

Part 2 - Project information (continued)

Please see D-1.1 - D-1.2 for full Project Description

Complete a separate Part 2 for each project claimed this year.

Section A – Project identification

200 Project title (and identification code if applicable)
801 - improved compounding equipment

202 Project start date **204** Completion or expected completion date **206** Field of science or technology code (See guide for list of codes)
2.03.01 Mechanical engineering

Project history

208 1 Continuation of a previously claimed project **210** 1 First claim for the project

218 Was any of the work done jointly or in collaboration with other businesses? 1 Yes 2 No

If you answered **yes** to line 218, complete lines 200 and 221.

220	Names of the businesses	221	BN
1			

The work was carried out (check any that apply)

222 1 By analysis only **226** 1 In a commercial plant or facility

223 1 In a laboratory **228** 1 Others, specify **229** _____

224 1 In a dedicated research facility

Purpose of the work

230 1 To achieve technological advancement for the purpose of creating new or improving existing materials, devices, products or processes. (Go to Section B – Experimental development)

232 1 For the advancement of scientific knowledge (Go to Section C – Basic or applied research)

Section B – Experimental development

The technological advancement you are trying to achieve with this work will result in:

	Materials, devices, or products	Processes
The development of new	235 1 <input type="checkbox"/>	236 1 <input type="checkbox"/>
The improvement of existing	237 1 <input checked="" type="checkbox"/>	238 1 <input type="checkbox"/>

240 What technological advancements were you trying to achieve? (Maximum 35 lines)

Scientific or Technological Objectives:
The key Performance measures as follows:

Objectives:	Existing benchmark	Units of measure	Performance
objective			
Temp variance:	+/- 5	- Deg C	- +/- 2
Output:	100	- output/minute	- 120
Shear:	10	- tons /sq. inch	- 12
Dispersivity:	1	- mm	- 0.5

Most notably temperature control tolerance needed to be improved by over 100%

Technology or Knowledge Base Level:
Benchmarking methods & sources for citings:
Similar prior in-house technologies: 3 products / processes examined -
The product was an improvement to our proprietary "Gelimat" plastic molding process and related machinery

240 What **technological** advancements were you trying to achieve? (*Maximum 35 lines*)

Internet / Google Searches: 33 sites & 18 articles reviewed - Identified issues on mix variation effects on temperature + limits of thermocouples
 Patent searches: 2 patents examined - 2 method to use thermocouples for control process - neither applicable our environment
 Potential components: 14 products examined - 14 proecuts from 4 different thermocouple suppliers and differences in performance
 Queries to experts: 2 responses - Spoke with 2 machine designers to identify alternate control methods. Identified limits with respect to control strategies using themocouples and related alternatives.

242 What **technological** obstacles did you have to overcome to achieve those advancements? (*Maximum 35 lines*)

Uncertainty #1: Temperature control
 Although mechanical development such as changes in the angles of the rotating blades and increased speed permitting timely fluxing of most plastics without any external application of heat has been explored, uncertainty remained as to practical ways to sense and control the temperature. A fraction of a second too long near the fluxing point could lead to an increase of over 50 C, and hence the potentially catastrophic degradation of plastics such as P.V.C.

The key variables in question were:

- Vibration
- Optimal measurement devices & locations

244 What work did you perform **in the tax year** to overcome those technological obstacles? (Summarize the systematic investigation) (*Maximum 70 lines*)

Activity #1-1: Thermocouples
 Description of work performed in Fiscal Year 2008:
 Experimentation method: Number of tests - Explanatory notes: justification of sample size

Analysis / simulation 12 alternatives - Examined 12 alternate configurations of Thermocouples & vibration techniques

Process trials 36 runs - Performed 3 runs at differing pressures for each of the 12 alternate configurations

All trials were recorded in a test matrix.
 Conclusions:
 Attempts at control by techniques such as by vibration and by thermocouples proved inadequate.

The result of this work provided Conclusions with respect to variables of:

Vibration & Optimal measurement locations

Activity #1-2: Fibre Optic system
 Description of work performed in Fiscal Year 2008:
 Experimentation method: Number of tests - Explanatory notes: justification of sample size

Analysis/simulation 1 alternative - Identified a potential system using fibre optics

Process trials 5 runs/samples - Performed 5 runs at differing pressures

Perform meas.:	Exist benchmark	-Units meas.	-Perform object.	-Result Vs. Expect
Temp variance	+/- 5	- Deg C	- +/- 2	- +/- 2 - Met
Output	100	- output/minute	- 120	- 112 - 60% met

244 What work did you perform in the tax year to overcome those technological obstacles? (Summarize the systematic investigation) (Maximum 70 lines)

Dispersivity	1	-	mm	-	0.5	-	0.6	-	80% met
Shear	10	-	tons /sq. inch	-	12	-	13	-	> 10%

Conclusions:
This new mixing technology proved successful for the compounding of P.V.C. and other shear-sensitive and/or temperature-sensitive plastics if deployed properly [IDEALLY WE WOULD QUANTIFY THIS FURTHER] within the system.

Section C – Basic or applied research

250 Describe the scientific knowledge that you were trying to advance. (Maximum 35 lines)

252 Summarize the work performed in the tax year, and explain how that work contributed to the advancement of scientific knowledge. (Summarize the systematic investigation) (Maximum 70 lines)

Section D – Additional project information

Who prepared the responses for Section B or Section C?

253	1 <input checked="" type="checkbox"/> Employee directly involved in the project	254 Name	Issac Newton
255	1 <input type="checkbox"/> Other employee of the company	256 Name	
257	1 <input type="checkbox"/> External consultant	258 Name	259 Firm

List three key employees directly involved in the project and indicate their qualifications.

260	Names	261	Qualifications/experience and position title
1	Al Einstein		PhD/ Physics
2	Issac Newton		M.Asc/Mechanical Engineering
3	Nick Tesla		CET/Electrical Technology

265 Are you claiming any salary or wages for SR&ED performed outside Canada? F-2 1 Yes 2 No

266 Are you claiming expenditures for SR&ED carried out on behalf of another party? 1 Yes 2 No

267 Are you claiming expenditures for SR&ED performed by people other than your employees? 1 Yes 2 No

If you answered **yes** to line 267, complete lines 268 and 269.

268	Names of individuals or companies	269	Social Insurance Number or Business Number
1	ABC Motor Engineers		
2	MEUK Testing Labs		
3			

I-0

What evidence do you have to support your claim? (Check any that apply)
You do not need to submit the evidence with the claim. However, you are required to retain them in the event of a review.

270 1 <input type="checkbox"/>	Project planning documents	276 1 <input type="checkbox"/>	Progress reports, minutes of project meetings
271 1 <input checked="" type="checkbox"/>	Records of resources allocated to the project, time sheets	277 1 <input checked="" type="checkbox"/>	Test protocols, test data, analysis of test results, conclusions
272 1 <input type="checkbox"/>	Design of experiments	278 1 <input type="checkbox"/>	Photographs and videos
273 1 <input type="checkbox"/>	Project records, laboratory notebooks	279 1 <input type="checkbox"/>	Samples, prototypes, scrap or other artefacts
274 1 <input type="checkbox"/>	Design, system architecture and source code	280 1 <input type="checkbox"/>	Contracts
275 1 <input type="checkbox"/>	Records of trial runs	281 1 <input type="checkbox"/>	Others, specify 282 _____

Section E – Project cost

Project expenditures claimed in the year:

285 Salary or wages		104,583 \$
286 Materials consumed and transformed	D-0	20,000 \$
287 SR&ED contracts		45,000 \$
289 Overhead and other expenses (if you use the traditional method in Part 3)		\$

Please see D-2.1 - D-2.3 for
full Project Description

Part 2 - Project information (continued)

Complete a separate Part 2 for each project claimed this year.

Section A – Project identification

200 Project title (and identification code if applicable)
802 - New database method

202 Project start date **204** Completion or expected completion date **206** Field of science or technology code
 (See guide for list of codes)
 2008-02 2008-09 1.02.03 Software (hardware developmen
 Year Month Year Month

Project history

208 1 Continuation of a previously claimed project **210** 1 First claim for the project

218 Was any of the work done jointly or in collaboration with other businesses? 1 Yes 2 No

If you answered **yes** to line 218, complete lines 200 and 221.

220	Names of the businesses	221	BN
1			

The work was carried out (check any that apply)

222 1 By analysis only **226** 1 In a commercial plant or facility
223 1 In a laboratory **228** 1 Others, specify **229** _____
224 1 In a dedicated research facility

Purpose of the work

230 1 To achieve technological advancement for the purpose of creating new or
 improving existing materials, devices, products or processes.
 (Go to Section B – Experimental development) **232** 1 For the advancement of scientific knowledge
 (Go to Section C – Basic or applied research)

Section B – Experimental development

The technological advancement you are trying to achieve with this work will result in:

	Materials, devices, or products	Processes
The development of new	235 1 <input type="checkbox"/>	236 1 <input type="checkbox"/>
The improvement of existing	237 1 <input type="checkbox"/>	238 1 <input checked="" type="checkbox"/>

240 What **technological** advancements were you trying to achieve? (Maximum 35 lines)

Scientific or Technological Objectives:
 [AUTHOR'S NOTE: THIS PROJECT DESCRIPTION IS BASED ON THE CRA'S EXAMPLE OF AN
 ELIGIBLE PROJECT FROM THEIR SR&ED SOFTWARE DEVELOPMENT INDUSTRY GUIDELINES:
 INFORMATION CIRCULAR 97-1.]

To develop and implement a new data basing method in order to double the speed
 of the database currently achieved in Version 3.5 of our "property record
 management system."

Technology or Knowledge Base Level:
 XYZ Co. has developed a proprietary DMS (database management system) as part
 of their PRMS (property record management system) product. The DMS works well
 with small data sets, but has excessive access times (>30 seconds) with large
 databases (>1 gigabyte).

[AUTHOR'S NOTE: THIS EXPLANATION OF STANDARD PRACTICE SHOULD ATTEMPT TO
 OUTLINE "READILY AVAILABLE INFORMATION" ON THE TOPIC CONSIDERED AND IDENTIFY
 THE BOUNDARIES OF "KNOWN" AND "UNKNOWN" VARIABLES. THESE IN TURN FORM THE
 BASIS OF THE "TECHNOLOGICAL UNCERTAINTIES". THIS INFORMATION IS USEFUL IN
 HELPING THE AUDITOR TO EVALUATE THE COMPANY'S "TECHNICAL QUALIFICATIONS" WITH

240 What **technological** advancements were you trying to achieve? (*Maximum 35 lines*)
RESPECT TO THE TECHNOLOGIES IN QUESTION.]

242 What **technological** obstacles did you have to overcome to achieve those advancements? (*Maximum 35 lines*)

Uncertainty #1: Relational Data Model Analysis - [Supporting Activity]
What kind of negative effects might result from using a relational data model with the DMS?

Uncertainty #2: Relational Environment Issues
How will using a data model designed for data communications in a relational environment affect performance?

Uncertainty #3: Relational Access + Packet Access Combination
How can we optimally combine relational and packet access against the same database to yield a minimum # of inefficiencies when processing tables in the DMS?

244 What work did you perform **in the tax year** to overcome those technological obstacles? (Summarize the systematic investigation) (*Maximum 70 lines*)

Activity #1-1 in Fiscal Year ending 2007-12-31: Literature Review
Description of work performed:
Conducted a literature review of relational data models. As a result we looked at 4 alternate data models.
Conclusions:
Discovered that relational data models could be inefficient when used in the DMS in some circumstances.

Activity #2-1 in Fiscal Year ending 2007-12-31: Data Communications Model Analysis
Description of work performed:
We experimented to determine if an existing data communications model could be adapted to achieve processing efficiencies, at the expense of additional storage space.
Conclusions:
Determined that a data communications model could achieve processing efficiencies.
This conclusion however uncovered a new uncertainty with respect to the optimal method to combine relational and packet access methods.

Activity #3-1 in Fiscal Year ending 2007-12-31: Model Comparison Tests
Description of work performed:
Conducted 7 comprehensive benchmark tests to compare performance between the two models.
Conclusions:
While some of the tables could be processed more efficiently if they were in packet form, others were best managed through relational techniques.

Activity #3-2 in Fiscal Year ending 2007-12-31: Hybrid Model Attempt
Description of work performed:
Experimentally employed a hybrid approach involving both relational and packet data management techniques in upgrading from PRMS 3.5 to 4.0. Created a prototype Data Model DMS with the intention of making it faster than the existing one.
Initial testing indicated that the new DMS was 75% faster than the existing DMS through use of the newly developed hybrid data access techniques.

Section C – Basic or applied research

250 Describe the **scientific** knowledge that you were trying to advance. (Maximum 35 lines)

252 Summarize the work performed **in the tax year**, and explain how that work contributed to the advancement of scientific knowledge. (Summarize the systematic investigation) (Maximum 70 lines)

Section D – Additional project information

Who prepared the responses for Section B or Section C?

253 1 <input checked="" type="checkbox"/> Employee directly involved in the project	254 Name Nick Teslas
255 1 <input type="checkbox"/> Other employee of the company	256 Name
257 1 <input type="checkbox"/> External consultant	258 Name 259 Firm

List three key employees directly involved in the project and indicate their qualifications.

260	Names	261	Qualifications/experience and position title
1	Nick Tesla		CET/Electrical technology
2			
3	F-2		

265 Are you claiming any salary or wages for SR&ED performed outside Canada? 1 Yes 2 No

266 Are you claiming expenditures for SR&ED carried out on behalf of another party? 1 Yes 2 No

267 Are you claiming expenditures for SR&ED performed by people other than your employees? 1 Yes 2 No

If you answered **yes** to line 267, complete lines 268 and 269.

268	Names of individuals or companies	269	Social Insurance Number or Business Number
1			

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272 1 <input type="checkbox"/> Design of experiments	278 1 <input type="checkbox"/> Photographs and videos
273 1 <input checked="" type="checkbox"/> Project records, laboratory notebooks	279 1 <input type="checkbox"/> Samples, prototypes, scrap or other artefacts
274 1 <input type="checkbox"/> Design, system architecture and source code	280 1 <input type="checkbox"/> Contracts
275 1 <input type="checkbox"/> Records of trial runs	281 1 <input type="checkbox"/> Others, specify 282

Section E – Project cost

Project expenditures claimed in the year:

285 Salary or wages	100,000 \$
286 Materials consumed and transformed	D-0 5,000 \$
287 SR&ED contracts	\$
289 Overhead and other expenses (if you use the traditional method in Part 3)	\$

Part 2 - Project information (continued)

Please see D-3.1 - D-3.3 for full Project Description

Complete a separate Part 2 for each project claimed this year.

Section A – Project identification

200 Project title (and identification code if applicable)
803 - Chemical - catalyst process improvement

202 Project start date **204** Completion or expected completion date **206** Field of science or technology code (See guide for list of codes)
1.04.06 Analytical chemistry

Project history

208 1 Continuation of a previously claimed project **210** 1 First claim for the project

218 Was any of the work done jointly or in collaboration with other businesses? 1 Yes 2 No

If you answered **yes** to line 218, complete lines 200 and 221.

220	Names of the businesses	221	BN
1			

The work was carried out (check any that apply)

222 1 By analysis only **226** 1 In a commercial plant or facility
223 1 In a laboratory **228** 1 Others, specify **229** _____
224 1 In a dedicated research facility

Purpose of the work

230 1 To achieve technological advancement for the purpose of creating new or improving existing materials, devices, products or processes. (Go to Section B – Experimental development) **232** 1 For the advancement of scientific knowledge (Go to Section C – Basic or applied research)

Section B – Experimental development

The technological advancement you are trying to achieve with this work will result in:

	Materials, devices, or products	Processes
The development of new	235 1 <input type="checkbox"/>	236 1 <input type="checkbox"/>
The improvement of existing	237 1 <input type="checkbox"/>	238 1 <input checked="" type="checkbox"/>

240 What technological advancements were you trying to achieve? (Maximum 35 lines)

Scientific or Technological Objectives:
 [AUTHOR'S NOTE: THIS SR&ED PROJECT IS BASED ON AN EXAMPLE DEVELOPED BY A CHEMICALS INDUSTRY CANADA REVENUE AGENCY (CRA) JOINT COMMITTEE ENTITLED, "CHEMICALS GUIDANCE DOCUMENT # 1 - SHOP FLOOR SR&ED" - THIS DOCUMENT IS AVAILABLE FROM THE SECTOR-SPECIFIC GUIDES ON THE CRA WEBSITE AT <http://www.cra-arc.gc.ca/taxcredit/sred/sector-e.html>]
 The primary technological objective of this project is to minimize catalyst batch-to-batch variability in order to increase the consistency of our resin. This will be achieved through the development of a correlation between catalyst fabrication conditions and the HDPE powder properties. For each batch the plant catalyst is tested on the lab-scale reactor. The powder properties (e.g. catalyst efficiency, bulk density, and powder morphology) will be correlated to the catalyst fabrication conditions. The information will be used to:
 (a) eliminate Lab Scale Reactor testing of catalyst batches by R&D personnel;
 (b) determine whether a batch is "in control" with respect to parameters of interest; if out of control, the batch will be scrapped;
 (c) predict the effect of catalyst batch on reactor operation and powder-drying system;
 (d) develop specific plans for improvements to catalyst fabrication hardware.

240 What **technological** advancements were you trying to achieve? (*Maximum 35 lines*)

A secondary objective was to successfully deploy a fibre optics probe and commission a new lab-scale reactor. The experimental work will require the application of these sophisticated tools to develop an empirical correlation between plant catalyst preparation conditions and polymer properties. This is the first such study of its kind in the shop-floor environment.

Technology or Knowledge Base Level:
The company currently experiences catalyst batch-to-batch variability in the consistency of our resin due to unknown variables between catalyst fabrication conditions and HDPE powder properties.

242 What **technological** obstacles did you have to overcome to achieve those advancements? (*Maximum 35 lines*)

Uncertainty #1: Modelling of catalyst fabrication conditions
From a technological point of view, it was not clear which catalyst fabrication conditions

- (such as metal ratio,
- zinc concentration,
- OH/Cl ratio)

would have an impact on the powder properties of interest

- (i.e. Catalyst efficiency,
- bulk density, and
- powder morphology)

or if there would be any statistically significant correlation of value for an empirically-based mathematical model.

[NOTE: OPTIMALLY THIS DESCRIPTION SHOULD QUANTIFY THE RANGES TESTED FOR KEY VARIABLES EITHER HERE IN THE UNCERTAINTY, OR IN THE CATALYST TEST TRIALS ACTIVITY]

244 What work did you perform in the tax year to overcome those technological obstacles? (Summarize the systematic investigation) (*Maximum 70 lines*)

Activity #1-1 in Fiscal Year ending 2007-12-31: Catalyst test trials
Description of work performed:

1. Plant catalyst tested on the new lab scale reactor
2. Powder properties (12, 110 and bulk density) were control charted using a computer program
3. Catalyst preparation conditions (i.e. metal ratio, Zn concentration, OH/Cl ratio) were also control charted
4. A preliminary correlation was developed
5. Improvements were made to the sampling system
6. Manufacturing installed a new meter to control the alkyl halide addition
7. Lab scale reactor bulk density and powder morphology information was used to predict drying problems in the unit

[NOTE: THIS DESCRIPTION SHOULD LIST:

- THE NUMBER OF TESTS PERFORMED AND - THE RANGES OF VARIABLES TESTED.
- ALSO THE CORRELATION DERIVED SHOULD BE BRIEFLY DISCUSSED, AND
- THE IMPROVEMENTS MADE AND REASONS FOR THESE IMPROVEMENTS.]

Conclusions:
Results from this project have provided us with a better understanding of which catalyst fabrication conditions (such as metal ratio, zinc concentration, OH/Cl ratio) would have an impact on the powder properties of interest (i.e. Catalyst efficiency, bulk density, and powder morphology). The information garnered from the various control charts was successfully used to plan the following years R&D and Manufacturing activities, e.g. new meters for catalyst raw material metering, increase frequency of side stream analysis, refinements to catalyst database, etc.

In addition, the preliminary database was used to successfully predict V100 efficiency and powder morphology, which is a significant technology advance within the company. We also learned that coarse lab scale reactor powders

244 What work did you perform in the tax year to overcome those technological obstacles? (Summarize the systematic investigation) (Maximum 70 lines)
often resulted in drying problems within the plant, based on the study which showed correlations between various powder parameters and drying properties.
[NOTE: THE CONCLUSION COULD QUANTIFY THE FINAL RESULTS, OR STATE WHICH VARIABLES WERE FOUND TO BE SIGNIFICANT / INSIGNIFICANT. THE CONCLUSION COULD ALSO ELABORATE FURTHER ON THE CURRENT STATUS OF THE PROJECT, AND IF THERE ARE PLANS FOR ANY FUTURE WORK.]
Activity #1-2 in Fiscal Year ending 2007-12-31: Other "post SR&ED" Activities:
Description of work performed:
1. Safety training conducted on new systems
2. Safe operating procedures documentation written
[NOTE: THESE ACTIVITIES ARE INELIGIBLE FOR SR&ED CREDITS PURPOSES SINCE THEIR PERFORMANCE DOES NOT DIRECTLY ADDRESS ANY OF THE STATED "TECHNOLOGICAL UNCERTAINTIES."]
Conclusions:
RECOMMENDATIONS ON SUPPORTING TECHNICAL DOCUMENTATION
EXAMPLES OF SUPPORTING INFORMATION THAT COULD BE AVAILABLE FOR ON SITE EXAMINATION BY CANADA CUSTOMS AND REVENUE AGENCY INCLUDE:
<input type="checkbox"/> BACKGROUND LITERATURE RELATED TO A PROJECT PLAN <input type="checkbox"/> RECORDS OF EXPERIMENTAL RUNS, TEST DATA AND RESULTS <input type="checkbox"/> PROJECT NOTE BOOKS AND/OR QUANTITATIVE MEASUREMENT DATA <input type="checkbox"/> LAB BOOKS OR RECORDS <input type="checkbox"/> INTERNAL DESIGN DOCUMENTS AND DRAWINGS <input type="checkbox"/> ANY OTHER RELEVANT DOCUMENTATION (E.G., PHOTOS) THAT SUBSTANTIATES SR&ED WORK <input type="checkbox"/> PROTOTYPES OR MOCK-UPS <input type="checkbox"/> PILOT-SCALE OR BENCH-SCALE EQUIPMENT USED FOR EXPERIMENTATION. <input type="checkbox"/> ANNOTATED SPC CHARTS <input type="checkbox"/> ANNOTATED PROCESS LOGS <input type="checkbox"/> USED PARTS OF EQUIPMENT <input type="checkbox"/> SAMPLES OF MATERIAL <input type="checkbox"/> SHIPPING DOCUMENTATION FOR EXPERIMENTAL PRODUCTS <input type="checkbox"/> EVIDENCE FROM CUSTOMER/END USER TRIALS
THE CRA WILL CONSIDER OTHER SUPPORTING EVIDENCE, AS NECESSARY AND APPROPRIATE, IN EVALUATING SR&ED CLAIMS.
[AUTHOR'S NOTE: FOR ADDITIONAL EXAMPLES SPECIFIC TO THE "PLASTICS" AND "CHEMICAL" INDUSTRIES, VISIT, www.rdbase.net]

Section C – Basic or applied research

250 Describe the scientific knowledge that you were trying to advance. (Maximum 35 lines)

252 Summarize the work performed in the tax year, and explain how that work contributed to the advancement of scientific knowledge. (Summarize the systematic investigation) (Maximum 70 lines)

Section D – Additional project information

Who prepared the responses for Section B or Section C?

253	1 <input checked="" type="checkbox"/> Employee directly involved in the project	254	Name Al Nobel		
255	1 <input type="checkbox"/> Other employee of the company	256	Name		
257	1 <input type="checkbox"/> External consultant	258	Name	259	Firm

List three key employees directly involved in the project and indicate their qualifications.

260	Names	261	Qualifications/experience and position title
1	Al Nobel		P.Eng/Chemical Engineering
2	Lou Pasteur		BSc./Chemistry
3	Nick Tesla		Electrical Technology

265 Are you claiming any salary or wages for SR&ED performed outside Canada? **F-2** 1 Yes 2 No

266 Are you claiming expenditures for SR&ED carried out on behalf of another party? 1 Yes 2 No

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275	1 <input type="checkbox"/> Records of trial runs	281	1 <input type="checkbox"/> Others, specify 282

Section E – Project cost

Project expenditures claimed in the year:

285	Salary or wages	D-0	100,000	\$
286	Materials consumed and transformed			\$
287	SR&ED contracts			\$
289	Overhead and other expenses (if you use the traditional method in Part 3)			\$

Please see D-4.1 - D-4.2 for full Project Description

Part 2 - Project information (continued)

Complete a separate Part 2 for each project claimed this year.

Section A – Project identification

200 Project title (and identification code if applicable)
703 - Plant breeding - new cultivar

202 Project start date **204** Completion or expected completion date **206** Field of science or technology code
(See guide for list of codes)

2007-02 2008-09 1.06.08 Plant sciences, botany
Year Month Year Month

Project history

208 1 Continuation of a previously claimed project **210** 1 First claim for the project

218 Was any of the work done jointly or in collaboration with other businesses? 1 Yes 2 No

If you answered **yes** to line 218, complete lines 200 and 221.

220 Names of the businesses **221** BN

1

The work was carried out (check any that apply)

222 1 By analysis only **226** 1 In a commercial plant or facility
223 1 In a laboratory **228** 1 Others, specify **229** _____

224 1 In a dedicated research facility

Purpose of the work

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Section B – Experimental development

The technological advancement you are trying to achieve with this work will result in:

	Materials, devices, or products		Processes	
The development of new	235	1 <input type="checkbox"/>	236	1 <input type="checkbox"/>
The improvement of existing	237	1 <input checked="" type="checkbox"/>	238	1 <input type="checkbox"/>

240 What technological advancements were you trying to achieve? (Maximum 35 lines)

Scientific or Technological Objectives:
[AUTHOR'S NOTE: REPRODUCED FROM THE CRA PLANT BREEDING & SEED INDUSTRY SR&ED PROGRAM GUIDANCE PAPER - AVAILABLE FROM THE SECTOR-SPECIFIC GUIDES ON THE CRA WEBSITE AT <http://www.cra-arc.gc.ca/taxcredit/sred/sector-e.html>]
The objectives of this plant breeding project are to develop soybean cultivars, for the 2600 to 3000 heat unit areas of Eastern Canada, that offer the following improvements over existing cultivars:
· 10% improved yield over currently available cultivars
· 10% improved lodging resistance over currently available cultivars
· no sacrifice of resistance to leaf disease(s) or Phytophthora root rot.
[AUTHOR'S NOTE: AS ILLUSTRATED ABOVE AND BELOW, IDEALLY THE TAXPAYER WOULD ATTEMPT TO QUANTIFY STANDARD PRACTICE PERFORMANCE LEVELS & METHODS AND THEN BENCHMARK THESE IMPROVEMENTS AGAINST THEM.]

Technology or Knowledge Base Level:
Soybeans are typically accompanied by maturity delays or increased susceptibility to lodging and disease(s).
The scientific/technological advancement expected in this plant-breeding project is the development of a new cultivar that embodies the genetic traits

240 What **technological** advancements were you trying to achieve? (*Maximum 35 lines*)

for higher yield and resistance to lodging in a genotypic combination that surpasses the performance features of existing cultivars without compromising disease resistance.

Our base level knowledge for this project is derived from our development of crosses and advanced lines in previous years' projects. This work provided us with desirable traits in our F3 and F6 lines, thus providing a starting point for our current research.

[AUTHOR'S NOTE: IDEALLY, THE TAXPAYER WOULD ATTEMPT TO QUANTIFY PROGRESS MADE TO DATE IN ISOLATING DESIRABLE TRAITS IN THEIR PREVIOUS GENETIC LINES.]

[AUTHOR'S NOTE: IDEALLY, THE TAXPAYER WOULD ATTEMPT TO IDENTIFY THE SPECIFIC METHODS OR VARIABLES WHICH CREATE THE PERCEIVED LIMITATIONS WITH RESPECT TO OBTAINING THE STATED OBJECTIVE(S).]

242 What **technological** obstacles did you have to overcome to achieve those advancements? (*Maximum 35 lines*)

Uncertainty #1: feasibility of genetic traits

The scientific/technological uncertainty relates to the feasibility of combining the desirable genetic traits from different germplasm sources into a superior performing cultivar out of thousands of possible segregating genotypic outcomes resulting from hundreds of crosses.

Uncertainty #2: Maintain disease resistance

Additionally, scientific uncertainty relates to the feasibility of achieving this result without sacrificing disease resistance, which is often compromised with yield improvements.

244 What work did you perform in the tax year to overcome those technological obstacles? (Summarize the systematic investigation) (*Maximum 70 lines*)

Activity #1-1 in Fiscal Year ending 2006-12-31: Experimental crosses

Description of work performed:

During the current taxation year (2006), the work undertaken and progress attained included:

- 120 new parental crosses were made in the nursery
- 4500 F3 lines meeting our selection criteria from previous crosses were advanced to F6 by single seed descent using winter nurseries
- 5000 F6 Lines originating from previous crosses were tested in preliminary yield trials at 2 locations and 200 were selected that met the criteria for further advancement
- 150 advanced lines from previous crosses were tested in advanced trials in 4 locations and 6 elite performers were selected for wide area testing

[AUTHOR'S NOTE: IDEALLY, WE WOULD ALSO EXPLAIN WHY ANY OF THE ABOVE DECISIONS WERE MADE.]

Conclusions:

Incremental advances were made towards some of the intended scientific objectives:

- the enhanced yield trait was more successfully transferred from (xx) genotypes than from (yy) or (zz) genotypes
- there was a negative correlation between yield and early maturity (i.e. < 2900 heat units)

[AUTHOR'S NOTE: IDEALLY, WE WOULD COMPARE RESULTS TO INITIAL EXPECTATIONS AND PROVIDE EXPLANATIONS OR "CONCLUSIONS" FOR RESULTS THAT WERE UNEXPECTED AT THE OUTSET OF THE WORK. THESE "CONCLUSIONS" ARE MORE RELEVANT TO DETERMINING SR&ED ELIGIBILITY THAN MERELY LISTING THE "RESULTS" (I.E. WHETHER THE END PRODUCT ITSELF WAS SUCCESSFUL).]

Activity #2-1 in Fiscal Year ending 2007-12-31: Disease testing

244 What work did you perform in the tax year to overcome those technological obstacles? (Summarize the systematic investigation) (Maximum 70 lines)

Description of work performed:

5 finished lines originating from previous crosses were tested in pre-commercial co-op trials at 8 locations, and tested in official public co-op registration trials. Official tests will be used to corroborate our disease, quality and performance results and select candidates for registration and commercialization.

Conclusions:

Resistance to soil borne diseases (e.g. Sclerotinia, Alternaria) was influenced more by plant stature (i.e. lodging trait) than the presence of the disease resistance gene itself due to the closer proximity of foliage to the soil in lodged specimens. As a result of this work five lines yielded at least 5% above commercial check varieties, with improved lodging and acceptable disease resistance.

[AUTHOR'S NOTE: IDEALLY, WE WOULD COMPARE RESULTS TO INITIAL EXPECTATIONS AND PROVIDE EXPLANATIONS OR CONCLUSIONS.]

RECOMMENDATIONS ON SUPPORTING TECHNICAL DOCUMENTATION

THE R&D BASE PROGRAM ALSO ALLOWS USERS TO CROSS REFERENCE SUPPORTING INFORMATION WHICH IS GENERATED OVER THE COURSE OF THE WORK.

THE TYPE OF RECORDS REQUIRED WOULD BE THOSE THAT WOULD NORMALLY BE GENERATED IN THE COURSE OF UNDERTAKING PLANT BREEDING. AS A GUIDELINE, SOME EXAMPLES OF THE KINDS OF SUPPORTING INFORMATION THAT SHOULD BE AVAILABLE FOR ON-SITE REVIEW BY THE CANADA REVENUE AGENCY (CRA) MAY INCLUDE THE FOLLOWING:

- BACKGROUND LITERATURE RELATED TO A PROJECT OBJECTIVES AND PLAN
- RECORD OF GENETIC CROSSES -NURSERY DATA BOOKS -RECORDS OF FIELD TRIALS -NOTES ON EXPERIMENTAL PROCEDURES -PROJECT NOTE BOOKS AND/OR QUANTITATIVE MEASUREMENT DATA -RESULTS OF STATISTICAL ANALYSES -ANY OTHER RELEVANT MATERIAL/INFORMATION (E.G. PHOTOS) THAT SUBSTANTIATES THE SR&ED WORK

[AUTHOR'S NOTE: FOR ADDITIONAL "AGRICULTURAL" AND "LIFE SCIENCE" EXAMPLES VISIT, www.rdbase.net]

Section C – Basic or applied research

250 Describe the scientific knowledge that you were trying to advance. (Maximum 35 lines)

252 Summarize the work performed in the tax year, and explain how that work contributed to the advancement of scientific knowledge. (Summarize the systematic investigation) (Maximum 70 lines)

Section D – Additional project information

Who prepared the responses for Section B or Section C?

253	1 <input checked="" type="checkbox"/> Employee directly involved in the project	254	Name		
255	1 <input type="checkbox"/> Other employee of the company	256	Name		
257	1 <input type="checkbox"/> External consultant	258	Name	259	Firm

List three key employees directly involved in the project and indicate their qualifications.

260	Names	261	Qualifications/experience and position title
1	Al Nobel		P.Eng/Chmical Engineering
2	Al Einstein		PhD./Physics
3	Nick Tesla		CET/Electrical technology

265 Are you claiming any salary or wages for SR&ED performed outside Canada? F-2 1 Yes 2 No

266 Are you claiming expenditures for SR&ED carried out on behalf of another party? 1 Yes 2 No

267 Are you claiming expenditures for SR&ED performed by people other than your employees? 1 Yes 2 No

If you answered **yes** to line 267, complete lines 268 and 269.

268	Names of individuals or companies	269	Social Insurance Number or Business Number
1			

What evidence do you have to support your claim? (Check any that apply)
You do not need to submit the evidence with the claim. However, you are required to retain them in the event of a review.

270	1 <input checked="" type="checkbox"/> Project planning documents	276	1 <input checked="" type="checkbox"/> Progress reports, minutes of project meetings
271	1 <input type="checkbox"/> Records of resources allocated to the project, time sheets	277	1 <input type="checkbox"/> Test protocols, test data, analysis of test results, conclusions
272	1 <input type="checkbox"/> Design of experiments	278	1 <input type="checkbox"/> Photographs and videos
273	1 <input checked="" type="checkbox"/> Project records, laboratory notebooks	279	1 <input type="checkbox"/> Samples, prototypes, scrap or other artefacts
274	1 <input type="checkbox"/> Design, system architecture and source code	280	1 <input type="checkbox"/> Contracts
275	1 <input type="checkbox"/> Records of trial runs	281	1 <input type="checkbox"/> Others, specify 282

Section E – Project cost

Project expenditures claimed in the year:

285	Salary or wages	95,417	\$
286	Materials consumed and transformed		\$
287	SR&ED contracts		\$
289	Overhead and other expenses (if you use the traditional method in Part 3)		\$