as they constitute experimental development work undertaken for the purpose of achieving technological advancement

[370] According to the respondent, the activities cannot qualify as SR&ED projects given the absence of technological uncertainty as part of this project. According to Mr. Mimoune, the project only ended up leading to a diagnosis of a problem that occurred as part of an ordinary installation operation following discussions and consultations. According to him, the project is not a continuation of project B-11-06 since the difficulties encountered were not due to the mix provided, but to the way of preparing the surface on which it was to be poured, which is a technical problem related to standard practice. Also, according to the respondent, the mix had already been tested.

13.3 Discussion

a) Qualification of the project

[371] The work consisted of doing large-scale trials of a product formerly developed by BMQ. It was a question of testing the performance of quick-setting latex concrete as a running surface, and not as a repair material. Indeed, quick-setting latex concrete was a material known and used in the industry as a repair material.

[372] Also, the evidence has shown that BMQ did not provide concrete to carry out repairs on the bridges, but to perform tests on them.

[373] Mr. Bertrand testified that he knew the characteristics of quick-setting latex concrete because he had done laboratory analyses on this concrete, but this material had never been tested to be used as a running surface. Thus, the objective of this project was to advance the technology related to quick-setting latex concrete. Indeed, according to Mr. Bertrand’s testimony, this concrete had never been used as a running surface on a suspended bridge. The American expert consulted by Mr. Bertrand confirmed that to his knowledge, latex concrete had never been installed on a suspended bridge. Based on the evidence, I conclude that the project characteristics were not determined in technological terms. This project therefore extends beyond standard practice, given that experimenting with this concrete on this type of a bridge had never been done.

[374] On Pierre Laporte Bridge, after having removed the concrete topping, BMQ noted that the adherence was not good and concluded that it was due to the bridge's thermal stress. Concerning the trials on the Dubuc Bridge, given the poor surface preparation, the concrete did not adhere properly. As mentioned above, the MTQ wanted to test the concrete in extreme conditions.

[375] According to the respondent, since the product created in the context of project B-11-06 had already been tested on other job sites, it is not clear that there was technological uncertainty in this case. I do not share this view. The evidence showed that there was technological uncertainty since quick-setting concrete had never been used as a running surface material and uncertainty about the way the surface should be prepared to promote the adherence of the concrete, and about the method of curing concrete to avoid cracking. Therefore, the solutions could not be based on standard practice only.

[376] Regarding the use of the scientific method, given that tests were performed in a scientific manner and that the changes made to adjust the proportions were in response to the results obtained, I conclude that the scientific method was followed. Contrary to the respondent's submission, the trial-and-error method was not used on this project. Hypotheses were also formulated and verified.

[377] As with the other projects, BMQ's tests can be partially reconstructed based on its documentation, but a report compiling the tests and tracking BMQ's thinking throughout the project was not prepared. However, even though BMQ did not keep a detailed record contemporaneous with the tests, the documentation produced at the hearing and the testimonial evidence, particularly Mr. Bertrand's testimony, show the course of the activities.

[378] For these reasons, the activities carried out by BMQ as part of this project constitute SR&ED.

b) The expenditures

[379] In the case of Mr. Bertrand and Mr. Dubé, the salary expenditures at issue relate to hours spent doing bibliographic research and discussing with an American expert as well as with MTQ representatives. The contested salary expenditures also include hours spent by interns and ACI technicians on discussions with BMQ clients or MTQ representatives, on project planning and the analysis of results.

[380] The salary expenditures for the hours indicated for the months of March to May 2011, for which the deduction is claimed, cannot be considered as expenditures for the salaries of employees directly engaged in SR&ED. These hours represent instead hours for activities preceding the beginning of the project rather than hours devoted to an attempt to investigate a technological uncertainty. Indeed, the goal of these activities was to verify the information available and to make presentations to the MTQ concerning the product. Twenty-seven hours must therefore be subtracted (that is, nine hours for Mr. Bertrand and 18 hours for Mr. Dubé).

[381] Concerning the 10 hours recorded for the day of June 20, 2011, they seem to be a reduplication of those entered for the day of June 18, 2011, and must, therefore, be subtracted. I arrive at the same conclusion for six hours recorded for the days of July 11 and July 6, 2011.

[382] Concerning the hours for the analysis of the results of a test, this activity is an integral part of the scientific method and nothing prevents them from carrying it out in conjunction with an industry partner. As for the hours devoted to this project by the ACI technicians and the interns, the evidence showed that they were participating in the analysis of the results, in particular by attending meetings for updates and the exchange of ideas, and that they were also authorized to do manipulations and the different tests. Therefore, the expenditures related to these hours represent expenditures for the salary of employees directly engaged in SR&ED, since these activities affect the course of SR&ED work. Thus, these expenditures would be deductible under section 37 and would qualify for ITCs.

[383] The deduction claimed for salaries must be reduced in the light of the elements described above. Therefore, it is necessary to subtract 12 hours in the case of Mr. Bertrand, 24 hours in the case of Mr. Dubé, six hours in the case of A. Labbé-Thibault and one hour in the case of J. Moreau, which amounts to a total of $1,964.

[384] In addition, given Mr. Dubé’s testimony that the time shown on time sheets is rounded, it is reasonable to conclude that 10% of the time logged on the project is excessive.

[385] Thus, the salary expenditures for which the deduction is claimed by BMQ should be reduced by a total of $3,575, representing salaries for non-eligible activities ($1,964) and the 10% expenditure reduction ($1,611). The salary

expenditures deductible under section 37 and that qualify for ITCs therefore total $14,496.

[386] Given the respondent's concession, expenditures totalling $1,975 for materials and $4,159 for subcontractor fees are deductible under section 37 and qualify for ITCs.

14) Project B-12-07: Development of a repair product for roller-compacted concrete

14.1 Project description

[387] This project is a continuation of BMQ's parking lot resurfacing project. Roller-compacted concrete or RCC is a product that was not entirely successful after its arrival on the market 15 years ago. An RCC repair product was available, but it was very costly. According to Mr. Bertrand, BMQ decided to develop a repair product for this type of concrete that could be used for repairs as a thin layer as well as for deeper application.

[388] According to Mr. Bertrand, it is difficult to validate the durability of such a product without testing it in real conditions, which include, for example, the passage of heavy vehicles, because laboratory tests are not always sufficient to obtain an accurate reflection of the product.

[389] BMQ therefore undertook to test some repair products on its own slab made of RCC located in its parking lot. Two bands were cut in the RCC slab in the BMQ parking lot to test the products, that is, two small sections of the parking lot slab were demolished (two feet wide, twenty feet long and different depths, that is, 25 and 125 millimetres, respectively). One was demolished by scarification and the other through the use of a jackhammer. Both were situated in a section of the BMQ parking lot where heavy trucks drove regularly to be loaded.

[390] In particular, three concrete repair mixes were put in place on the strips. According to Mr. Bertrand, the mixes tested were not "off-the-shelf" mixes. The mixes were all made of quick-setting concrete, but had variations in the type of cement and the admixtures used.

[391] The first mix put in place was a mix developed by BMQ in the 2000s. It was to serve as a point of comparison for the other two mixes. The second mix was a

self-placing concrete containing a type of cement that BMQ had only been using for two years as well as a superplasticizing admixture and a colloidal admixture that gave the mix its self-placing property. Finally, the third mix was of an experimental nature and had the particularity of containing powdered acrylic latex. This mix had been tested in the United States and used to repair concrete structures in that country. However, the expert consulted by Mr. Bertrand had confirmed that he did not believe that this concrete would perform well in the planned repairs. Mr. Bertrand did not know if this third mix would give satisfactory results in scaling tests and if it would meet the adherence standard, since this mix had never been tested in Quebec in our difficult weather conditions.

[392] The cements used in the second and third mix came from the same supplier, CTS Cement, with whom BMQ had planned the implementation of this project.

[393] Samples were taken when the repair products were put in place to verify the adherence by slanted cutting, the network of air bubbles, as well as compression resistance. According to Mr. Bertrand, two of the three mixes can be used to make RCC repairs; however, the experimental mix from the United States can only be used indoors since it has not met durability test standards.

[394] During the years that followed, BMQ continued to observe the evolution of the repairs made. Three years after the end of the tax year in issue, BMQ conducted traction resistance tests on cores taken from the strips to verify the adherence of the mixes to the concrete slab on which they were applied. Tests on other repair products combined with different techniques for demolishing the RCC slab were also carried out in the tax years after the 2012 tax year.

[395] Should the activities carried out by BMQ as part of this project qualify as SR&ED, the sole controversy would concern expenditures totalling $11,523 for salaries, $967 for materials and $1,917 for subcontractor fees, for which the deduction was claimed by BMQ. The respondent submits that only the amounts of $1,920 for salaries and $394 for materials are deductible expenditures under section 37 and would qualify for ITCs.

14.2 Positions of the parties

[396] According to the appellant, technological uncertainty existed from the fact that the only data available on this type of concrete came from California, where the weather conditions are different and that the mixes developed had to be

compatible with mobile concrete mixers. Mr. Mimoune misunderstood the project, since he does not distinguish RCC as such from repair products for this concrete. The product made it possible to develop promising new products, which they continued to follow-up on in the years following the year in dispute. These activities are therefore SR&ED because they qualify as experimental development work undertaken for the purpose of achieving technological advancement.

[397] The respondent's position is that the activities cannot qualify as SR&ED. According to Mr. Mimoune, the mixes had been developed in collaboration with CTS Cement, the company that created the cements introduced in the mixes that were tested. BMQ neither changed the mixes nor developed new placement techniques for concrete. Repair products were available, and although it was necessary to adapt them for use in mobile concrete mixers, this was a normal obstacle in the industry. BMQ did not use the scientific method, according to him, since the steps consisted mainly of consulting experts. Also, the respondent argued that discussions led directly to large-scale tests and that the scientific method was therefore not followed by BMQ. Moreover, the fact that the first tests gave satisfactory results supports the position that no technological uncertainty had to be overcome in the context of this project.

14.3 Discussion

a) Qualification of the project

[398] In this case, the evidence showed that relatively new cements had been introduced in the mixes tested and that the performance of the mixes as RCC repair products was unknown in the standard techniques or practices of the industry. Indeed, a mix had been created by BMQ in 2009 and used to carry out repairs on the Champlain Bridge; another mix, containing an acrylic latex, was an experimental concrete that had been tested in the United States and used for repairs of some works in the United States; and another mix was used by BMQ since the beginning of the 2000s. I consider that BMQ's objective for this project was to advance processes for the repair of RCC slabs. The evidence showed that the characteristics of repair concrete was not determined at the outset; the objective was, in fact, to develop a concrete that could be used for repair in thin layers as well as for deeper application. There was therefore a response to the criteria of technological progress.

[399] In this case, BMQ convinced me of the existence of technological uncertainty in this project, which could not be dispelled by technical studies or normal procedures, since BMQ demonstrated that the probability of accomplishing the objectives sought was not known or determined in advance based on the normally available technological knowledge. Indeed, no large-scale test had been done to test the new RCC repair materials. BMQ could therefore not rely on technical studies or standard practice to dispel this technical uncertainty. More specifically, one of the mixes had never been tested or used in Quebec.

[400] Also, BMQ used the scientific method as part of this project, having proceeded with the comparison of the results of the different mixes placed in similar conditions; it also formulated hypotheses.

[401] As with the other projects, BMQ's tests can be partially reconstructed based on its documentation, but a report compiling the tests and tracking BMQ's thinking throughout the project was not prepared. However, even though BMQ did not keep a detailed record contemporaneous with the tests, the documentation produced at the hearing and the testimonial evidence, particularly Mr. Bertrand's testimony, show the course of the activities.

[402] For these reasons, the activities carried out by BMQ as part of this project constitute SR&ED.

b) The expenditures

[403] The respondent contests the eligibility of expenditures for salaries, materials and subcontractors incurred by BMQ as part of this project, although the appellant reduced its claim in relation to each of these expenditure items.

[404] The respondent contests the eligibility of $11,523 in salary expenditures paid to employees for certain activities related to this project. First of all, it is a question of remuneration for certain hours spent by Mr. Bertrand and Mr. Dubé discussing with the cement supplier CTS Cement to develop mixes and plan tests, and with MTQ representatives to establish the project objectives (12 hours for Mr. Bertrand and 22 hours for Mr. Dubé). It is also a question of remuneration for the hours spent by the interns and ACI technicians (34 hours in the case of A. Labbé-Thibault and six hours in the case of J. Pierre). The respondent considered that the salaries paid to the interns and ACI technicians for their participation in discussions, in formulating mixes, demolishing the concrete slab

that was already in place and preparing the surface as well as in analyzing the results do not qualify. The respondent therefore only considered that the salary costs for their participation in placing mixes and taking samples qualified. Two hours of results analysis indicated for January 4, 2012, are also questioned in the case of Mr. Dubé.

[405] As for expenditures for materials, the respondent considers that they should be reduced to $394.

[406] Finally, BMQ incurred subcontracting expenditures so that subcontractors prepared the RCC concrete surface where the products were to be tested and so that independent laboratories performed tests to verify compliance with standards. For the respondent, none of these expenditures qualify.

[407] As previously mentioned, the salaries related to management activities affecting the course of SR&ED work are salaries paid directly for the performance of SR&ED activities, and the expenditures related to these activities are deductible under section 37 and qualify for ITCs. However, discussions with a client that do not affect the course of SR&ED work cannot be taken into account. In this case, the time sheets only mention discussions related to the formulation of mixes, the planning of tests and analyses of results obtained for certain mixes, that is, activities directly affecting the course of SR&ED activities. The salary expenditures for Mr. Bertrand and Mr. Dubé for the hours devoted to these activities therefore qualify.

[408] Also, the expenditures for hours devoted by the ACI technicians and the interns to the same tasks would qualify, since, according to the evidence, their role at BMQ is to take part in the analysis of results—participation that includes meetings for updates and the exchange of ideas—and they are also authorized to do manipulations and the different tests. Concerning the two hours spent by Mr. Dubé analyzing results, they would also qualify, since they are also hours directly related to SR&ED activities. As previously mentioned, the analysis of results is an integral part of the scientific method. The hours recorded for interns and ACI technicians in this regard should also qualify.

[409] However, I consider that the salary expenditures for the hours recorded for the interns and ACI technicians regarding the demolition and excavation of the concrete slab do not qualify for the purposes of section 37 nor for the purposes of

ITCs. When they demolish the concrete slab, these employees are not directly engaged in SR&ED. These expenditures, therefore, do not qualify.

[410] The deduction claimed for salaries must be reduced in the light of the elements described above. Therefore, it is necessary to subtract 18 hours in the case of S. Fournier, nine hours in the case of A. Labbé-Thibault, and 33 hours in the case of J. Pierre, which amounts to a total of $1,524.

[411] In addition, given Mr. Dubé's testimony that the time shown on time sheets is rounded, it is reasonable to conclude that 10% of the time logged on the project is excessive.

[412] Thus, the salary expenditures for which the deduction is claimed by BMQ should be reduced by a total of $2,715, representing salaries for activities that do not qualify ($1,524) and the 10% expenditure reduction ($1,191). The salary expenditures deductible under section 37 and that qualify for ITCs therefore total $10,728.

[413] According to the documentary evidence filed at the hearing, the expenditures for materials totalled $494, representing the cost of the various mixes tested as part of this project. However, according to Exhibit AR-1, the appellant waived asking for the cost deduction related to mobile concrete mixers (that is, the 32 hours during which they were used). Given the concessions made by the parties, the expenditures for materials deductible under section 37 and that qualify for ITCs therefore total $494.

[414] The expenditures related to subcontractors whose services were retained to conduct laboratory tests are considered as expenditures for SR&ED, being expenditures incurred in support of the project and directly related to SR&ED work. However, the expenditures incurred for the excavation of the RCC slab should not be included as deductible expenditures under section 37 that qualify for ITCs, as they are instead replaced by the proxy amount, since I consider that these expenditures do not represent expenditures directly related to SR&ED work. Thus, given the concessions made by the appellant and the exhibits filed as evidence, the expenditure of $1,917 for subcontractors is deductible under section 37 and qualifies for ITCs.

E. CONCLUSION

[415] For the reasons stated above, I conclude that the activities carried out by BMQ as part of projects B-10-18, B-11-04, B-11-07, B-12-01, B-12-03 and B-12-07 are SR&ED activities. The following amounts are also deductible expenditures as current expenditures under section 37 and expenditures that qualify for ITCs:

i) For the 2010 tax year: $3,521 for salaries, $427 for materials and $360 for subcontractor fees;

ii) For the 2011 tax year: $37,668 for salaries, $2,520 for materials and $3,425 for subcontractor fees;

iii) For the 2012 tax year: $44,192 for salaries, $4,433 for materials and $9,204 for subcontractor fees;

[416] Consequently and in accordance with these reasons, the appeals for the 2010 tax year, the 2011 tax year and the 2012 tax year are allowed, without costs.

Signed at Ottawa, Canada, this 11th day of December 2019.

"Dominique Lafleur"

Lafleur J.

Translation certified true
on this 4th day of March 2020.

François Brunet, Revisor

SCHEDULE A

Income Tax Act, R.S.C. 1985, c. 1 (5th supp.)

Paragraphs 37(1)(a) and (b), subparagraph 37(1)(b)(i) and subclause 37(8)(a)(ii)(A)III and clause 37(8)(a)(ii)(B)

Scientific research and experimental development

37 (1) Where a taxpayer carried on a business in Canada in a taxation year, there may be deducted in computing the taxpayer's income from the business for the year such amount as the taxpayer claims not exceeding the amount, if any, by which the total of

(a) the total of all amounts each of which is an expenditure of a current nature made by the taxpayer in the year or in a preceding taxation year ending after 1973

(i) on scientific research and experimental development carried on in Canada, directly undertaken by or on behalf of the taxpayer, and related to a business of the taxpayer,

[…]

(b) the lesser of

(i) the total of all amounts each of which is an expenditure of a capital nature made by the taxpayer (in respect of property acquired that would be depreciable property of the taxpayer if this section were not applicable in respect of the property, other than land or a leasehold interest in land) in the year or in a preceding taxation year ending after 1958 on scientific research and experimental development carried on in Canada, directly undertaken by or on behalf of the taxpayer, and related to a business of the taxpayer, and

(ii) the undepreciated capital cost to the taxpayer of the property so acquired as of the end of the taxation year (before making any deduction under this paragraph in computing the income of the taxpayer for the taxation year),

[…]

Interpretation

(8) In this section,

(a) references to expenditures on or in respect of scientific research and experimental development

[…]

(ii) where the references occur other than in subsection 37(2), include only

(A) expenditures incurred by a taxpayer in a taxation year (other than a taxation year for which the taxpayer has elected under clause (B)), each of which is

[…]

(III) an expenditure of a capital nature that at the time it was incurred was for the provision of premises, facilities or equipment, where at that time it was intended

1. that it would be used during all or substantially all of its operating time in its expected useful life for, or

2. that all or substantially all of its value would be consumed in,

the prosecution of scientific research and experimental development in Canada, and

(B) where a taxpayer has elected in prescribed form and in accordance with subsection 37(10) for a taxation year, expenditures incurred by the taxpayer in the year each of which is

(I) an expenditure of a current nature for, and all or substantially all of which was attributable to, the lease of premises, facilities or equipment for the prosecution of scientific research and experimental development in Canada, other than an expenditure in respect of general purpose office equipment or furniture,

(II) an expenditure in respect of the prosecution of scientific research and experimental development in Canada directly undertaken on behalf of the taxpayer,

(III) an expenditure described in subclause (A)(III), other than an expenditure in respect of general purpose office equipment or furniture,

(IV) that portion of an expenditure made in respect of an expense incurred in the year for salary or wages of an employee who is directly engaged in scientific research and experimental development in Canada that can reasonably be considered to relate to such work having regard to the time spent by the employee thereon, and, for this purpose, where that portion is all or substantially all of the expenditure, that portion shall be deemed to be the amount of the expenditure,

(V) the cost of materials consumed in the prosecution of scientific research and experimental development in Canada, or

(VI) ½ of any other expenditure of a current nature in respect of the lease of premises, facilities or equipment used primarily for the prosecution of scientific research and experimental development in Canada, other than an expenditure in respect of general purpose office equipment or furniture;

Subsection 127(5)

Investment tax credit

(5) There may be deducted from the tax otherwise payable by a taxpayer under this Part for a taxation year an amount not exceeding the lesser of

(a) the total of

(i) the taxpayer's investment tax credit at the end of the year […] or of the taxpayer's SR&ED qualified expenditure pool at the end of the year or at the end of a preceding taxation year, and

[…]

Subsection 127(9)

[…]

SR&ED qualified expenditure pool of a taxpayer at the end of a taxation year means the amount determined by the formula

A + B - C

where

A is the total of all amounts each of which is a qualified expenditure incurred by the taxpayer in the year,

B is the total of all amounts each of which is an amount determined under paragraph 127(13)(e) for the year in respect of the taxpayer, and in respect of which the taxpayer files with the Minister a prescribed form containing prescribed information by the day that is 12 months after the taxpayer's filing-due date for the year, and

C is the total of all amounts each of which is an amount determined under paragraph 127(13)(d) for the year in respect of the taxpayer

[…]

qualified expenditure incurred by a taxpayer in a taxation year means

(a) an amount that is an expenditure incurred in the year by the taxpayer in respect of scientific research and experimental development that is an expenditure

(i) for first term shared-use-equipment or second term shared-use-equipment,

(ii) described in paragraph 37(1)(a), or

(iii) described in subparagraph 37(1)(b)(i), or

(b) a prescribed proxy amount of the taxpayer for the year (which, for the purpose of paragraph (e), is deemed to be an amount incurred in the year),

[…]

Income Tax Rules, C.R.C. c. 945

Rule 2900(4)

[…]

> 2900(4) For the purposes of the definition *qualified expenditure* in subsection 127(9) of the Act, the prescribed proxy amount of a taxpayer for a taxation year, in respect of a business, in respect of which the taxpayer elects under clause 37(8)(a)(ii)(B) of the Act is 65% of the total of all amounts each of which is that portion of the amount incurred in the year by the taxpayer in respect of salary or wages of an employee of the taxpayer who is directly engaged in scientific research and experimental development carried on in Canada that can reasonably be considered to relate to the scientific research and experimental development having regard to the time spent by the employee on the scientific research and experimental development.

ANNEXE A

Loi de l'impôt sur le revenu, L.R.C. 1985, ch. 1 (5e suppl.)

Alinéas 37(1)a) et b), sous-alinéa 37(1)b)(i) et subdivision 37(8)a)(ii)(A)III et division 37(8)a)(ii)(B)

Activités de recherche scientifique et de développement expérimental

37 (1) Le contribuable qui exploite une entreprise au Canada au cours d'une année d'imposition peut déduire dans le calcul du revenu qu'il tire de cette entreprise pour l'année un montant qui ne dépasse pas l'excédent éventuel du total des montants suivants :

a) le total des montants dont chacun représente une dépense de nature courante qu'il a faite au cours de l'année ou d'une année d'imposition antérieure se terminant après 1973 :

(i) soit pour des activités de recherche scientifique et de développement expérimental exercées au Canada directement par le contribuable ou pour son compte, en rapport avec une entreprise du contribuable,

[…]

b) le moins élevé des montants suivants :

(i) le total des montants dont chacun représente une dépense en capital que le contribuable a faite au cours de l'année ou d'une année d'imposition antérieure se terminant après 1958 quant à des biens acquis qui seraient, sans le présent article, des biens amortissables du contribuable – autres que des fonds de terre ou des droits de tenure à bail dans ces fonds –, pour des activités de recherche scientifique et de développement expérimental exercées au Canada directement par le contribuable ou pour son compte, en rapport avec une entreprise du contribuable,

ii) la fraction non amortie du coût en capital des biens ainsi acquis, pour le contribuable, à la fin de l'année (avant toute déduction, prévue par le présent alinéa, dans le calcul du revenu du contribuable pour l'année);

[…]

Interprétation

(8) Dans le cadre du présent article :

a) les mentions des dépenses afférentes aux activités de recherche scientifique et de développement expérimental :

[…]

(ii) lorsqu'elles figurent ailleurs qu'au paragraphe (2), se limitent :

(A) aux dépenses engagées par un contribuable au cours d'une année d'imposition, sauf une année d'imposition pour laquelle le contribuable a fait le choix prévu à la division (B), représentant chacune :

[…]

(III) soit une dépense en capital pour la fourniture de locaux, d'installations ou de matériel qui, au moment où la dépense est engagée, répondent à l'une des conditions suivantes :

1. ils sont censés être utilisés, pendant la totalité, ou presque, de leur temps d'exploitation au cours de leur vie utile prévue, dans le cadre d'activités de recherche scientifique et de développement expérimental exercées au Canada,

2. la totalité, ou presque, de leur valeur est censée être consommée dans le cadre d'activités de recherche scientifique et de développement expérimental exercées au Canada,

(B) si un contribuable en fait le choix sur formulaire prescrit et en conformité avec le paragraphe (10) pour une année d'imposition, aux dépenses engagées par lui au cours de l'année, représentant chacune :

(I) soit une dépense courante pour la location de locaux, d'installations ou de matériel servant à des activités de recherche scientifique et de développement expérimental exercées au Canada et qui y est attribuable en totalité, ou presque, à l'exception d'une dépense pour du mobilier ou de l'équipement de bureau de nature générale,

(II) soit une dépense pour des activités de recherche scientifique et de développement expérimental exercées au Canada et entreprises directement pour le compte du contribuable,

(III) soit une dépense visée à la subdivision (A)(III), à l'exception d'une dépense pour du mobilier ou de l'équipement de bureau de nature générale,

(IV) soit la partie d'une dépense faite relativement à des frais engagés au cours de l'année pour le traitement ou le salaire d'un employé exerçant directement des activités de recherche scientifique et de développement expérimental au Canada, qu'il est raisonnable de considérer comme se rapportant à ce travail compte tenu du temps que l'employé y consacre; à cette fin, la partie de dépense est réputée correspondre au montant de la dépense si elle en constitue la totalité, ou presque,

(V) soit le coût du matériel consommé dans le cadre d'activités de recherche scientifique et de développement expérimental exercées au Canada,

(VI) soit la moitié de toute autre dépense courante pour la location de locaux, d'installations ou de matériel utilisés principalement dans le cadre d'activités de recherche scientifique et de développement expérimental exercées au Canada, à l'exception d'une dépense pour du mobilier ou de l'équipement de bureau de nature générale,

Paragraphe 127(5)

Crédit d'impôt à l'investissement

(5) Est déductible de l'impôt payable par ailleurs par un contribuable en vertu de la présente partie pour une année d'imposition un montant qui ne dépasse pas le moins élevé des montants suivants :

a) le total des sommes suivantes :

(i) tout crédit d'impôt à l'investissement du contribuable à la fin de l'année […] ou de son compte de dépenses admissibles de recherche et de développement à la fin de l'année ou d'une année d'imposition antérieure,

[…]

Paragraphe 127(9)

[…]

compte de dépenses admissibles de recherche et de développement Quant à un contribuable à la fin d'une année d'imposition, le résultat du calcul suivant :

$$A + B – C$$

où :

A représente le total des montants représentant chacun une dépense admissible que le contribuable a engagée au cours de l'année;

B le total des montants représentant chacun un montant déterminé selon l'alinéa (13)e) pour l'année quant au contribuable, relativement auquel il présente au ministre un formulaire prescrit contenant les renseignements prescrits au plus tard douze mois après la date d'échéance de production qui lui est applicable pour l'année;

C le total des montants représentant chacun un montant déterminé selon l'alinéa (13)d) pour l'année quant au contribuable.

[…]

dépense admissible Dépense engagée par un contribuable au cours d'une année d'imposition qui représente :

a) soit une dépense relative à des activités de recherche scientifique et de développement expérimental qui, selon le cas :

(i) est affectée à du matériel à vocations multiples de première période ou à du matériel à vocations multiples de deuxième période,

(ii) est visée à l'alinéa 37(1)a),

(iii) est visée au sous-alinéa 37(1)b)(i),

b) soit un montant de remplacement visé par règlement applicable au contribuable pour l'année (qui, pour l'application de l'alinéa e), est réputé être un montant engagé au cours de l'année).

[…]

Règlement de l'impôt sur le revenu, C.R.C., ch. 945

Paragraphe 2900(4)

[…]

2900(4) Pour l'application de la définition de *dépense admissible*, au paragraphe 127(9) de la Loi, le montant de remplacement applicable à un contribuable quant à une entreprise pour une année d'imposition à l'égard de laquelle il fait le choix prévu à la division 37(8)a)(ii)(B) de la Loi est égal à 65 % du total des montants représentant chacun la partie du montant qu'il a engagé au cours de l'année, au titre du traitement ou du salaire de son employé qui participe directement à des activités de recherche scientifique et de développement expérimental exercées au Canada, qu'il est raisonnable de considérer comme se rapportant à ces activités compte tenu du temps que l'employé y consacre.

CITATION:	2019 TCC 278
COURT FILE NOS.:	2015-3425(IT)G 2016-4491(IT)G
STYLE OF CAUSE:	BÉTON MOBILE DU QUÉBEC INC. v. HER MAJESTY THE QUEEN
PLACE OF HEARING:	Montreal, Quebec
DATES OF HEARING:	April 8, 9, 10, 11 and 12 and May 29, 30 and 31, 2019
REASONS FOR JUDGMENT BY:	The Honourable Justice Dominique Lafleur
DATE OF JUDGMENT:	December 11, 2019

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Counsel for the respondent:	Anne Poirier

COUNSEL OF RECORD:

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