I.1 SR&ED tax cases - Part I

Presenters:

Justin Frape, BSc.

David Sabina, CPA

Webcast

Nov 30, 2023

I) 2023 SR&ED Tax cases

SR&ED INDUSTRY	APPELLANT	PRIMARY ISSUE	WIN / LOSS
Tractor design	Buhler	Technological Advancement	Win
Food development	Canafric	Extension of technology	Win
Thermal Storage process	ACBK	Defining Standard Practice	Loss
Mold designs	Mold Leaders	Defining Standard Practice	Loss
Injector design	Daves Diesel	Defining Standard Practice	Loss
Welding processes	JEC	Defining Standard Practice	Loss
Jewelry design	Chagnon	Defining Standard Practice	Loss
Machine Design	9158 Quebec	Systematic Investigation	Loss

Implications of rulings

APPELLANT	RULING & RATIONALE	IMPLICATIONS & OPPORTUNITIES	SIGNIFICANCE
Buhler	system uncertainty	ability to illustrate integration issues	High
Canafric	not applicable between products	unusual verdict based on evidence	Moderate
ACBK	failure to define state	improving patented process - planning	Moderate
Mold Leaders	failure to define state	BSc. + in field of science	Low
Daves Diesel	failure to define state	BSc. + in field of science	Low
JEC	failure to define state	BSc. + in field of science	Low
Chagnon	failure to define state	BSc. + in field of science	Low
9158 Quebec	unavailable - subcontracted	need SR&ED info from contractors	Low

SR&ED PROEJCT – THINKING OUTSIDETHE BOX

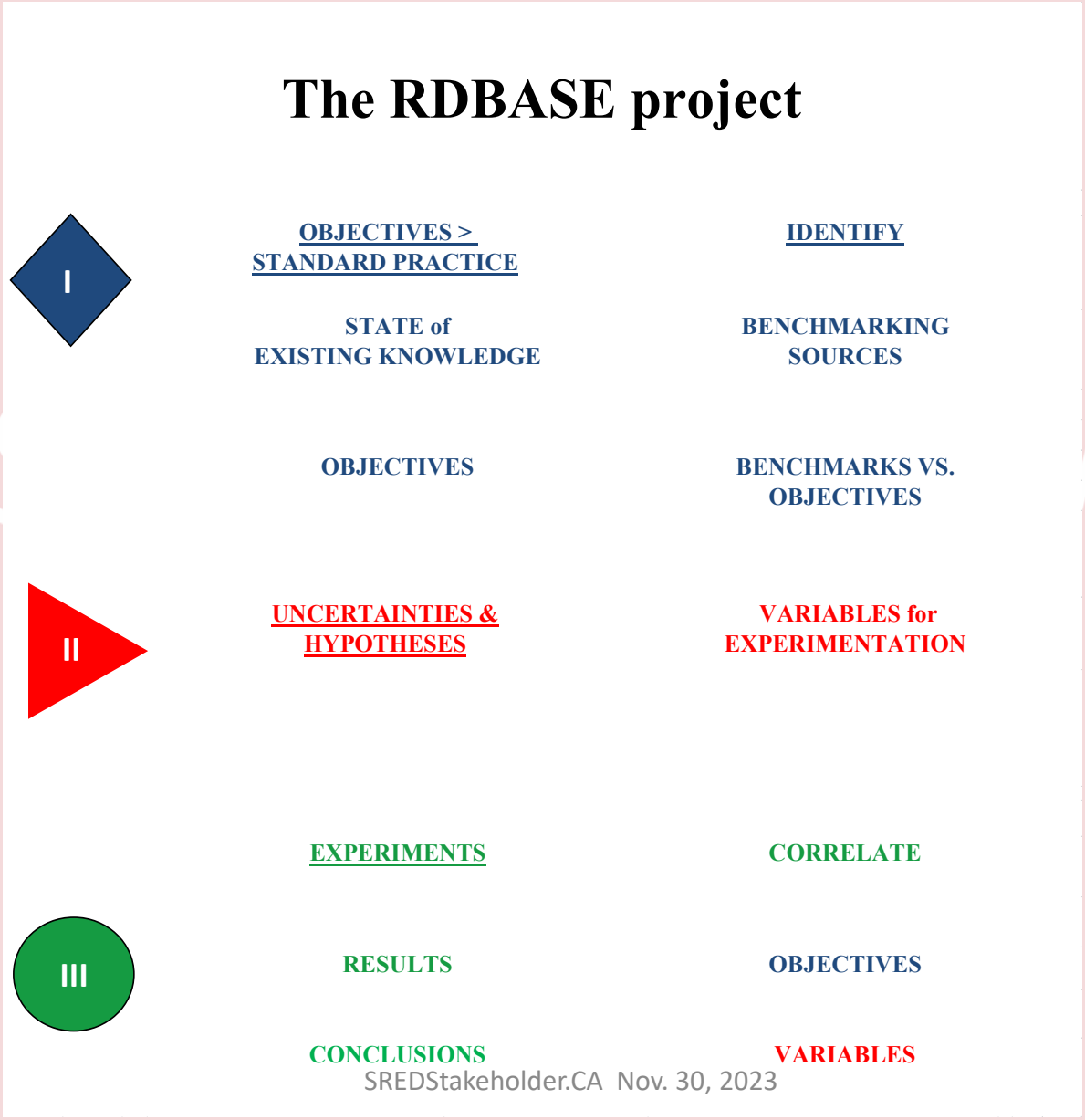
STEPS

1) DEFINE PRIOR ART

2) CORRELATE prior art to VARIABLES for experiments

3) ANALYSIS of & CONCLUSIONS on VARIABLES

Project Format for tax case analysis



References for tax case analysis

- Paragraph numbers for quoted text
  - E.g. 54] The judge stated ….
  - Relevant data in project sections
  - PDF downloads available

SR&ED cases – TECHNOLOGY

1) Buhler – WIN Tractor design

- Analysis of Tax Court of Canada judgment of BUHLER VERSATILE INC., Appellant, and HIS MAJESTY THE KING, Respondent.
- Citation: 2023TCC18 Date: 2023-02-06.
- paragraphs for source data have been [cited].

Issue(s):

- Evidence of advancement & systematic investigation

Relevant legislation:

- ITA 37 & 248(1)

Buhler - Facts

[1] The appellant is an agricultural equipment manufacturer and specializes in the manufacture of agricultural tractors.

[2] The Minister disallowed appellant's 2005 SR&ED claim expenses totalling $3,591,220 with respect to seven projects.

[5] Minister ….. appellant's activities not SR&ED … more accurately described as routine testing, quality control, and/or product development.

[15] 2005-SR&ED claim consisted of seven projects however,

[17] bulk of SR&ED claim project 5 (4WD Phase D Tier II High HP) .. both parties focused their respective presentations on this project.

.

Principal Investigator & witness backgrounds

Name	Title	Technical Degrees	Company
Willy Janzen	CFO		Buhler Industries Inc.
Barry Thompson	Engineer	Professional Engineer (Mechanical) since 1991	Versatile sub of Buhler
Allan Minaker	Engineer	Professional Engineer since 1982 Bachelor of Science in Agricultural Engineering Specializing in Power and Machinery	Versatile sub of Buhler
James Pell	Engineer	Mechanical Engineer and Senior Applications Engineer with Cummins Inc. (Engine supplier)	Cummins Inc. Engine supplier
Scott Lagadyn	RTA	Professional Engineer since 2015 Bachelor of Engineering (Mechanical) Master of Science in Mechanical Engineering and Industrial Management	Canada Revenue Agency
Keith Chrystall	RTA	Bachelor Applied Science in Mechanical Engineering Master of Science in Mechanical Engineering	Canada Revenue Agency
Dr. Donald Himbeault	Senior Mgr.	Professional Engineer (Mechanical) since 1998	PricewaterhouseCoopers

Tractor design project objectives

- [18] The appellant's goal in this project was to create a line of high-horsepower 4WD tractors which met Tier II emission standards and were suitable for agricultural and commercial construction (e.g. scraping/earth-moving/ levelling) applications.
- Within this line, they sought to build a 4WD tractor with over 500 horsepower, which would be above industry levels at the time. Mr. Janzen (Buhler, CFO) explained that more powerful agricultural tractors were needed as farms and farm implements had increased in size while the number of farm employees decreased.

Objectives beyond standard practice – stack-up to create TU

Measurement	Current Performance	Objective	Has results?
Power (hp)	425	500	Yes
Emission requirement (tier)	2	2	Yes
Power bulge (%)	5	8	Yes
Torsional coupler spike load capacity (x)	(not set)	(not set)	No
Price ($)	(not set)	(not set)	No

Technological Uncertainty (TU)
a) Torsional coupler

- [28] The appellant's **425-HP tractor** used a version of the torsional coupler referred to as an **LCD rubber coupler**; … essentially a large rubber ring in a metal shell … commonly used in tractor industry.
- To accommodate the larger QSX-15 engine, it was necessary to **raise the engine** which resulted in a **5-degree operating angle** between the engine **crankshaft** and the **transmission input shaft** (which receives power from the engine).
- The LCD coupling **ordinarily** required the crankshaft and transmission input shaft to be **in-line (i.e. at a 0-degree** angle) so the 5-degree operating angle resulted in a **whipping motion** that greatly reduced the lifespan of the coupler.

Technological Uncertainty (TU)
(b) Cooling

- [32] The larger **QSX-15 engine (designed for road trucks)** presented multiple challenges in keeping it cool … maintaining Tier II emissions compliance.
- Either a **sufficient airflow** must be created or a cooling system devised
- tractor operates **dustier conditions** than a highway truck. The dust and debris plug cooling system components

- [33] engine burns fuel … heat is produced.
- A fast-moving highway vehicle will generate ground air which circulates through the radiator and a cooling stack,
- maximum **speed of a tractor is significantly lower**… does not generate the same natural **airflow** for cooling.

Technology or Knowledge Base Level:

Benchmark Method/Source	Measurement	Explanatory notes
Competitive products or processes	4 products	No other competitor with 535 HP tractor. 4 main competitors worldwide with potential designs.
Similar prior in-house technologies	2 products / processes	rework of prior design concepts
Suppliers	1 products	Engineer from Engine supplier (Cummins Inc.) provided design input & expert witness
Queries to experts	1 responses	determining why the coupler failed, the appellant consulted with Torsion Control who in turn gave feedback and suggestions

Key Variables for experimentation

- Cooling system design
  - dust vs. low airflow,
  - turbulent airflow vs. pressure effects,
  - cooler face orientations and shapes
- Torsional coupler design
  - Causes of whipping motion
  - slip joint design
  - materials

Experimentation – overview
Activity 1 – Torsional coupler

- [29] The appellant decided to **move away from a rubber coupling** and try a spring coupler, i.e. which has no rubber and instead uses a series of springs for dampening.
- It **started with spring couplers made by a company called Torsion Control**, testing them both in the field and using a dynamometer (device which measures torque).
- A torsional coupler **should last over 5,000 hours but it was failing after less than 100 hours** with the QSX-15 engine.

Experimentation – purpose of coupler

- [27] the transmission (which controls the engine's power) would itself consist of multiple gears, shafts, and bearings rotating at various speeds.
- in this system of spinning components, a **torsional coupler is needed to isolate and minimize vibration** to prevent vibrations destroying the system itself.
- Mr. Lagadyn (CRA) described the purpose of the torsional coupler as that of forcing the power of the engine to go through it, thus providing its **dampening** effect to the rest of the drive line.

Experimentation – determining cause(s) of failures – test apparatus

[30] In determining why the coupler failed, appellant consulted with Torsion Control who gave feedback and suggestions.

Mr. Lagadyn (CRA) summarized appellant's approach as follows:

- appellant **created a bench test apparatus** … featured a flywheel and a **driveshaft operating at an angle**.
- intent to first fail the coupler and observe baseline reliability,
- then test improved coupler designs to measure incremental reliability gained, if any.
- However, during **bench testing**, recognized **testing was not matching the failures** seen **in the field**.
- appellant considered that the **bench testing was creating steady state loads**, whereas **in the field** the loads would be **intermittent spike loads.**

Experimentation – hypothesizing causes

- [30] The appellant **also considered** the possibility that the coupling might **be failing due to axial thrust loads** on the coupler.
- The driveshaft contained a **slip joint** which would **in theory prevent** thrust loads.
- The appellant considered that **high torque** might be creating enough **friction to prevent** the slip joint from **slipping as intended**.

Experimentation – testing hypotheses

- [30] The appellant considered the **thrust loading** could be occurring on the coupler from relative movement between the engine and transmission (due to the engine and transmission shifting on their elastomer mounts).
- The appellant pursued **measurement of actual in-service loads** and movements on **the coupler and driveshaft** on a **full scale loaded tractor**.
- Tractor driveshaft was outfitted with a strain **gauge** arrangement to **measure the torque** passing through the coupler and driveshaft.

Results

- [31] Mr. Minaker testified that the end design was one piece with 12 sets of springs (up from 9),
- which was larger and heavier but also more durable and more expensive.

Judges ruling & Rationale – Conclusions on “why?”

JUDGE STATED

- [64] The appellant was focused and methodical in the way it uncovered, recognized, and resolved the issues involving cooling and the torsional coupler, as two examples of the larger challenges.
- It did not always know **whether a specific theory** would successfully resolve a particular issue **but it always knew why it was testing that theory**.

- [65] For example, the appellant moved away **from rubber couplers to spring-based** ones because the rubber was breaking;
- however, the appellant did not know that the spring couplings would work.
- The appellant then eventually moved away **from a 2-piece welded design to a one-piece design**.

Experimentation – overview
Activity 2 – cooling system

- [38] For maximum cooling, appellant challenged by need to accommodate the **physical size** of the components while achieving **proper fin-spacing**;
- each component had protrusions called fins to increase their surface area for cooling.
- Mr. Minaker explained the **tighter the fin-spacing**, the **better the heat rejection but** the **worse the airflow**
- limited amount of tractor face area to work with .. to keep tractor at a reasonable size but
- they ultimately **had to widen it twice** in order to house the components.

Experimentation – dyno testing

- [39] The appellant tested the cooling system using the dynamometer (called dyno testing) as well as doing field testing.
- dyno testing took place in a test cell which was a large enclosed room
- Tractor would run at full throttle for 6 to 8 hours at a time and **approximately 30 variables such as temperatures, pressures, and flows** would be **measured** to determine how the cooling system was working.

Experimentation – turbulent airflows, air pressures & IMTD

[41] Another challenge involved the charge air cooler itself.

- Cummins (engine supplier) had a very tight system specification called the **intake manifold temperature differential (IMTD)**;
- required air be **cooled by at least 63 degrees** Fahrenheit while the engine was operating **at maximum horsepower**.
- appellant changed the **design of the charge air cooler** to create a **turbulent airflow** which
- **increased cooling but** simultaneously **reduced the air pressure inside** charge air cooler to an unacceptable level.
- Conversely**, increasing the air pressure** inside the charge air cooler led to an **unacceptable IMTD**.

Experimentation & compensation Air vs. oil coolers

[41] The appellant ultimately **increased the face area of the charge air cooler** to compensate but **in turn had to reduce the size of the oil coolers** mounted underneath.

[42] Additional testing

- The appellant put its tractors through a **suite of other tests** such as noise levels, steering, rollover protection system (called the cab test), braking, air conditioning, power train, manual transmission, bump track (involving random speed bumps),hydraulic system, and air seeder fans.

Results

[43] A limited number of these tractors went into production in late 2005.

- Mr. Janzen testified that at the time, this 4WD tractor was known to have the highest horsepower in the world.
- He stated that when its product life ended in 2014, the appellant sold the intellectual property associated with it for $2.6M in 2017.

Judge Ruling & Rationale – Conclusions on SU = TA

- [57] I am of the view that **the technological uncertainty** in this case fits squarely under the description of a **system uncertainty (SU**).
- In other words, the **integration of nontrivial combinations of established** (well-known) **technologies and principles** carried a **major element of technological uncertainty**.
- When all the individual parts were combined, their individual uncertainties were merged into a system uncertainty and the system uncertainty was the entire tractor. All of the constituent parts needed to function in unison to achieve the appellant's objective.

Ruling on costs + opportunities

- [77] The 535-HP tractor was **one of three models** in that 4WD line and as indicated earlier,
- I consider the **435-HP and 485-HP models** to lack the necessary system uncertainty to qualify for SR&ED **absent specific evidence**.
- [78] As a **principled basis, I would allow one-third** of $2,916,197 as qualified SR&ED expenditures, i.e. $972,065.67 (rounded to $972,066) based on the 535-HP tractor being one of three models in the line
- COMMENT: Might argue higher costs on 535 HP unit vs. equal allocations

Key Criteria Summary

2301 - Buhler - Tractor design WIN		
BENCHMARKS	**ACTIVITIES BY YEAR**	
Competitive products or processes: 4 products Similar prior in-house technologies: 2 products / processes Suppliers: 1 products Queries to experts: 1 responses	2023 '1-1 Torsion coupler	 '1-2 Cooling system design
OBJECTIVES	**RESULTS**	
Power: 500 hp		500
Emission requirement: 2 tier		2
Power bulge: 8 %		8
Torsional coupler spike load capacity: x	y	
Price: $		
UNCERTAINTIES & KEY VARIABLES	**CONCLUSIONS**	
1 - Technological uncertainty		
cooler face and shapes		Y
Cooling system design - dust & low airflow		Y
torsional coupler - whipping,slip joint, materials	Y	
turbulent airflow vs. pressure effects		Y
	METHODS	
Analysis	16	168
Trials	12	55
Prototypes	4	6
Lines of code		
	COSTS	
Hours	1,400	1,600
Materials $	$ 350,000	$ 500,000
Subcontractor $		$ 30,000

Implications

- Excellent evidence of eligible work for machinery & automotive industries
- Strong Technical backgrounds of researchers & experts hired
- Could likely have argued cost allocations higher than 1/3

2) Canafric – WIN
Food Industry

- Analysis - Tax Court of Canada judgment of CANAFRIC INC., Appellant, and HIS MAJESTY THE KING, Respondent. TCC 2023 108 Date: July 26, 2023

Issue(s):

- Evidence of advancement & systematic investigation

Relevant legislation and analysis:

- ITA 37 & 248(1)

Facts

[1] This is an appeal by Canafric Inc. (“Canafric”) disallowing Scientific Research and Experimental Development (“SR&ED”) expenditures and the corresponding Investment Tax Credits (“ITCs”) for the **2013, 2014, 2015 and 2016 taxation years**

[2] Canafric operates a food manufacturing business specialized in developing frozen pies mainly for the Canadian and the United States markets. During the Taxation Years, Canafric carried on various projects and activities aimed at developing new or advancing pre-existing products.

Objectives

Measurement	Current Performance	Objective
Shelf life (days)	5	10
reduce salt (%)	(not set)	(not set)
increase protein (%)	(not set)	(not set)
maintain taste (%)	(not set)	(not set)
freeze / thaw credibility (%)	(not set)	(not set)
Cooking time (%)	100	80
Use of chemical preservatives (%)	30	0

TU – Technological Uncertainties & Prior Art

PER THE JUDGE:

- [94] Based on the challenges described by Mr. Pandya, projects 1304, 1306, 1401, 1402, 1501 and 1502 posed a technological uncertainty which could not be resolved by routine engineering or standard procedures.
- Canafric attempted to create recipes in order to meet client objectives for their products.
- Each project consisted of a new or improved product which meant there was no information available on how to achieve these goals.

The most significant underlying key variables are:

- methods to reduce fat & salt (unresolved), transferability of methods (unresolved), cooking techniques to reduce time, effects of no anitbiotics on meats

Transferability of techniques?

- [94] A major source of disagreement for all SR&ED Claims was David Zhou's (CRA, RTA) position that each breakthrough was transferrable from one product to the other.
- For example, Mr. Zhou said that salt and fat reduction techniques could be replicated in different products.
- Mr. Pandya clearly demonstrated that this was not the case because the ingredients will react differently when used in different products. Canafric was unable to achieve all of its targets.

Principal Investigator background

Mr. Suvrut Pandya

- CEO
- No technology background provided

Judges analysis of witnesses – CRA vs. claimant

[95] I found Mr. Pandya to be a very impressive witness. He demonstrated a deep knowledge of the area under research and had excellent communication skills.

He was very well spoken and factual in his evidence and was obviously very experienced in the area of the research being conducted.

Mr. Zhou on the other hand, although factual, was very much a generalist without support or backups.

He was rigid in his evidence and his approach lacked the understanding necessary to property evaluate the operations in question.

SR&ED Projects 2013

[3] For the 2013 taxation year, Canafric claimed SR&ED in respect of five projects (the "2013 SR&ED Claim"):

- i. 1302: Mortimer's brand Saffron Garden
- ii. 1303: Loblaw's PC Scotch beef pie
- **iii. 1304: Metro Irresistible Asian Style dinners - X**
- **iv. 1306: Costco deli chicken pie fill - X**
- v. 1307: Costco crustless quiche

[4] Projects **1304 and 1306** were selected for a joint technical and financial review by the Minister.

- Minister disallowed SR&ED expenditures of $90,682 and corresponding federal ITC's of $22,183 on these two projects

Project 1306 – Costco pie filling Objectives

[19] Project 1306 was a pie filling developed for Costco, meant to follow a specific cooking process.

- Canafric boil filling to 165 deg F to eliminate bacteria.
- then freeze filling & pack in 10 pound bags
- Costco bake it before displaying it in its refrigerator.

[20] In addition to the usual fat and salt reduction requirements, Costco wanted a pie filling that could

- achieve a 10-day shelf life
- without using artificial or chemical preservatives.

Technology or Knowledge Base Level:

- No specific details provided

Measurement	Current Performance	Objective
Shelf life (days)	5	10
reduce salt (%)	(not set)	(not set)
increase protein (%)	(not set)	(not set)
maintain taste (%)	(not set)	(not set)
freeze / thaw credibility (%)	(not set)	(not set)
Cooking time (%)	100	80
Use of chemical preservatives (%)	30	0

Technological Uncertainty (TU)

- [20] The **challenges** to maintain product integrity and taste after
- three bakes, one freeze and two filling phases,
- shelf life without artificial preservatives &
- increase protein levels in filling by 35%.

Experimentation process overview

[15] product **development process for all projects** as follows:

- i. customer requests product with specific targets in terms of content, shelf life, taste acceptability, texture et cetera;
- ii. Canafric develops and elaborates a recipe addresses targets;
- iii. product tested & sent to taste panel to meet requirements.

[16] Mr. Pandya explained that **plant trials and product development** are two distinct stages of the process.

- **development work** developing, elaborating and **testing a recipe**,
- **plant trials** to verify that success achievable on a **larger scale**.
- only proceed with plant trials once product meets requirements.

Experimentation & Results

- [21] unable to achieve a 10-day shelf life.
- Mr. Pandya testified product samples sent to an external laboratory for testing.
- The results established product became unsafe for human consumption after six days.
- No plant trials took place for project 1306.

CRA arguments for denial

- [25] Mr. Pandya testified that all the challenges relating to projects 1304 and 1306 were described to David Zhou (CRA, RTA) during the meeting.
- David Zhou told Canafric's representatives, including Mr. Pandya, that reducing fat and salt contents was not a technical challenge since salt and fat **reduction techniques are transferrable** from one product to another.

JUDGE'S RULING & RATIONALE: 5 criteria per NW Hydraulics case

I) TECHNOLOGICAL UNCERTAINTY

- [87] The first criteria, whether there is a technological risk or uncertainty … when it is unknown or uncertain whether a certain objective can be accomplished, due to a lack of scientific knowledge.

II) HYPOTHESIS

- [102] Mr. Pandya described Canafric's development process

- [104] This process meets the second criterion.
- Canafric formulated hypothesis specifically aimed at achieving its various goals.

JUDGE'S RULING & RATIONALE: 5 criteria per NW Hydraulics case

III) SCIENTIFIC METHOD

- CRA's position … a **"trial and error"** approach trying various recipes **without attempting to explain or analyze the reason why** each recipe did not work.

I disagree with this position.

- When recipe could not meet requirements,
- **conducted analyses to understand** which requirement not met and
- **modified specific parts of the recipe** in order to address the issue.
- **limited by clients' demands** regarding which **ingredients** to use.

IV) TECHNOLOGICAL ADVANCEMENT

- [94] Canafric was unable to achieve all of its targets. Nonetheless, the elimination of certain recipes which did not work constituted a technological advancement.

JUDGE'S RULING & RATIONALE: 5 criteria per NW Hydraulics case

V) RECORDS & SUPPORTING DOCUMENTATION

- [105] whether the claimant kept a detailed record of the hypotheses tested and results as the work progressed

- [110] **Documentary evidence is not mandatory. Testimonial evidence may be presented** in support of a claim.
- In this case, Canafric provided both documentary and testimonial evidence in support of its various claims.

JUDGE'S RULING & RATIONALE: 5 criteria per NW Hydraulics case

V) RECORDS & SUPPORTING DOCUMENTATION

- 111] On September 14, 2015, an on-site meeting took place regarding the 2013 SR&ED projects 1304 and 1306.
- Mr. Pandya testified **all technical information regarding projects explained orally** to Mr. Zhou (CRA, RTA) during meeting.
- This was **corroborated by Mr. Zhou** himself.
- Mr. Papadopoulos (CRA, FR) and Mrs. Hassanein (CRA, RTM), while they could not speak to the specifics of the discussion, **confirmed**
- a **"lengthy technical discussion" took place** between Canafric's representatives and Mr. Zhou.

Overall ruling

[114] Based upon the evidence, Appellant's evidence was most compelling and met the burden put forth upon them by the pleadings.

- The Respondent **failed to address the Appellant's evidence in a forthright manner**, especially the documentation provided to the CRA and the detailed technical discussions, which took place during the on-site meetings.
- This was never addressed by the Respondent other than by denying the claim.

[116] I am more than satisfied the Appellant discharged its burden. The **appeal is allowed**.

Comments on eligibility

- Taste panel or “organoloeptic” testing often “systematic investigation”
- Examples per prior CRA APPLICATION POLICY PAPER FOR FOOD INDUSTRY
- Repealed 2012 but still likely relevant

Examples per prior CRA APPLICATION POLICY PAPER FOR FOOD INDUSTRY

- [NOTE: THIS EXAMPLE IS REPRODUCED FROM THE FOOD AND CONSUMER PACKAGED GOODS SECTOR SR&ED GUIDANCE DOCUMENT AS PREPARED BY FOOD AND CONSUMER PRODUCTS MANUFACTURERS OF CANADA (FCPMC) AND CANADA REVENUE AGENCY (CRA)]

- Desirable manufacturing and processing attributes are often accomplished by developing specifications for formulations and manufacturing parameters. (F.I.M.S.).
- In cases where such work involves a SR&ED project, those activities that directly contribute to the resolution of the technological uncertainties, qualify as SR&ED support activities.

Eligible Objectives per Policy paper

- Technology involved in the development of product formulations and manufacturing process specifications usually requires SR&ED to meet consumer needs throughout worldwide geographical locations and temperature zones including:
- 1) Product stability,
- 2) Consistency in quality,
- 3) Flavor,
- 4) Texture,
- 5) Form,
- 6) Extended shelf life &
- 7) Safety
- As some of the key attributes that this industry designs into its products.
- [AN IDEAL TECHNICAL DESCRIPTION WOULD QUANTIFY THE OBJECTIVE PERFORMANCE PARAMETERS.]

Eligible Organoleptic testing

Term "organoleptic properties" to describe sensory characteristics of products.

- Consumer testing eligible when analytical tool in support of a SR&ED project.

Types of (eligible) testing involving sensory testing:

- 1. Discrimination testing - include both Triangle & Difference testing.
- 2. Sensory panel testing either a professional trained panel of experts or a semi trained consumer group i.e. church group, scouts, guides, seniors etc.
- 3. Focus group testing or framework testing of experimental prototypes.
- 4. CLT (Central Location Test): pre recruited personal interviews to evaluate experimental product prototypes.
- 5. HUT (Home Use Test): an in home placement of experimental product prototypes generally with a questionnaire or other mechanisms to capture information related to the product design attributes.
- 6. In Situ Test: End use testing for service products used outside the home, in hospitals, food service operations, dental offices etc.

Ineligible “market” testing

The following **types of (ineligible) consumer research** are often conducted to obtain information to assist in making **marketing or business decisions** about a product:

- 1. V HUT or Volume Home Use Test, to measure volume potential
- 2. Simulated Test Market to measure share of market potential.
- 3. Product Positioning Research
- 4. Copy Pre Testing where consumers react to advertising
- 5. Ideation Research where consumers help articulate brand positioning.
- 6. Continuous Tracking Research, to track consumer awareness
- 7. Usage and Attitude (U A) studies consumers consumption behaviour and attitudes.
- 8. Focus Group testing related to marketing programs

- [AUTHOR'S NOTE: THE TYPES OF ACTIVITIES THAT ARE NOT ELIGIBLE ARE SUBJECTIVE AND ARE PRIMARILY RELATED TO MARKETING OR BUSINESS DECISIONS]

Link to other pre-2012 project examples

- https://www.rdbase.ca/industry-example/

TCC 5 criteria for SR&ED

INFORMATION REQUIRED	HOW TO PROVIDE INFO.
Tax Court of Canada (TCC) **5 SR&ED eligibility Questions**	**RDBASE SR&ED project -** **5 Steps**
1. Was there a scientific or a **technological uncertainty**—an uncertainty that could not be removed by **standard practice**?	**Step 1a):** Define Standard Practice (SP) **Step 1b):** Objectives > Standard Practice & **Step 2:** Correlate research to uncertainties
2. Did the effort involve formulating **hypotheses** specifically aimed at reducing or eliminating that **uncertainty**?	**Step 2**: Correlate research to uncertainties
3. Was the adopted procedure consistent with the total discipline of the **scientific method**, including formulating, testing, & modifying hypotheses?	**Steps 1-5: Specifically 3a):** Work done "systematically"
4. Did the process **result in** a scientific or a **technological advancement**?	**Step 3b):** Clarifying "technological conclusions" = advancements
5. Was a **record of** the hypotheses tested and the **results** kept as the work progressed?	**Step 2:** Correlate research to uncertainties **Step 3a):** Work done "systematically"

Tips for compliance

INFORMATION REQUIRED **Tax Court of Canada (TCC)** **5 SR&ED eligibility Questions**	**Author's Commentary: HOW to meet all requirements**
1. Was there a scientific or a **technological uncertainty**—an uncertainty that could not be removed by **standard practice**?	The TCC question **contemplates the first 3 steps** of the RDBASE SR&ED project structure.
2. Did the effort involve formulating **hypotheses** specifically aimed at reducing or eliminating that **uncertainty**?	**Hypotheses** require **"variables"** for experimentation. These create the basis for the **"controlled experiments"** required by the tax court.
3. Was the adopted procedure consistent with the total discipline of the **scientific method**, including formulating, testing, & modifying hypotheses?	**"scientific method"** internationally accepted definition. Arguably contemplates **all 5 steps / questions**
4. Did the process **result in** a scientific or a **technological advancement**?	**"Technological advancement" is the "conclusion"** after **ALL 5 steps** to be performed.
5. Was a **record of** the hypotheses tested and the **results** kept as the work progressed?	**Documentation** required by the "scientific method" & ITA **"systematic investigation"** criteria.

Key Criteria Summary

2302 - Canafric - food development WIN		
BENCHMARKS	**ACTIVITIES BY YEAR**	
	2023	
	'1-1	'1-2
(none)	2013 - 2/5 projects denied	2014 - 3/3 projects denied
OBJECTIVES	**RESULTS**	
Shelf life: 10 days	6	
reduce salt: %	20	
increase protein: %	35	
maintain taste: %	95	
freeze / thaw credibility: %		
Cooking time: 80 %		85
Use of chemical preservatives: 0 %	20	
UNCERTAINTIES & KEY VARIABLES	**CONCLUSIONS**	
1 - Technological uncertainty		
cooking techniques to reduce time		Y
effects of no anitbiotics on meats		Y
methods to reduce fat & salt	Y	
transferability of methods	Y	
	METHODS	
Analysis		
Trials		
Prototypes		
Lines of code		
	COSTS	
Hours	250	300
Materials $	$ 2,500.00	$ 3,000.00
Subcontractor $	$ 1,500.00	

Implications

- Unusual combination of lacking
  - BSc. + in field of science &
  - Written documentation
- Shows judges can be favourable to small claimants

3) ACBK (Hydro LMR) – LOSS Thermal Storage

Analysis:

- This project description is based on the Tax Court of Canada judgment of ACBK Management Inc. vs. The king Date : 2022-09-29, Neutral reference : 2022 CCI 94,

Issue(s):

- Evidence of advancement & systematic investigation

Relevant legislation and analysis:

- ITA 37 & 248(1)

Facts

[11] Hydro LMR created a project called "Study and Analysis of a Thermal Storage System"

Technology or Knowledge Base Level:

[9] in a prior year, **Dominic Laperle (“Mr. Laperle”)** had installed a system called

- “**hydrodynamic system for the energy-efficient assistance of a building**, construction methods and corresponding uses" in a residence in Quebec.
- Mr. Laperle **obtained a patent** for this system.

[10] After construction and hydrodynamic system installed,

- Marc Brunet (“**Mr. Brunet”), of the Center de recherche industrielle du Québec (“CRIQ**”), contacted Mr. Roy to to **ask him if he could improve** Mr. Laperle's system.
- asked to accompany him on **visit** to residence

Following the visit, Mr. Roy decided, through Hydro LMR, to

- purchase land in Quebec,
- **build** a triplex and install
- an **improved version** of Mr. Lapierre's system.

Client received expert feedback

[26] Before construction, Mr. Roy met with Daniel Rousse (“Mr. Rousse”), researcher holding the Industrial Research Chair in Energy and Efficiency at the École de technologie supérieure (“ÉTS”), to

- carry out a numerical simulation of its system.
- After this meeting, Mr. Roy obtained the ÉTS report with the results of the simulation.
- Subsequently, Mr. Roy decided to build a “life-size” prototype of his system, which he integrated into the triplex.

TU – Technological Uncertainties & Prior Art

[28] Mr. Roy, to design his “life-size” prototype, **used Mr. Laperle's notes and patent**.

- However, he identified a **major design problem** in Mr. Laperle's system.
- **temperature of water** in tanks not adequate; too cold and freezing.
- **prevented pump** to transport water to solar panels on roof **working properly**.
- **causes** of problem were **size of tanks**,
- **absence of a probe** to measure temperature &
- **programming** of control panel.

[29] Mr. Roy testified he faced two technological uncertainties, namely

- **size of the water tanks** &
- **temperature of the water** they contained.

Based on experiments performed key variables are:

- tank size,
- water temperatures,
- **basin orientations**

Principal Investigator background

- [8] André Roy (“Mr. Roy”) was the president and sole director of Hydro LMR during the relevant period.
- He is an electromechanical [technician?] by training and specializes in automation.
- Mr. Roy's work consisted mainly of designing, installing and programming automated systems in the food industry.

Experimentation

[29] In order to solve these problems, with the help of the data contained in the ÉTS report,

- Mr. Roy changed the **size of the pools**
- **installed probes** to measure the temperature
- inserting the **smaller of two basins inside larger** one
- installed **third basin** (conventional water heater) outside building and connected to system
- installed and programmed **control panel** controls water pump.

According to Mr. Roy, these uncertainties could not be eliminated using standard procedures or standard techniques

CRA arguments for denial

[31] according to Mr. Desmarais (CRA) testimony,

- Mr. Roy used **known thermodynamic principles to measure** energy exchanges in a system.
- possible to measure heat exchanges between basins and model system envisaged using
- **equations and mathematical** concepts **known** at the time
- to estimate adequate **dimensions of the basins**.
- A **scale model** could also have been used **to test it**.

[32] Mr. Desmarais also indicated that Mr. Laperle's **patent referred to other prior patents** relating to thermal storage,

- which enabled him to conclude that there were **systems similar** to the one designed by Hydro LMR **since the 1980s**.

Judges ruling & Rationale

[30] evidence shows Mr. Roy used **standard techniques** to resolve two technological uncertainties he was facing.

During his testimony, Mr. Roy **did not describe precisely** the techniques used to overcome uncertainties, during design or construction of system.

Evidence **does not show** that

- modification of sizes of pools,
- installation of probes for measuring temperature,
- installation of valves &
- design and installation of control panel
- **required practices not commonly** used at the time.

Loss

- [34] Consequently, the Court concluded that the activities ... do not constitute SR&ED activities within the meaning of the ITA.

Key Criteria Summary

2303 - ACBK Thermal Storage LOSS	
BENCHMARKS	**ACTIVITIES BY YEAR**
	2023
Patent searches: 1 patents	Activity 1
OBJECTIVES	**RESULTS**
Efficiency : 90 %	
VARIABLES	**CONCLUSIONS**
1 - Technological uncertainty	
basin orientations	
tank size	
water temperatures	
	METHODS
Analysis	5
Trials	4
Prototypes	1
Lines of code	
	COSTS
Hours	700
Materials $	$ 10,000
Subcontractor $	$ 5,000

HOW TO TURN JUDGEMENT TO A WIN

Get **expert opinions or testimony**

- e.g. testimony from **Marc Brunet** (“Mr. Brunet”), of the Center de recherche industrielle du Québec **(“CRIQ”),**
- who had contacted Mr. Roy to to ask him if he could improve Mr. Laperle's system.

Perform more detailed prior art review

- for example review of initial patent &
- correlation of current analysis to issues cited

Patent – original design / devices

Patents

hydrodynamic system for the energy-efficient &

← Back to results ✎ (hydrodynamic system for the energy-efficient &); Inventor: laperle;

Hydrodynamic systems for the energy efficiency of a building, construct

Abstract translated from French

Hydrodynamic systems for the energy saving assistance of a residential, commercial and / or industrial building comprising at least one hydrodynamic basin proportional to inertial force, a device for the recovery and redirection in said hydrodynamic basin of a recovered liquid, a device for evacuation of the liquid thermal mass to the outside of the building and / or to the sanitary elements of said building; and a device allowing heat exchange between the liquid thermal mass present in the storage element of said hydrodynamic basin and the heating and / or refrigeration elements present in said building. These systems are constructed in particular by implementing known techniques and are used to reduce the consumption of drinking water and / or as an additional water reservoir useful in particular in the event of a fire.

CA2685857A1

Canada

Download PDF Find Prior Art Similar

Other languages: French

Inventor: Dominic Laperle

Current Assignee : Individual

Worldwide applications

2009 ~~CA~~

Application CA2685857A events

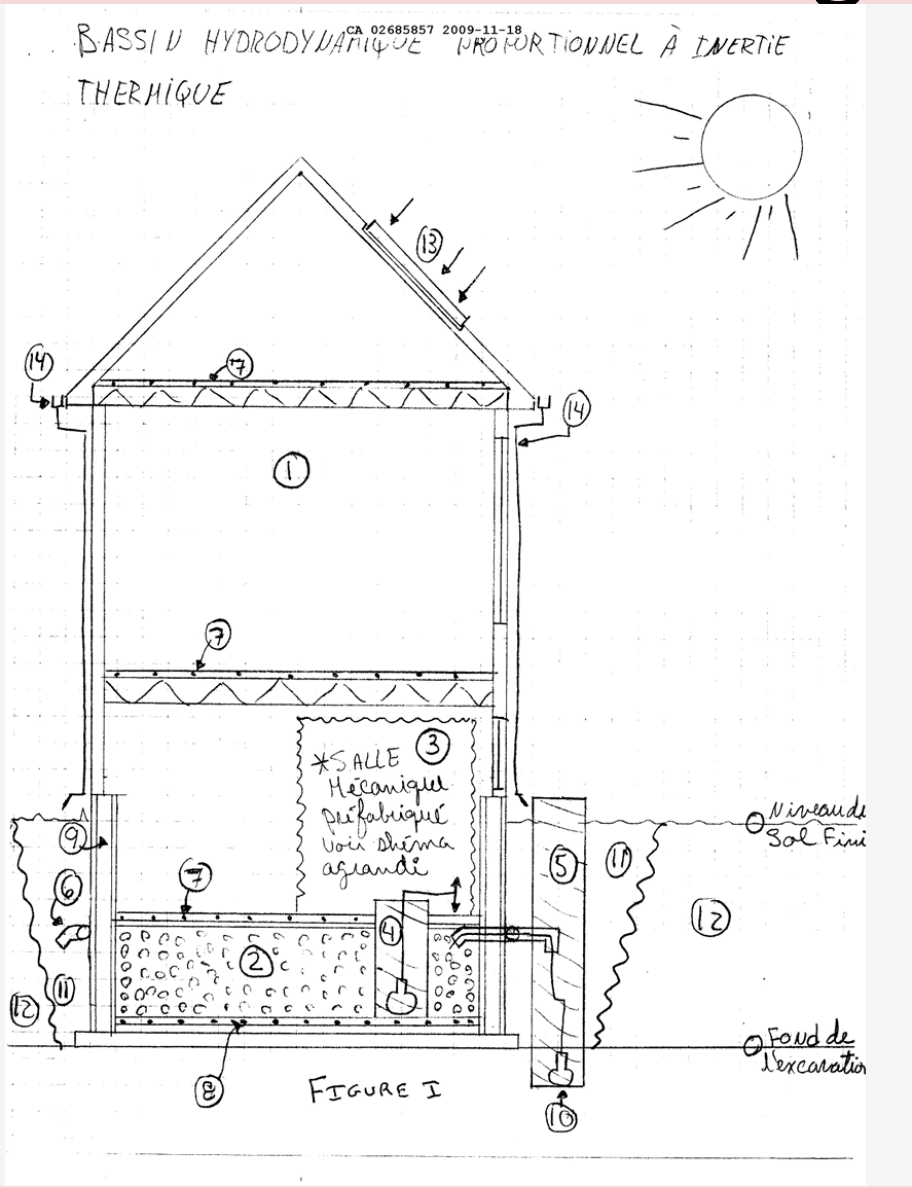
2009-11-18	Application filed by Individual
2009-11-18	Priority to CA2685857A
2011-05-18	Publication of CA2685857A1
Status	Abandoned

Could review cited patents

Similar Documents

Publication	Publication Date	Title
EP2005069B1	2018-01-10	Device for heating, cooling and producing domestic hot water using a heat pump and low-temperature heat store
DK2614330T3	2015-07-06	STORAGE CONTAINER DEVICE FOR AN ENERGY STORAGE SYSTEM AND ENERGY STORAGE SYSTEM WITH A STORAGE CONTAINER DEVICE
EP2622209B1	2016-06-08	Method and facility for producing backup electrical power
JP2007333295A	2007-12-27	Heat storage system
US20020179298A1	2002-12-05	Air-conditioning system with thermal storage
US10024550B2	2018-07-17	Energy efficient thermally dynamic building design and method
US8595998B2	2013-12-03	Geosolar temperature control construction and method thereof
JP2007333296A	2007-12-27	Heat storage system
EP2805116A1	2014-11-26	Cooling system for a building with low energy consumption
FR2511133A1	1983-02-11	SOLAR ENERGY COLLECTOR WITH INTEGRATED HEAT ACCUMULATOR AND RADIATOR
JP4360690B1	2009-11-11	Rainwater infiltration type underground heat exchange system
FR3065976A1	2018-11-09	ABOVE GROUND POOL

Fig. 1 – overview diagram



Patent Elements – energy efficient house

Important elements of house in connection with installation of a system hydrodynamics identified in **FIG. 1 following devices and equipment**:

- 1- building with wall, roofs & fenestration **oriented** most possible **south**;
- 2- the **hydrodynamic basin with thermal inertia containing stones of 5/4 from inches to 21/2 inche**s and in which the **water level is equal to the overflow**, to a temperature between **35 and 65 degrees** Fahrenheit;
- 3- the **mechanical room** containing, a water pump, a circulator, a compressor of refrigeration, exchanger tank, high velocity central ventilation and one air exchanger, **all prefabricated;**
- 4- **access sump** inside mechanical room for exchange hydrodynamics;
- 5- **external sump** to accommodate surface water & water from tablecloth if necessary depending on the **type of soil**;
- 6- overflow of evacuation;
- 7- **thermal slab** in basement and on floors **for distribution of heater hydronic** or for accumulated **heat transfer**;

Patent Elements - Can we identify "System Uncertainties"

- 8- the **thermal slab** at the bottom of the basin to add to the system of refrigeration;
- 9- the **foundation** in prefabricated high performance formwork for a control of internal temperature;
- 10. **submersible pump** for rainwater control inside basin;
- 11. self reworked around perimeter of permeable building;
- 12. **undisturbed soil** during excavation;
- 13. solar **thermal panel in connection** with water **heat exchanger** hot and **thermal slab bottom basin**; and
- 14. outdoor stormwater **catchment** to maximize level of accumulated water.

Performance of existing patent Use to benchmark improvements

home located in Quebec, at Saint-Césaire, has

- a living **space of 493 m3**,
- **standard 95** thermal insulation Canada Building Code
- solar system of **6** Stieble Eltron type **solar panels**,
- **each panel capacity 6,000 to 9,000 Btu**, 1,800 to 2,700 Watts.
- year of operation, **electricity saving of 45% to 50%** recorded.
- a **saving in drinking water** from **95%.**

4) Mold Leaders – LOSS
Mold design

Analysis Tax Court of Canada judgment of MOLD LEADERS INC., Appellant, and HIS MAJESTY THE KING, 2023 TCC 127, August 21, 2023,

Issue(s):

- Evidence of advancement & systematic investigation

Relevant legislation and analysis:

- ITA 37 & 248(1)

Facts - 8 SR&ED Projects

In the relevant years of 2016 and 2017, ML engaged in approximately 320 projects brought to it by customers.

- projects not carried on with SRED in mind.
- eight of these projects claimed for SRED and are at issue in this appeal.

For illustrative purposes we will examine first of the 8 projects then

- summarize basis for judges denial of the claim

Principal Investigator background

[9] Mr. David Duong was primary witness for the appellant, ML.

- He is ML's owner & president.
- Following high school, graduated two-year mechanical technician program at Humber College in Toronto.
- learned CAD/CAM design and CNC machining.

[10] Mr. Duong worked for five years with a company that introduced him to mold making, and where he became head of the CNC machining department.

[11] He moved from there to a newly established company that grew quickly in the business of mold making.

- In 2002 Mr. Duong started his own mold maker company, the appellant, ML.

Client expert witness – not involved / objective ?

[52] ML called one witness, Mr. Amit Saini.

- He is a professional engineer and certified professional accountant.
- president of National R&D Inc. (National R&D).
- Neither he nor National R&D had any involvement with the subject projects while being worked on by ML.

Expert witness not allowed

The judge noted:

- [54] I note also that as its first witness in this matter ML called an individual seeking his acceptance as an expert witness knowledgeable of the plastic injection molding industry.
- A voir dire was conducted on the first day of the hearing into whether he could be accepted as an expert.
- I rendered an oral decision finding based on the voir dire that the individual did not have sufficient background in the plastic injection molding industry to be qualified as an expert in that industry

Trial & Error vs. Systematic Investigation

[19] In answering what was achieved, Mr. Duong did not identify a technological advance.

- Of note also is ML counsel's reference to the ML work as, "all this trial and error".

Four cavity mold - Technological Objectives

Project 1: commenced 2016 contract with customer, Dynaplas,

- for ML to **design and make a 4-cavity mold**
- for **production of a particular valve** in anti-lock braking systems automotive industry.

[16] The mold was to open and eject the part once solidified.

- Initially H13 steel was used for making the mold.
- **part was plastic** but **hardened with 30 percent glass**, which made the **plastic harder** than ML was used to.
- The **first mold made with H13 steel was not acceptable.**
- testing revealed that it **misaligned after a short period**.
- agreed W360 steel use higher hardness rating than H13 steel.
- ML did not have experience with W360 steel.
- obtained W360 steel from a European company.

Technology or Knowledge Base Level:

- Not defined

Technological Uncertainty (TU)

[17] ML had to learn to work with W360 steel, with which it was unfamiliar.

- W360 steel harder to cut and grind (mill).

.

Experimentation & Result

- eight versions of mold tested by customer
- sent back to ML six times with comments for improvement.
- Ultimately, a mold was accepted

Knowledge gained – any?

[18] ML's counsel, in examination of Mr. Duong, asked what ML achieved "in terms of technology" through work on this project:

- Q: But in terms of technology, what did you advance?
- A: So we learned that the **hard milling processing - - it's just like a science,** you put too many - - so many things together then you can achieve it.
- Q: what did you anticipate the problems being versus what the problems were? How hard was it relative to what you anticipated?
- A: **We did not expect these issues. So we learned in a hard way**
- Q: You learned the hard way?
- A: Yeah.

Judges ruling & Rationale

The judge commented;

[59] Here there was **not evidence as to the overall industry state of knowledge** in the context of any of the eight projects.

[60] The **fact that no evidence** was called as to the state of knowledge in the mold making industry generally made it **difficult to know** if and **when a "challenge" for ML did or did not** constitute a **technological risk or uncertainty.**

[68] The appeal will be **dismissed, with costs.**

Key Criteria Summary

2304 - Mold Leaders Mold designs LOSS	
BENCHMARKS	**ACTIVITIES BY YEAR**
	2023
Internet searches: 1 Articles	Activity 1
OBJECTIVES	**RESULTS**
units before misalignment: 10000 cycles Hardness: 55 hrc	
UNCERTAINTIES & KEY VARIABLES	**CONCLUSIONS**
1 - Technological uncertainty	
	METHODS
Analysis Trials Prototypes Lines of code	8
	COSTS
Hours	100
Materials $	$ 2,000
Subcontractor $	

Steps to become eligible – Sample Article on standard practices

CAB WORLDWIDE

Factors Affecting Machinability of Metals

Semih Genculu, P.E.

"Machinability" is not an exact term. It may be defined as the relative ease or difficulty of removing metal in transforming a raw material into a finished product with the desired dimensional requirements at the best cost. Since it is not an absolute material property, machinability means different things to different people. When one states that material A is more machinable than material B they may be referring to,

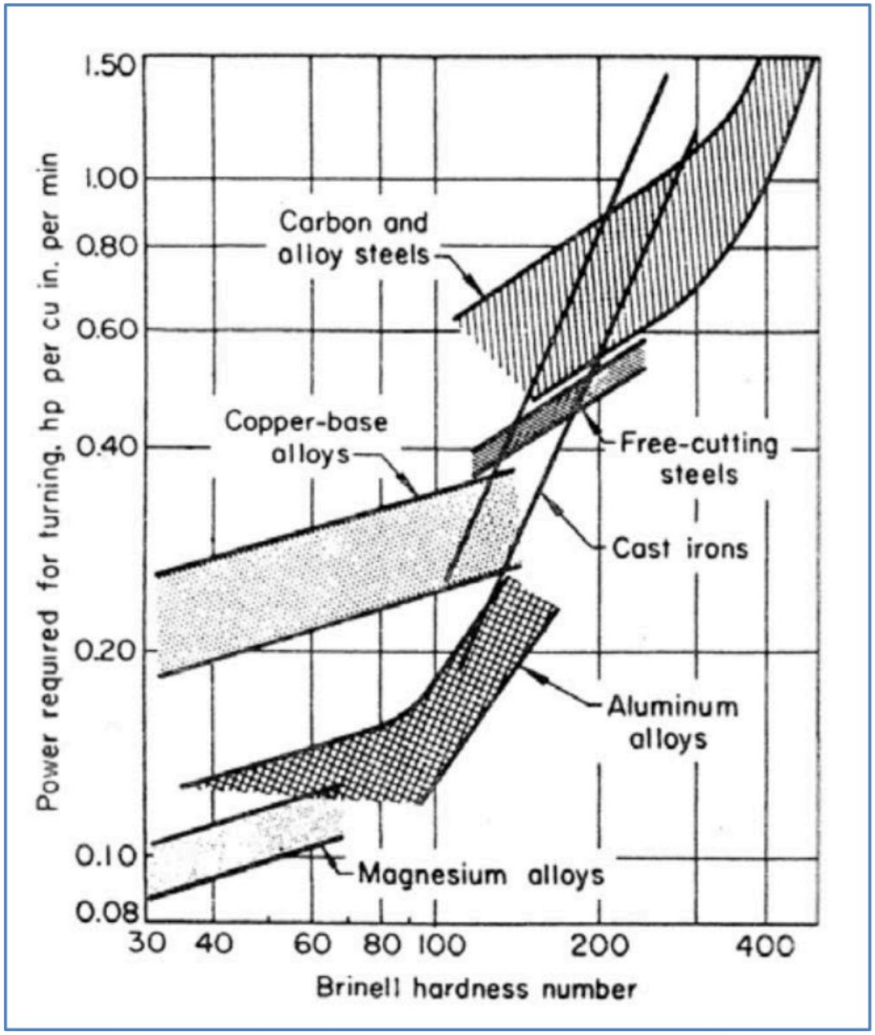
- Material A having longer tool life compared to B,
- Material A requiring lower cutting forces and power compared to B, or
- Material A providing better surface finish compared to B.

In general high hardness will lead to poor machinability, however many other factors affect machinability. Factors affecting machinability include tool material, feeds, speeds, cutting fluids, rigidity of the tool holding device, and the microstructure, grain size, heat treat condition, chemical composition, fabrication methods, hardness, yield and tensile strength of the work piece.

Steps to become eligible – JUDGING MACHINABILITY

- Depending on the application, **machinability** may be defined in terms **of tool wear rate, total power consumption, attainable surface finish** or other benchmarks.
- Machinability depends **on the joint influences of a large number of factors,** many of which are quite complex.
- For example, machinability is certainly closely linked to the **physical and mechanical properties of the workpiece.**
- As shown in the figure **(next slide) hard, brittle metals being generally more difficult to machine than soft,** ductile ones.
- However, very **ductile metals**, such as pure copper, stainless steels and some aluminum alloys tend to **form long stringy chips,** which makes them **difficult to machine.**
- Machinability is also strongly dependent on **the type and geometry of tool** used,
  - the **cutting operation**,
  - the machine tool,
  - **metallurgical structure** of the tool and workpiece,
  - the **cutting/cooling fluid**, and
  - the machinist's skill and experience.

Machinability issues by hardness



Influence of workpiece hardness on machinability
(ASM Handbook, 8th ed. Vol.3)

Recommendations

- Had the company done background research on these issues
- they may have been able to identify areas of “technological uncertainties” beyond “standard practice”
- And provide this to the judge

5) Daves Diesel – LOSS
Fuel injector refurb

This analysis based on the Tax Court of Canada judgment of Dave's Diesel Inc. v. The Queen

- Date 2022-06-10 2022 TCC 62

Issue(s):

- Evidence of advancement & systematic investigation

Relevant legislation and analysis:

- ITA 37 & 248(1)

History of firm

- [8] Mr. Dave's father established the Appellant's business in Brampton, Ontario a decade before starting the project. Although Mr. Dave described the Appellant **as a fuel injection shop for the diesel engine industry**, it was not a mechanic shop as no mechanics worked there.
- [9] Before starting the project, the Appellant remanufactured components of used mechanical fuel injection systems for dealers under warranty programs offered by the manufacturers of the injectors.

Nature of work

- The Appellant went about remanufacturing components of used mechanical fuel injectors in the following way:
- The process was to receive the component from an engine shop, like the dealership, then we would disassemble it, do an assessment of its failures, and then reassemble it with brand new components, and put it on a test stand to recalibrate [it] to [the] provided manufacturer specifications.

Principal Investigator background

- [6] The Appellant called Mr. Rushi Dave as its only witness. Mr. Dave was General Manager of the Appellant in 2013 and 2014. He was one of four individuals who worked on the project.
- [7] Mr. Dave did not study mechanical engineering and has no degree, certificate or designation in the field. However, he did study business and marketing and worked for a large advertising, marketing, and public relations firm before joining the Appellant 15 years ago.

Objectives

[11] The Appellant set out to find a way to remanufacture injectors on its own.

Those injectors were found in diesel-powered trucks, generators, marine equipment, and construction and farm equipment. The Appellant studied three types of injectors as part of the project:

- (a) Delphi 4 Pin (an electronic fuel injector used in certain Volvo diesel engines);
- (b) C7 (an electronic fuel injector used in certain Caterpillar diesel engines); and
- (c) ISX (a mechanical fuel injector used in certain Cummins diesel engines).

Technology or Knowledge Base Level:

- **No analysis provided**

Technological Uncertainty (TU)

[26] The Appellant says that the relevant "technological uncertainty" was **whether it could successfully develop** a process to remanufacture the three different types of injectors.

Note: scientific vs. system uncertainty

Experimentation & documentation

[21] Most of the **diary entries are rather concise**. The following are some of more **descriptive ones** (square brackets indicate type of injector tested):

January 4, 2013

- Broke [Delphi 4 Pin] injector trying to understand how it comes apart.

January 23, 2013

- Purchased and tested 12 [C7] cores and found all to be operating differently and having leaks from different sections of injector.

February 25, 2013

- Received prototype [C7 adapter] from machine shop and installed. The thinner O-ring would not stand up to the pressure and kept breaking.

March 6, 2013

- Continued [ISX] trials and documenting results. Not ideal and still not operating as expected. No atomization.

Experiment notes - continued

March 15, 2013

- Used a thin steel punch and applied pressure from the top of the [Delphi 4 Pin] injector and popped out the terminal insulating sleeve and seal.
- …….

September 12, 2013

- Run [Delphi 4 Pin] trials with different shim thicknesses.

September 25, 2013

- Spring pressure trials [Delphi 4 Pin].

SR&ED documentation –

- [23] As Mr. Dave presented his oral evidence, he showed the Court a series of colour photographs illustrating the machines and tools used in the project.

Judges comment on documents

[44] Take the shim thickness test of September 12, 2013 or the spring pressure test of September 25, 2013 as examples.

- **What shim thicknesses were tested**? What were the results of each test? Which shim thicknesses passed the test?
- What was the **standard selected** for passing the test?
- For the spring pressure test, **what pressures** were applied and for **how long**? What were the results of each test at each pressure and for each duration? At what pressure, and at **what point, did each spring fail**?
- There is **no record** of the answers to these questions.

DAVE'S DIESEL

C7 / C9

HEUI Injector Output Comparison – Data for HI 2000 Test Stand

TAX COURT OF CANADA
COUR CANADIENNE DE L'IMPÔT
EXHIBIT PIECE A-2
NAME OF EXHIBIT: DAVE'S DIESEL INC. HMQ
DATE: MAY 10 20 12
COURT REGISTRAR - GREFFIER DE LA COUR
FILE NO. / Nº DE DOSSIER 2012-1698(IT)G

RPM	Pulse Width	ICP	1	2 XXXX	3	4 XX	5	6	7	8
~~600~~	~~2~~	~~600~~								
600	2.5	600	6	2	6.5	5	8			
700	2.5	750	9.5	7	10	0	12			
2000	2	1100	7.5	0	2	2.5	8.5			
2500	2	2100	10.5	0	4.5	8	13			
~~3600~~	~~1.5~~	~~1200~~								
2000	1.9	2450	10	2	9	5	12			
3000	2.5	2450	30	4	28	16.5	29.5			
3000	3.5	2500	48	0	45	32	48			

Does not operate @ parameter.

Diesel Leaking From Port

Does not operate @ this parameter.

Valve sticking

Valve sticking

*Basic Settings:
Strokes: 500
Fuel Supply Pressure: 60 PSI
Test Fluid Temperature: 40° C
Leak Test Pressure: 1100 PSI

Date: MAR 21 '13

Customer Name: INTERNAL

Injector Part#: 10R4761 – CAT C7

Judges Analysis

- Was a detailed record of the hypotheses, tests, and results kept as the work progressed?
- [43] The Appellant has not satisfied its onus to demonstrate that it recorded, in respect of any particular test performed in 2013 and 2014

TU vs. routine engineering

- Was there a **technological risk or uncertainty** that could not be removed by routine engineering or standard procedures?
- "**routine engineering**" describes techniques, procedures and data that are generally accessible to **competent professionals in the field**.

- [27] The fact that a small group of **non-engineers and non-mechanics,** including two unskilled labourers, **did not know whether they could remanufacture** three types of used fuel injectors tells us **nothing about whether** it was **"technologically uncertain**" that those fuel used injectors could have been remanufactured by a competent professional in the field.

Judges ruling & Rationale

[29] The **onus was on the Appellant** to demonstrate that it was "**technologically uncertain"** that the used fuel injectors could have been remanufactured **by a competent professional in the field – a mechanical engineer,** for example.

[30] There was no evidence that taking a fuel injector apart without breaking it was anything other than "routine engineering" for such a professional.

- Similarly, there was no evidence that **understanding how the fuel injectors worked** was **anything but "standard procedure"** for a competent professional in the field.

Key Criteria Summary

2305 - Daves Diesel - injector design LOSS	
BENCHMARKS	**YEAR**
	2023
(none)	Activity 1
OBJECTIVES	**RESULTS**
remanufacture injectors: 3 number	0
UNCERTAINTIES & KEY VARIABLES	**CONCLUSIONS**
1 - Technological uncertainty	
shim thickness	
spring pressure	
	METHODS
Analysis	
Trials	22
Prototypes	3
Lines of code	
	COSTS
Hours	100
Materials $	$ 2,000
Subcontractor $	

6) JEC – LOSS
Welding Industry

Analysis of Tax Court of Canada judgment of JEC Distributors Inc. v. The King 2022-12-28 2022 TCC 170

Issue(s):

- Evidence of advancement & systematic investigation

Relevant legislation and analysis:

- ITA 37 & 248(1)

Facts

[1] The Appellant is a manufacturer and distributor of products for the auto industry. It primarily **focuses on welding products** and technology. The Appellant is what is known as a Tier 2 manufacturer.

[2] When the Appellant filed its tax return for its taxation year ending September 30, 2016, it claimed scientific research and experimental development expenditures of $91,537 in respect of three different projects.

The Minister of National Revenue denied that claim and the Appellant has appealed.

Principal Investigator background

- [3] Three of the Appellant's employees testified: Joe Ruggiero, Paul Lichaa, and Bill Dodge. **(no technology backgrounds?)**
- I found each of them to be credible witnesses. They provided very helpful descriptions of the Appellant's work and the work involved in the projects in question.

CRA witness

[4] I also heard the testimony and cross-examination of Jason Sousa from the Canada Revenue Agency. I found him to be a credible witness but his evidence was of little assistance to me.

Data Link Flow Monitor
Technological Objectives

[9] The first project was called the “Data Link Flow Monitor”. The Appellant’s witnesses explained that the Appellant’s welding guns have two welding tips that close over the metal to be welded like a jaw.

[11] The purpose was to develop a **system of sensors** that could be **applied to each welding gun** to monitor the flow and temperature of the water to that gun.

[14] Appellant believed that, **if it could gather enough data** from the welding guns, it **could develop algorithms** that would help **to predict when a problem** was going to arise.

This would allow the Appellant’s customers to anticipate problems and possibly fix them before they happened.

Technology or Knowledge Base Level:

- approached 1 supplier of flow monitoring methods

Technological Uncertainty (TU)

- Appellant believed that a system that monitored **each gun individually** would allow its customers to pinpoint which gun in the welding cell was causing a problem and thus reduce the amount of shut down time.
- [13] To gather data from each gun, the Appellant also needed to find **a way to connect each welding gun's temperature and flow monitors to the customers' manufacturing computer systems**, preferably using Ethernet connections.
- This presented challenges because **different customers operated different systems**.

Experimentation

[15] The witnesses explained that the Appellant tested a **number of different sensors** to monitor flow and temperature. It kept changing the technologies until it found something that it thought would work not only in the lab but also on the manufacturing line.

[16] After encountering problems with standard flow monitoring technology, the Appellant **asked a company with expertise in flow monitoring** to develop a **custom solution** for them.

However, it had **problems connecting** those monitors to the customer's systems because it could not get access to the relevant **proprietary software**.

Results

[17] Ultimately, the **biggest problem** for the Appellant was that there was a lot of **electrical noise** on the manufacturing line and it interfered with the sensors. This electrical noise is **well known to be an issue** with resistance welding.

[18] The Appellant also found that **the sensors could not withstand the dirt** and contamination present in a welding cell.

Finally, there were challenges with **communication protocols**. The Appellant had problems finding a way of **sending so many different signals** to and from the welding cell at the same time **without slowing down the other communications** that need to happen on the line.

[19] To date the Appellant has been **unable to overcome** any of the above problems

Judges Analysis

[22] it is **not enough** for the Appellant to prove that **it could not remove the risks** and uncertainties through routine engineering or standard procedures. The test is an **objective test, not a subjective** test. The Appellant must show that the **risks could not be overcome by** routine engineering or standard procedures generally accessible to **competent professionals** in the field. The Appellant **did not do so**.

[23] The Appellant's expertise is in welding technology. I **have no way of knowing**, for example, whether an **electrical engineer or even a skilled electrician** could have proposed a **routine solution to prevent the electric noise** from reaching the sensors.

Similarly, I have no way of knowing **whether a computer engineer** or a technician with networking expertise could have **employed standard networking procedures** to connect the sensors to the Appellant's customers' networks.

Judges ruling & Rationale

- [24] Based on all of the foregoing, I find that Project 1 does not meet the first test.

- [25] I note that, as the Appellant **never proceeded to the stage of attempting to develop algorithms**, I have not considered whether that part of Project 1 would have met the first test.

Key Criteria Summary

2306 - JEC Distributors - welding LOSS	
BENCHMARKS	**YEAR**
Suppliers: 1 products	Activity 1
OBJECTIVES	**RESULTS**
Sensors (per gun vs per cell): 12 number	
UNCERTAINTIES & KEY VARIABLES	**CONCLUSIONS**
1 - Technological uncertainty	
communication protocols	
electrical noise mitigation	
	METHODS
Analysis	12
Trials	7
Prototypes	
Lines of code	5000
	COSTS
Hours	150
Materials $	$ 2,000
Subcontractor $	$ 5,000

Implications

- Recurring theme
  - Importance of benchmarking standard practice
  - Ideally have BSc or equivalent
  - In relevant field of science
  - If multiple fields (e.g. mechanical and software) need to choose most significant / relevant

7) Anne-Marie Chagnon Corp. Jewelry production - LOSS

- Jewelry manufacturer claiming work on mold development
- Ms. Gutierrez (claimant) admitted she had no knowledge in the field of molding …therefore at the learning stage.
- Result work deemed “routine technical studies" or "usual procedures" known to "competent specialists in this field"

8) 9158-1629 QUEBEC INC., LOSS

2 projects

– Vending machine using propane vs. electricity

– Machine to manufacture rolls & reduce costs

[10] Almost all expenses incurred on two projects **paid to firm Automation Machine Design who did the work**.

[28] **no detailed** testimony or **documentation** demonstrate **appellant, or Automation Machine Design,** i) **systematically formulated assumptions** specifically aimed at **overcoming uncertainties**, …

9) Coopers Park Real Estate

[1] "Minister") reassessed the 2007, 2008 and 2009 taxation years of Appellant

- to apply the general anti-avoidance rule (the **"GAAR") to deny** loss carryforwards, **investment tax credit carryforwards and SR&ED pool**

[21] Appellant submits not for Minister to determine whether a document is relevant.

Judge agreed & granted extension to provide relevant info.

Welcome questions or feedback

Presenters:

Justin Frape, BSc.
justin.frape@gmail.com

David Sabina, CPA, MBA
dsabina@meuk.net