William Neil (Bill) Howell, M.A.Sc., P.Eng. Alberta

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Summary :

Retired 28Oct2012 from : Science Research Manager at the Mining and Mineral Sciences Laboratories of Natural Resources Canada (NRCan) in Ottawa : My recent responsibility was to manage and build a new Recycling R&D program, and to find cost recovery funding for it. I have experience in corporate and government business development, market research, management and execution of scientific & engineering R&D and projects, and plant operations.

Updated 20Jan2014

Quick personal information

- B.A.Sc.Chemical Engineering - U of Calgary 1978, MASc Chemical Engineering - U of Ottawa 1986
- Member: International Neural Network Society (INNS, ~1990-on), Institute of Electronics and Electrical Engineers - Computational Intelligence Society (IEEE-CIS, ~2003-on).
- Member : Alberta APEGGA (2007, 2013-), Order of Engineers of Québec (OIQ, ~1980-2010?); Canadian Institute of Mining, Metallurgy and Petroleum (CIM, ~1995-2010?)
- Bilingual (federal government levels EEE in French reading, writing, oral).

NOTE: Other versions of my résumé are posted on my website, www.gcpedia.gc.ca/wiki/Bill_Howell_home_page , including a combination functional/ chronological résumé and a résumé with long detailed descriptions of each responsibility (1 to 23 pages).

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Functional perspective

R&D Management Background

- 4+ years as R&D Program Manager – Mineralogy & Metallurgical Processing, 24 scientific staff ; Recycling Technologies Initiative – new program with 3 staff
- 10 years as Secretary for major mining R&D consortia, on Management & Technical committees, contracts, consortia tracking, notifications, planning, reports. Memberships generally included the mining industry, federal & provincial governments, R&D contactors, and trade unions in DEEP. :
- Mining Automation Program (MAP- 27 M$ cash & in-kind) – 3 mining companies & NRCan
- Diesel Particulate Matter in underground mines (DEEP, 5 M$) - 13 organizations
- Explosives Free Rock Breakage Initiative (EFRB, 1 M$) – 12 organizations
- Hydrogen Mine Introduction Initiative (HMII, ~2.1+ M$) – 7 organisations
- Organising, Technical, & Review Committee member of International Joint Conference on Neural Networks, the world's pre-eminent NN conference (2003, 2005, 2006, 2007, 2009, 2013)
- 4 months experience as Acting Deputy Director of the Mining and Mineral Sciences Laboratories

Business Background

- 3 years sales/marketing of R&D services to Canadian mining companies while at NRCan
- 2 years as Market Research Manager for chemical company, including the econometric modelling of prices/volumes reporting and presentations to senior management and major clients
- 2 years of the initial stages of business development projects for a chemical company, including competitor analysis, financial analysis of projects
- experienced in the preparation of business plans, presentation/analysis of operating results
- marketed computer voice dictation systems to lawyers and doctors through my own small company

Technical Background

- 6 years of chemical engineering R&D - uranium solvent extraction, leaching, fluid modelling, inorganic acids processes, seed coatings, enzyme pasturisation
- 3 years plant operations engineer in the inorganic chemical industry
- strong (non-practicing) knowledge of Computational Intelligence subjects, some neuroscience
- extensive knowledge of the fundamentals of Climate Change science, and the common errors and misconceptions by scientists in that area

endpage

Reverse chronological listing of responsibilities

Natural Resources Canada (NRCan), Ottawa, March 1993 – April 2012
Mining & Mineral Sciences Laboratories (MMSL) - for most of my responsibilities
http://www.nrcan.gc.ca/mms/canmet-mtb/mmsl-lmsm/mmsl-e.htm

I have worked for ~20 years as a "permanent" (indeterminate) federal government employee, mostly related to the management, administration, and marketing of R&D for the mining industry.

Feb11-Apr12 *Science Research Manager – Recycling Technologies Initiative*
Job: To start up & manage an R&D program
Contacts:

Recycling Technologies Program
Alain Dubreuil. ResSci - SustainMatMgmt & LifeCycle. NRCan-MMS-MMSL. Ottawa
Augustine Orumwense. Mgmt Development & Scientist - Comminution. NRCan-MMS-MMSL. Ottawa

Others
Magdi Habib. Director General. NRCan MMSL. Ottawa
Jean-Marie Fecteau. Acting Director- Ground Control & Recycling. NRCan-MMS-MMSL. Ottawa
Michael Clapham. Sr Policy Advisor- Recycle. NRCan-MMS-MMMKB-ICAD. Ottawa
Robert Sinclair. Policy Advisor- Rare Earths. NRCan-MMS-MMMKB-ICAD. Ottawa
Brian Smith. Sr Policy Advisor - Nickel & Rare Earths. NRCan-MMS-MMMKB-ICAD. Ottawa
Mark Kozdras. Program Manager - Automotive Materials. NRCan-MMS-MTL. Hamilton
Kumar Sadayappan. Res Scientist- Recycle. NRCan-MMS-MTL. Hamilton
Amjad Javaid. Res Scientist - Recycle. NRCan-MMS-MTL.
Eddy Chui. Dir - Clean Electric Power. NRCan-IETS-CE-CEOTT. Ottawa
Vladimir Razbin. Engng Projects Mgr. NRCan-IETS-CE-CEOTT. Ottawa
Luc Pilon. Métallurgiste - développement des procédés. Fonderie Horne. Xstrata Copper Canada. Quebec
Jean Bussière. Rare Earths. Energy-Mining-Environment. NatlResCouncil of Canada. Bouchervile. Québec
Dean MacNeil. Research Officer - Recycle. NatlResCouncil of Canada. Ottawa

Recycling was a major Strategic concept for our Minerals and Metals Sector (both the policy and science areas), that had had several previous incarnations in the past. I started up this brand new (re-incarnated) R&D program with little resources and on two people, growing to 3 mid-way through the year.

I set up a novel "employee sharing" arrangement with a sister lab, and modest cost recovery resulted for our lab. Furthermore, I pushed through a major shift in thinking to change the core of the Recycle programs activities, to target much greater impacts and value that played into our team's inherent strengths.

However, with government cutbacks, the entire Recycle Strategy was shelved, policy immediately reallocated personnel, with the entire Recycle science R&D program being cut entire several months later. This responsibility was carried at the ~20-35% level at the same time as several other projects and responsibilities (see below).

Jul10-Dec11 *Science-Policy Integration Nexus of Expertise (SPINE)*
Job: Team member, author of 5 incomplete reports on fundamental science & concepts (these are posted on my website)

Contacts:

Core team

Chrystia Chudczak. Assistant Commissioner & Comptroller. NRCan-DMO-NPA. Ottawa
Ken Hart. Sr Policy Advisor. NRCan-IETS-SSTB. Ottawa
Jeff Kinder. Manager - S&T Strategy. NRCan-IETS-SSTB. Ottawa
Emily Gusba. Reference Librarian. NRCan-CMSS-IMB-LIB. Ottawa

Others

Ron Sabourin. Project Officer. NRCan-SPI-SPEA-KM. Ottawa
Hamid Boland. Organizational Effectiveness Exploitation Group. DRDC. Toronto
Peter Kwantes. Defence Scientist - Adversarial Intent Section. Toronto
Dariusz Burzynski. Manager - S&T Cluster. NRCan-IETS-SSTB. Ottawa
Jean-Paul Salley. MA International Policy. NRCan-SPI-SPEA. Ottawa
Cali Yakaback. Communications Intern. NRCan-IETS-SSTB. Ottawa

SPINE was a VERY energetic and imaginative initiative of Chrystia Chudczak, at the time a DG of the Minerals and Metals Sector of NRCan. The idea was to sound out user needs and interests with respect to post-[wiki, blog] social media systems such as LinkedIn, and to develop concepts for the workplace objectives, principles, and user requirements for a pan-federal-government system. Chrystia discussed details with well over 200 individuals in several countries in [government, industry, academia, IT vendors], often with her team in conference calls, and directly involved her team in a hailstorm of information and enthusiasm, as well as several workshops (notably DRDC-led).

SPINE was the first and only chance for me as a government employee to apply some of my extra-work interests related to Computational Intelligence (CI – including neural networks, evolutionary computation, fuzzy systems, particle swarms etc). I wrote 5 very-incomplete (20%) reports on social media issues, and posted them to the government wiki system gcpedia.

Oct09-Jun11 *Chief Building Emergency Officer (CBEO), 555 Booth Street*
Job: Recruit & manage emergency (evacuation) team, revamp manuals, actions & responses to formal external inspections

Contacts: Building Emergency Organisation (BEO) 555 Booth Street

Magdi Habib. Senior Officer, Director General of MMSL
Anthony Montenegrino. Property Manager. SNC Lavalin
Alex Doiron. CBEO that came after me
Robert Beaudoin. Deputy CBEO
David Koren. Alternate Deputy CBEO
Maureen Leaver. Alternate Deputy CBEO
Al Kuiper. Alternate Deputy CBEO
Yvonne Boucher. NW Corner Person
Charlene Hogan. SW Corner Person
Morgan King. SE Corner Person
Wesley Griffith. NE Corner Person
Katrina Nicholson. Chief, Health & Safety Office
Jean-Marc Pelletier. Health and Safety Officer

Dec08-Dec11 *Secretary - Hydrogen Mine Introduction Initiative (HMII)*
Job: Sit on Management & Technical committees, work with contracts, consortia tracking, notifications, planning, reports (HMII, ~2.1+ M$) – 7 organisations

Contacts:

Technical committee

Russell Blades. Manager - R&D Energy & GHG. Barrick. Toronto
Marc Bétournay. Mine Hydrogen Technical Committee Chair. Senior Scientist. Rock Mechanics - Mine Mechanization. NRCan-MMSL. Ottawa
Patricia Brisebois. Technicienne de projets. IAMGOLD. Mine Mouska. Québec
Fernando Carrascal. Dir Operational Excellence. Goldcorp. Toronto
Jean-Noël Cloutier. Chercheur. LTEE Hydro-Québec. Shawinigan. Québec
Pascal Coté. Commercial Specialist - Hydrogen Energy. Hydrogène Énergie. Air Liquide. Montréal. QC
Peter Golde. Chief Mine Engr R&D. Vale. Copper Cliff. Ontario
Bill Howell. Mine Hydrogen Secretary. NRCan-MMSL. Ottawa
Roland Jolin. Chargé projet efficacité énergétique. Xstrata Nickel Raglan. Laval. Québec
Pierre Thibault. Mine Hydrogen Treasurer. Dir services techniques. Association minière du Québec. Sainte-Foy. Québec

Advisory Committee

Jim Angel. Mechanical Engr. Technical Support. Mine Safety and Health Administration. Triadelphia. West Virginia. USA
Pierre Bénard. Investigateur Principal. Institut de recherche sur l'hydrogène. UQTR. Trois-Rivières. QC
Allan Coutts. Fellow - Society of Fire Protection Engineers. URS Safety Management Solutions. Aiken. South Carolina. USA
Doug Eastick. Mining & Mineral Processing. Hatch. Sudbury
Ravi Gopal. Founder President & CEO. Paceas Technologies. Mississauga. Ontario
Andrei Tchouvelev. Founder President & CEO. AV Tchouvelev & Associates. Mississauga. Ontario

Alternates on TC

Alain Grenier. Surintendant général. IAMGOLD. Mine Mouska. Québec
Marcel Laflamme. Gestionnaire de program. Mécanisation et automation des mines. RNCan CANMET-LMSM. Val dOr. Québec
John Ross de Vries. Manager-Operational Excellence. Musselwhite mine. Goldcorp. NW Ontario
George Sanderson. Electrical Distribution Specialist. Musselwhite mine. Goldcorp. NW Ontario
Daniel Vallières. Directeur ingénierie minière U/G. IAMGOLD. Mine Mouska. Québec
Chris Woodall. Sr Director – Mining. Barrick. Toronto

was Technical Committee

Sophie Bergeron. Ingénieure minier principal - Long Terme et Projets. Xstrata Nickel Raglan. Montréal
Yan Coté. Ingénieur minier - projets techniques. Xstrata Nickel. Laval. Québec
Pierre Gauthier. Dir Corporate Development. Air Liquide Canada. Montréal. Québec
Ed Desjardins. Sr Manager. Mining Technology. Barrick. Toronto

Lawyers/ legal committee and other reference people

Vince Maivelett. Manager - Contracts & Procurement. URS-SMS. Aiken. South Carolina. USA
Phillip Marks. Senior Legal Counsel. IAMGOLD. Toronto
Victor Ndihokubwayo. Legal Counsel. NRCan-DMO-LS. Ottawa
Mylène Mastrostefano. Avocat. Hydro Québec - IREQ. Varennes

Risk Management & Insurance

Tom Stewart. Assurances risques. Air Liquide. Montréal
Louis David. Vice-Président. Assurances Aon Parizeau. Montréal

Sep08-Dec11 *Secretary – Explosives Free Rock Breakage (EFRB) initiative*
Job: Sit on Management & Technical committees, work with contracts, consortia tracking, notifications, planning, reports (EFRB, 1 M$) – 12 organizations
Contacts:

Technical committee

Wojciech Boczar. Chief Engineer mechanical. Investment and Development Dept. KGHM Polska Miedź SA. Lubin. Poland
Marc Bétournay. EFRB Technical Committee Chair. Senior Scientist. Rock Mechanics - Mine Mechanization. NRCan-MMSL. Ottawa
Patricia Brisebois. Technicienne projets souterrains. IAMGOLD. Longueuil. Québec
André Charette. Chercheur. Hydro-Québec LTE. Shawinigan. Québec
Fred Delabbio. General Manager Innovation - Underground Technology & Innovation. Rio Tinto. Milton. Queensland. Australia
Peter Golde. Chief Mine Engr R&D. Vale. Copper Cliff. Ontario
Bill Howell. EFRB Secretary. NRCan-MMSL. Ottawa
Jim Kennedy. Manager Mine Engineer & ex-Explosives Guy. Barrick. Toronto & Salt Lake City
Michel Leclerc. Directeur Général. Agnico-Eagle. Cadillac. Québec
Pierre Leduc. Conseilleur Services technique. Hydro Québec. Montréal
Marc Lucas. Directeur – Opérations Minières. Xstrata Nickel Raglan. Québec
Tyson Pederson. Mine EIT & ex-Oilwell Frac Guy. AREVA. Saskatoon. Saskatchewan
Pierre Thibault. EFRB Treasurer. Dir services techniques. Association minière du Québec. Sainte-Foy. Québec

Alternates for TC

Alain Grenier. Surintendant général. IAMGOLD. Mine Niobec et Mouska. Québec
Marcel Laflamme. Gestionnaire de program. Mécanisation et automation des mines. RNCan CANMET-LMSM. Val dOr. Québec
Max Oddie. Manager - Underground Technology. Rio Tinto. Montréal. Canada
Daniel Vallières. Dir projets souterrains. IAMGOLD. Longueuil. Québec
Chris Woodall. Sr Director – Mining. Barrick. Toronto

Projects

Marcel Mongeon. EFRB IP contractor. Mongeon Consulting. Hamilton
Paul Herrbach. Ingénieur. FabGroups. Valleyfield. Québec
Ferri Hassani. EFRB Microwaves project. Prof Mining & Materials Eng. McGill U. Montréal. Québec

Dec07-Aug08 *Project Manager – Special Apparatus and Facilities*
Job: A short-term mix of responsibilities
Contacts: Louise Laverdure, Mario Riopel, Bernard Vigneault, Carrie Rickwood, Rory Gilsenan, Christine McGraw, Richard Tobin, Jim Farrell

This was a period of mixed project responsibilities. Some examples are :

a) Perform nano-toxicology review – This issue was potentially of importance scientifically, technically, and commercially, and was a concern to our policy group.
b) Acting Manager, Business Affairs and Communications (BAC) - It was important to keep the office running for two months plus, and to put out a high-quality annual report of our labs efforts.
c) NRCan Horizontal Task Team on Renewables and Bioeconomy - This was one of the 5 Horizontal Task Teams as defined by the Deputy Minister for NRCan. Mr. Howell's main focus was the Biofuel/ Bioeconomy side as the sole MMS representative (there were large numbers of Forestry and Energy reps, some CCRS).

Oct06-Nov07 *On leave in Calgary – temporary employment & family*
Job: Campaign work; looking for possibility to stay permanently close to family.
Contacts: Varied (looking for opportunities, family)

Nov04-Sep06 *Project Manager – Special Apparatus and Facilities for underground mining R&D initiatives*
Job: Build R&D initiatives and external funding in the mining industry, eg for 2.4 M$ testing facility
Contacts: Louise Laverdure, Deputy Director of Mining R&D, NRCan-MMSL, Ottawa
Graham Swan, Principal Ground Control Scientist, Falconbridge, Sudbury
Denis O'Donnell, CVRD-Inco, Sudbury
Paul Podstawka, Industry Canada - FedNor, Sudbury
Fred Delabbio, Rio Tinto, Brisbane

I administered and helped coordinate efforts to build large underground mining R&D consortia with a substantial cost recovery component for our R&D lab. This kind of initiative also ensures that our lab works closely with industry and other stakeholders to tackle substantial science and technology challenges in the mining industry. This meant that I established communications with a network of "protagonists" in industry, government, academia and the provinces; I set up and ran conference calls, video conferences and meetings, assisted the project leaders in the initial concept/cost/schedule, worked on progressively more detailed technical proposals, and contributed to "selling the concept" to help secure the necessary funding. It should be noted that funding decisions are ultimately promoted within each organisation through internal project representatives, and through industry-government-supplier R&D meetings where priorities are discussed. However, a lot of work is required to develop proposals in a format and of the right content that can be approved by all participants. It means ensuring that everyone's concerns are addressed, which isn't always easy when circumstances and personal perspectives can vary radically. Typically it takes a couple of years or so to put these together, given budget cycles, the complexity of the projects, and the competition from other priorities (and people/ organisational changes!!).

Following my position as R&D Program Manager, I was to administer a "*Deep Mining Research Consortium" (DMRC* - http://www.deepminingresearch.org), which has been organized to "engaged in underground hardrock mining research to improve the manageability of risks associated with mining below 2000 metres in Canada". However, the "host" organisation (as Secretariate) was eventually selected to be the Canadian Mining Industry Research Organization (CAMIRO) rather than NRCan-MMSL (CANMET). This effort continues, and is one of the biggest R&D initiatives in Canadian mining.

My efforts were then focussed on a major R&D initiative to build a "D*ynamic Test Facility for Underground Support Systems*" (~2.5 M$/ 5 years), with ground support expert Véronique Falmagne as project leader until she left for Golders Associates. That concept complemented anticipated research needs for one aspect of deep mines or underground mining in bad ground.

Over 9 months, a major concept was built, but tabled in favour of spending a year on preliminary research that we defined in order to better define the main project. That effort continues under project leader Michel Plouffe of NRCan-MMSL.

The most recent large R&D consortia that I worked on was "*Explosive Free Rock Breakage*" (EFRB), which is still under development as of Dec06. This effort is currently conceived of as a ~ M$/ 5 years staged effort to seek non-explosive means of rock breakage. This has been a dream for many decades because the elimination of delays in mining by using continuous processes (as with Tunnel Boring Machines (TBMs) for civil engineering projects) rather than the drill-blast-muck cycle would have major benefits for industry. Many major initiatives for hard rock mining in the past have failed, largely because of the the limitations of materials of construction for cutters, and perhaps inadequate automisation/ telerobotics/ controls for for the equipment. The EFRB idea really came up as a follow-on to Placer Dome's "mini-Mole" narrow vein tele-robotic excavator, which was amazingly successful for a 5 year project. While the EFRB project has not been approved, support does seem promising, and even industry restructuring and takeovers that led to the loss of several key proponents were "patched" by the involvement of good people from the changed or evolved organisations. Rock mechanics expert Marc Bétournay of NRCan-MMSL is the project leader. *[Howell 23Apr2012 - Note that this early effort was a pre-cursor to the EFRB collaboration that later arose.]*

Dec01-Oct04	*Science Research Manager – Mineralogy and Metallurgical Processing*
Job:	Managed 24 research staff, also involving realignment/ restructuring
Contacts:	Roy Sage*, Director, NRCan-MMSL, Ottawa
	Richard Tobin, Director-General, Minerals Technology Branch, Ottawa
	Jacques Saint-Cyr*, Director-General, Minerals Technology Branch, Ottawa

For three years I directly managed 24 people and a cash budget of ~250 k$ (low point) to ~525 k$ (normal budget level - not including salaries/ benefits, overhead admin costs, building and equipment). The Mineralogy & Metallurgical Processing (MMP) R&D group was the second largest in MMSL, and had 2 of 3 of the most senior scientists. Twelve staff had PhDs, three had masters degrees, and eight staff were technicians, mostly with BSc or college degrees. There was only 1/2 of a secretary available for the entire group! MMP also had a history of prolific publications and high-end instrumentation, but of poor cost recovery performance per-capita and declining priority. There were also significant internal tensions and problems with the groups direction. On top of that, the lab (MMSL) had its two worst budget years ever by a long shot during this time. My responsibility was considered to be a real challenge.

During my rein as manager, MMP attained the second highest cost-recovery in MMSL (the highest level if "non-official" revenues are included), in spite of enormous resistance against cost recovery by many scientists. A senior scientist who had always lagged in cost recovery also landed a major project during this time following a decade of very low external support for his work. Furthermore, the MMP program was organised into distinct groups in a manner to still allow collaboration, but that kept people into focussed, compatible teams and minimized frictions and complications between people. The groups were a basis for targets, budgets, and communications. By setting up the groups scientists were less prone to step on one another's

toes, and they were more visibly accountable for results, and group budgets were dependent on the results as well as other criteria (somewhat unorthodox for government R&D, but within the cost-recovery trends that were essential to the labs' overall budget). Information on MMP's performance and activities was never so open and accurate, before or after my period as manager. The R&D groups that I set up within the MMP program were:

- Applied mineralogy (X-ray diffraction, scanning electron microscopy, microprobe, surface characterisation, syncrotron analysis on external instruments)
- Base metals (hydrometallurgy mostly - integrated with minearalogy
- Gold processing (cyanidation)
- High temperature ceramics/ refractories
- Mineral processing (grinding, flotation)
- Recycle (minerals and metals focus, some interaction with Canadian Association for Recycling Industries)

Under threats of even further cuts to R&D funding, MMP was selected from 8 or 9 R&D programs to be dissolved by an outgoing ADM, but that decision was put off by the incoming ADM. Note that in the fall of 2006, instead of cutting MMP it was decided to chop the concrete research program and some advanced materials groups at our sister lab - Materials Technology Laboratory (MTL). However, that decision has not yet been carried out, and in time may not be necessary. Furthermore, the concrete group was enormously successful according to major organisational criteria over a long period of time!

None of this situation made me particularly popular with many of the staff, but it did win respect from some. I am not at all apologetic for taking tough decisions in a group with intense internal competitions, although I do recognize that with more experience I could have managed things better. I also needed to find a way to avoid getting buried in the bureaucracy. MMP was a positive contributor to essential MMP goals during a very trying time. It also provided an environment that allowed key intermediate scientists to grow and excel in spite of the traditional blocks that hindered that before I was manager.

May00-Nov01 *Climate Change - Minerals and Metals Action Plan 2000, plus Minerals and Metals Strategy for Regions*

Job: Assistant to Sector lead with Branch input to sectoral strategy - develop and compose action plan.

Contacts: Roy Sage*, Director, NRCan-MMSL, Ottawa
Phil Jago, Chief, Canadian Industrial Program for Energy Conservation (CIPEC - http://oee.nrcan.gc.ca/industrial/cipec.cfm), NRCan-Energy Sector, Ottawa
Pamela Burr, Research Scientist, Canadian Forestry Service, Ottawa

My boss, Roy Sage, had been the Minerals and Metals Sector (MMS) "Champion" on Climate Change for several years, when the only person he had assisting him, Chris Padfield, moved on to a great opportunity in another sector. I was brought in several months before the deadlines for proposals for "Action Plan 2000" (AP2), so I caught up on background material, assisted in interdepartmental meetings leading to Action Plan 2000, and did a substantial amount of the

writing up of the proposal for the Minerals and Metals Sector. While this responsibility only lasted for about 6 months or less before I moved on to becoming an R&D Program Manager under Roy Sage, it was an excellent exposure to fast preparations of major collaborative-horizontal proposals in the government.

The administration of the MMS component of AP2 passed to Linda Wilson under Roy Sage's leadership, and was later recognized as one of the more effectively run components of NRCan's AP2 efforts.

Note that I am NOT a "Kyoto Premise" fan - quite the opposite. I haven't seen any major scientific papers that convincingly show that:

- CO2 has a significant impact on global temperature when it is above 60-90 ppm, as compared to historical behaviour over various timescales back 570 million years; and/or
- the results aren't better interpreted simply as indicating that the concentration of CO2 is a function of temperature (pre-anthropogenic, possibly even in recent times)

To me, the real issue is that we need far better models of astronomy (sun, galactic rays, orbitals etc), geology (volcanoes, oceanography, geothermal, geomagnetic), and biology (possible equilibrium [CO2] in the atmosphere being mediated by photosynthesis & its evolution (eg gymnosperm/angiosperm trees, C3 to C4 grasses). *[Howell 23Apr2012 - Since the original version was composed in ~2006, my thinking has greatly expanded in the astronomy, Earth, physics areas, to the point that I am even more convinced of the failures & shortcomings of consensus science, ergo essentially all scientists, while at the same time recognizing their successes (again, essentially all of the scientists). But that's more a subject of epistemology, philosophy, psychology, and sociology …]*

Apr98-Mar01	*Mining Automation Program (MAP)*
Job:	Secretary, Management and Technical Committees
Contacts:	Bob Hargreaves, Director, NRCan-MMSL, Ottawa
	Peter Jones, VP Operations, INCO, Toronto
	Seppo Seppälä, Executive Director of MAP, Sandvik Tamrock, Finland
	Greg Baiden, Manager, Inco Mines Research, Sudbury
	Larry ???,

The Mining Automation Program (MAP) ran from 1995 through 2000 plus, and was one of the most ambitious and largest underground mining R&D efforts in the recent past. It was a collaboration between INCO, Dyno Nobel, Sandvik Tamrock, and NRCan-CANMET, and had the objective of demonstrating several key "tele-robotic" prototypes for underground mining - an extreme bandwidth underground communications system, a scoop, development drill, and explosives loader. Many other project components were also important parts of this initiative. The inspiration behind this initiative was Greg Baiden of Inco (now at Laurentian University), and the concepts and targets went far beyond other projects in this area.

I was Secretary of the Management and Technical Committees of MAP, reporting directly to the Executive Director Seppo Seppala of Sandvik Tamrock in Finland, although my office stayed in Canada. Seppo is a phenomenal project manager, and he went on to be President of an aircraft

component. In addition to help organize and track meetings, I coordinated and reported on CANMET-MMSL's projects, often helping to specify, cost, schedule, and track project progress with the project leaders. Additionally, I ran the Lotus Notes server for the initiative, even though I am not an IT person and never did get formal training. A Lotus Notes consultant was used occasionally for system reconfiguration and major "blow-ups" which were rare.

The objectives of MAP were very aggressive, and not long after the wind-down of the project related work ceased at Inco and Dyno Nobel, while some effort continued at Sandvik-Tamrock. Still, the concepts behind MAP were advanced for the time, and the lessons will be useful for successive generations of mine automation. While CANMET-MMSL's cash resources were very limited, the ground control group in particular made substantial contributions towards the MAP objectives.

As the program wound down I moved on to a great opportunity as R&D Program Manager for a large and challenging group.

Apr97-Jan00	*Diesel Emissions Evaluation Program (www.deep.org)*
Job:	Secretary, Management Board and Technical Committee
Contacts:	Bob Hargreaves*, Director, NRCan-MMSL, Ottawa
	Bruce Conard*,
	Jozef Stachulak, Chief Ventilation Engineer, Inco, Sudbury
	Andrew Hara,
	Gary Allen,
	Gilles Brousseau,
	Andy King

In the early to mid-90s, some scientific papers were suggesting that diesel particulate emissions might be carcinogenic and could have a major health impact independent of, or in combination with, other toxic components of diesel emissions (such as NOx, SO3, PAHs, CO, etc etc). The DEEP R&D program was a large and urgent initiative by Canadian mining stakeholders to prepare for extreme changes in Occupational Safety and Health (OSH) regulations that were proposed by the American Conference of Governmental Industrial Hygienists (ACGIH), whose advice has regulatory implications in many jurisdictions in the USA and Canada. Our federal government lab, a number of major mining companies and several smaller ones, labour unions, provincial mine inspectors, universities, and the mining research organisation joined this consortium.

I was selected to be the Secretary for DEEP, and organised meetings and follow-up for both the Management and Technical Committees, and helped with project proposals and over-all communications. Given the very different perspectives of all of the players around the table, a fair amount of team-building/ repair was necessary, and communications and follow-up were paramount. It was also very important to build at least some genera support for competing project concepts to ensure that the R&D agenda was progressing in a timely fashion, and in a direction compatible with the overall program objectives.

I received an NRCan award for my involvement in DEEP, along with other team members.

Jul96-Apr97	*Transportation Energy Technology Program (TETP)*
Job:	Research Officer, electric and hybrid vehicles
Contacts:	Nick Beck, Manager, TETP
	Martin Hammerli*, Hydrogen R&D Funding Coordinator
	Frank Campbell*, Director, CANMET Energy Technology Centre (CETC)
	Peter Reilley-Roe*,

For nine months I managed R&D project funding in the area of electric vehicles, during the height of the mid-to-late 1990's enthusiasm for electric cars, as exemplified by California's Air Resources Board regulation table to ensure a minimum percentage of zero-emission vehicles. The work consisted of tracking the progress of projects on ongoing battery and EV systems, and of representing Canada on the International Energy Agency's (IEA) Electric Vehicle "Annex". While most of the work consisted of ongoing projects, new proposals were assessed, and I developed a proposal/ contract for the extended participation of NRCan in the IEA revised Hybrid and Electric Vehicle annex. I also stood my ground against perceived irregularities in some of the contracting and hiring procedures.

Mar93-Jun96	*Business Development Coordinator, Mineral Sciences Laboratories*
Job:	Develop R&D contracts, especially in Western Canada
Contacts:	Irwin Itzkovitch*, Director
	Bob Hargreaves*, Manager, Business Development Office
	Philippe Dauphin, Business Development Coordinator

I moved to the federal government for an opportunity to work in a "pure marketing" role, and had the responsibility of promoting our lab's R&D capabilities to mining companies and suppliers in Western Canada, as well as assisting with some opportunities in Ontario. The marketing efforts really lasted for 12 to 18 months, after which major organisational changes (first lab mergers and changes in the emphasis of R&D management polices, then the huge "Program Review" of the federal government) resulted in almost all of my work being allocated to business plans, contract management, and reorganisation issues.

While there was some limited success with Western opportunities, CANMET-MMSL is still largely an Ontario-Quebec focussed organisation given the location of facilities and personnel, the costs of travel, the expertise of the scientists at the lab, and long-term declining resources that have limited initiatives.

Imperial Chemicals Industries (ICI) & CIL Employment

Nov88-Feb93 *ICI Forest Products, Montreal*

Job: Market Research Manager, Chloralkali
Contacts: Bill Wowchuk, Marketing Manager
Norm Thogersen, General Manager
Paul Donnini, Business Development Manager

My work included the macro-and micro-economic modelling and forecasting of inorganic chemicals and their end-use markets. Major surveys of pulp and paper operations were carried out, production and import-export statistics were monitored, and presentations were made to major clients to explain pricing and market dynamics. I learned a lot about commodity markets, pricing, and client relations (product management and marketing - as an observer). Specific projects included:

- Hydrogen peroxide - phone survey of pulp and paper industry, integration of more general market trends, micro-economic (industry & technology specific) blended with macro-economic (indicators etc) analysis, report and presentation. This work helped to justify a major business partnership related to a new hydrogen peroxide plant in Quebec.
- End-use market & macro-economic analysis of chloralakli markets and caustic substitutes & competitive processes (ongoing).
- Special grade of hydrochloric acid - quick analysis.
- Techno-economic analysis of lime soda to caustic business opportunity.
- Specialty chemicals for the pulp and paper industry - business opportunities and targetting.

For the last couple of years my work increasingly included business development projects, which entailed the technical assessment of specialty chemical opportunities, conceptual process layout and costing, and estimates of market size.

At the end, although slated for a product management job, I was extremely impressed by the high quality marketing staff, and elected to pursue a marketing position for my next job (more specifically, industrial sales). Business was also under pressure, and within a couple of years of leaving the business unit was sold off to an American company.

Jan87-Oct88 *ICI - CIL Sulfur Products, Mississauga*
Job: Research Engineer
Contacts: Athol Tricket,
Russell Derrah,
Jean du Manoir,
Andy Yethon,
Rob Michalowitz

My time at the central research lab of ICI Canada allowed me to do research on a number of fascinating industry challenges, including:

- a sensitive/difficult pasturization of a biological enzyme (B.T. pesticide) that was critical for our biotech research group;
- analysis and challenge of the direction of several long-term, high-profile corporate R&D projects (polymer coated urea project by the agriculture research lab, critical analysis of

re-incarnated proposals to reduce SO2 off-gases to elemental sulfur, etc)
- the production of specialty grades of oleum and sulfuric acid at oleum storage sites using microwave processing (here I assisted the project leader)
- chemical engineering process design, from overall flowsheet to individual unit operations to special data-derived liquid vapour equilibrium models, using ICI's advanced software (somewhat like ASPEN). Not having access to corporate training, I learned this by myself from somewhat cryptic manuals.
- Selection and mounting of instrumentation to measure sulfuric acid quality at a major smelter operation.
- Extensive testing for the cleanup of SO2/SO3 gas process streams from the perspective of very high-purity end-use market requirements.
- Development of canola seed coatings.
- Assessment and testing of the INCO SO2-air process for cyanide destruction.

As it became clear that the science of my hobby (neural networks) could never be matched by my research at work, I sought to round out my background with a marketing group in the company (much better mobility, pay, and opportunity!).

Apr86-Dec86	*ICI - Canadian Fracmaster, Calgary*
Job:	Research Engineer, Rheology
Contacts:	Hutch Holton, Bob Greenhorn, Dave Larson

Just as I completed my Master of Applied Science (M.A.Sc.) degree in chemical engineering at the University of Ottawa, I landed an opportunity with ICI in Calgary. My main research project was to design and implement rheological research/testing equipment at Canadian Fracmaster, which had just been taken over by ICI. Given the abrupt drop in oil price (30 $/barrel -> 10 $/bbl) just as I joined the operation, the R&D efforts were slated for shut-down, and most personnel were transferred to other parts of ICI, although some left the company to pursue other opportunities.

I did do a range of tests on oilwell stimulation fluids, using an advanced vibrating rheometer. I played around with engineering models for non-Newtonian fluid behaviour, and compared them to field data with a good deal of satisfaction. I also learned routine lab tests for oilwell fracturing fluids and cements, acid jobs.

Other Organisations earlier in my career

?Sep83-Mar86?	*Energy, Mines & Resources, Ottawa*
Job:	Physical Scientist, hydrometallurgy
Contacts:	Gordon Ritcey*, World-Renowned Hydrometallurgist, Solvent Extraction, Process Flowsheet Design Mike Campbell*, R&D Section Head - Hydrometallurgy

Ron Molnar, Hydrometallurgist, Pilot Plants

As I was completing my Master's thesis in Chemical Engineering, I took full-time employment at the Minerals Sciences Laboratories (MSL) which later merged with mining to become MMSL. I did experimental work in the area of hydrometallurgy, including:

- oxygen use versus air for leaching uranium from Elliot Lake ores, including process computer modelling (kinetics, mass transfer)
- precipitation of iron from chloride/sulphate solutions
- zinc solvent extraction - fast kinetics to avoid iron carry-over etc
- direct fluoride leach to UF4 process,
- Atomic Emission Spectroscopy (AES) and wet chemical analysis, complimented by analytical lab resources were not used.

Sep81-Sep83? *Master of Applied Science in Chemical Engineering, University of Ottawa*
Job: Physical and chemical aspects of the solvent extraction of uranium by a tertiary amine

?Dec79-Aug81 *Alcan, Jonquiere QC*
Job: Process Engineer, AlF3 plant
Contacts: Yvon Larouche, Plant Manager
Guy Forté, ?Process Manager?
Wesley Stevens, Process Engineer, R&D Engineer

Following graduation with my BASc in Chemical Engineering, rather than stay in Alberta during the height of an oil boom I packed my bags to move to Quebec, learn French, and start my career. I ended up in an excellent region - Saguenay- Lac St Jean as a junior chemical engineer in the aluminum fluoride plant. Besides aluminum fluoride production, I was exposed to fluorspar grinding/ flotation, aluminum hydrate drying/ calcination, aluminum sulphate and sulfuric acid. As there was a major modernisation program planned, with completely new plants (plus outsourcing for sulfuric acid and a separate facility aluminum sulfate) the main challenges were minor modifications, commissioning a 98% sulfuric acid unloading facility for extreme winter cold (that was scary!).

Small construction projects included entrained water droplet knockout for a separator, stairs and support columns for large sulfuric acid storage tanks, pumping and heating control systems for acid lines, and the revamping of all of the production monitoring software (not control software).

Extra-Job Mega-Activities

In addition to the descriptions of my past jobs above it is also worthwhile to consider my efforts related to my hobbies:

- neural networks;
- biotech/genetics;
- math, statistics and physics for climate change science and modelling;
- computer languages (including the port of the Q'Nial Language from Unix to AmigaDOS, stretching C compilers beyond their limits).

From a science/ engineering perspective, my "hobbies" are vastly more advanced and challenging than anything that I have run into at the corporate or government labs that I have worked at. My hobbies also tend to be associated with issues of far greater overall priority and urgency for society (i.e. the implications of failures of the science underlying the Kyoto Premise for Climate Change, understanding the most complex system known - the human brain, the reality versus the hype and fears behind the social and medical implications of genetics, etc). These activities have also been a unique opportunity to work with some really amazing people.

Howell - Scientific journal peer reviews

IEEE-TNNLS	IEEE Transactions on Neural Networks and Learning Systems (was IEEE-TNN prior to ?~2010?)	IEEE-CIS
NCA	Neural Computing and Applications	
NN	Neural Networks	INNS

	Paper reviews			
Year	**NN**	**IEEE-TNNLS**	**NCA**	**Total**
2013	4			**4**
2012	4			**4**
2011	2			**2**
2010	2			**2**
2009	5			**5**
2008	5		2	**7**
2007	7			**7**
2006		6		**6**
2005				**0**
2004				**0**
2003				**0**
Total	**29**	**6**	**2**	**37**

Note that my reviews tend to be much longer and deeper than most.
NN – Elsevier's report shows 30 completed reviews and 2 pending as of 26Sep2013 (this applies to the NN journal only).

Howell - Scientific conferences: peer reviews and responsibilities

CISDA =	Computational Intelligence for Security and Defence Applications	IEEE-CIS
IJCNN =	International Joint Conference on Neural Networks	INNS + IEEE-CIS
INISTA =	International Symposium on INnovations in Intelligent SysTems and Applications	IEEE + Yildiz Technical University, Istanbul
IWACI =	International Workshop on Advanced Computational Intelligence	IEEE-CIS
SSCI =	Symposium Series on Computational Intelligence	IEEE-CIS
WCCI =	World Congress on Computational Intelligence	IEEE-CIS + [INNS for NNs]

Year	Conference	Location	Responsibility	Paper reviews	attended	website
2013	IJCNN	Dallas	Publicity Chair	10	Y	www.ijcnn2013.org
2013	INISTA	Albena, Bulgaria	(paper reviewer)	3	N	http://www.inista.org/
2013	SSCI	Signapore	(paper reviewer)	1	N	http://www.ntu.edu.sg/home/epnsugan/index_files/SSCI2013/
2012	CISDA	Ottawa	helped John Verdon create a Social Media Special Session	9	Y	http://ieee-cisda.org
2012	WCCI	Brisbane	Program Committee (paper reviewer)	5	N	www.ieee-wcci2012.org
2011	IJCNN	San Jose	Program Committee (paper reviewer)	7	N	www.ijcnn2011.org
2011	INISTA	?Turkey?	(paper reviewer)	3	N	http://www.inista.org/
2010	INISTA	?Turkey?	(paper reviewer)	3	N	http://www.inista.org/
2010	IWACI	Suzhou, China	Program Committee (paper reviewer)	17	N	http://www.iwaci.org/iwaci2010/
2010	WCCI	Barcelona	Technical Program (paper reviewer)	5	N	www.wcci2010.org
2009	IJCNN	Atlanta	Publicity Chair, Topic review chair	29	Y	www.ijcnn2009.com
2008	IJCNN	Hong Kong	Program Committee (paper reviewer),	14	Y	
2007	IJCNN	Orlando FL	Publicity Chair	4	Y	www.ijcnn2007.org
2007	INISTA	?Turkey?	(paper reviewer)	9	N	http://www.inista.org/
2006	IJCNN	Vancouver	International Liaison,	19	Y	
2005	IJCNN	Montreal	Program Co-Chair	28	Y	www.ijcnn2005.org
2004	IJCNN	Budapest, Hungary	(paper reviewer)	5	Y	
2003	IJCNN	Portland OR	International Liaison	7	Y	
2002	WCCI	Hawaii	Session Chair, (paper reviewer)	5	Y	
Total				**183**		

Attended – Note that I paid for all conference costs, including travel, registration, hotels etc, out of my after-tax pocket!!
I did paper reviews for ALL conferences listed, even if not mentioned. I did the reviews alone, not via a gradstudent or employee. Note that journal reviews are listed separately, and that I have NOT compiled a list of work-related reviews of papers and reports. Additionally, my reviews tend to be much longer and deeper than most.

Selected reports and publications

I have seldom been in a position to generate reports of a non-confidential nature suitable for publication. The list that follows is therefore comprised mostly of internal corporate reports that were not released. Often these reports were prepared with tight deadlines and with a specific "customer" in mind, so the style tends to be succinct and to the point. Still, I have always been proud of the technical depth and quality of most of my reports, which compare favourably with many of the publications of technical and marketing research personnel that I have worked with, reviewed, or administered.

Almost all of the work reports listed below were products of my own investigations, analysis and reporting. In a few cases initial direction and objectives came from senior scientists (M.A.Sc. thesis and earlier CANMET work in particular). Extensive computer modelling is used in most of the work, using several different computer languages and advanced usage/macro programming of applications such as spreadsheets and text retrieval software.

The big exception to my primary authorship is the Neural Networks journal special issue of selected papers from the International Joint Conference on Neural Networks 2005 in Montreal: http://faculty.uwb.edu/ijcnn05/ For that publication I was one of four guest editors.

Most of my work at ICI Sulfur Products research group was never produced in a major report format - for example: cleanup of smelter gas derived SO2 & H2SO4; pasturize bio-enzymes (B.T.), process evaluation/costing of slow-release polymer coatings for fertilizers, and formulation/ application of canola seed coatings. Some of this work was in the form of process design and cost estimation for senior management decisions on advanced R&D projects, while other work was in the form of highly technical engineering support to other researchers.

Of course, this listing omits a far, far greater volume of analyses and reporting of a scientific, engineering, operational, managerial, and conceptual nature, as produced throughout my career. One notable "deep specialty" area for my work environments has been [project, operational, managerial, financial] reporting using sophisticated software tie-ins to corporate information systems. These systems went far beyond the official IM capabilities. Another huge area that I put time into were a vast array of computer, programming languages, and related projects (including several major hardware projects). Of those, only the Q'Nial language port is listed below.

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Reports in reverse chronological order :

Work related :

1. Howell 2011 – Systems design issues for social media (version 110902 Howell, 18pp ~20% finished) , http://www.gcpedia.gc.ca/gcwiki/images/c/c6/SPINE_%E2%80%93_Systems_design_issues_for_social_media_110902_Howell.doc - Although a framework and a fair amount of comment has been produced for this paper, I do not have sufficient breadth to complete this on my own. However, I will be looking for others to either input or produce their own work, and I can raise a lot of issues and "provocations" that I hope to get others to respond to.
2. Howell 2011 - How to set up & use data mining with Social media.doc (15pp ~20% finished), http://www.gcpedia.gc.ca/gcwiki/images/c/ca/Howell_2011_-_How_to_set_up_%26_use_data_mining_with_Social_media.doc - A very large and diverse set of data-mining tools and systems are available for a wide range of needs, and it is not the intent of this document to overview the toolsets for data-mining. Instead, several "under-the-hood" capabilities (HOW) are discussed as are WHAT we might be seeking to achieve with Data-mining and Social Media.
3. Howell 2011 – Semantics beyond search (version 110905 Howell, 30pp ~25-30% finished), http://www.gcpedia.gc.ca/gcwiki/images/a/a6/Howell_2011_%E2%80%93_Semantics_beyond_search.doc - the intent here is to force open everyone's thinking on the potential impacts and applications of semantics. (posted 06Sep2011, authored by Howell)
4. Howell 2011 – Social graphs, social sets, and social media (63pp ~25% finished), http://www.gcpedia.gc.ca/gcwiki/images/9/90/Howell_2011_%E2%80%93_Social_graphs%2C_social_sets%2C_and_social_media.doc - Social graphs and social sets, including dynamics - Nothing has been done yet on this paper, which is far more challenging and advanced than any of the others. It does, however, tackle issues at the heart of the "new" social media (Facebook, Twitter like systems), as well as elaborating more advanced concepts (some of which have "placeholders" in the "Semantics beyond search" paper).
5. Howell - eGroupWare setup, wki pages, documentation, user support, and content - With the help of our ISP provider, I found the eGroupWare, FREE, web-based system for collaboration, with fantastic capabilities for end-user control over access to files, directories, wikis. I built ~40 wiki pages for two major initiatives (EFRB & HMII), and approximately 40 sub-groups. Here I will only list a few of the documents that I composed as guidelines etc :
    - Instructions – how to create wiki pages 090716.txt (5 pages)
    - Instructions – how to edit wiki pages 090716.txt (4 pages)
    - _eGroupWare - User Configuratipn default settings 100225.doc (2 pages)
    - _eGroupWare quick security guidelines & procedures.doc (9 pages)
    - 101201 Howell eGroupWare security check.doc (15 pages – I did these quarterly)
    - Many, many other documents, wikis, etc
6. Howell 090609 "Nano-toxicology – Definitions, products, regulations, working groups" (28pp) - This is the largest of several notes that I compiled in draft form as the result of a literature review of nanotoxicology, with an emphasis on aquatic nanotox related to metals and minerals. Opportunities, potential partners, and suggestions for our research lab were an important part of the project, which was never completed due to organisation changes and priorities. Other short notes on separate themes included :
    - Howell - nanoTox - Gaps in many of the scientific and policy papers (3pp)
    - Howell - nanoTox - Key processes in nano-toxicology (1pp listing)
    - Howell - nanoTox - Non-Governmental Organizations (NGOs) (5pp)
    - Howell - nanoTox - Off the wall comments (2pp)
7. Howell – Lotus Notes system administration for the Mining Automation Program (MAP)
8. Bill Howell "Telemining Safety/Regulatory Issues" Mining Automation Program final reports (Dyno Nobel, INCO, Natural Resources Canada, Sandvik Tamrock), 61 pages, February 2001
9. W.N. Howell, Jozef Stachulak, Don Peloquin, Andreas Mayer "Assessment of Diesel Particulate Filter (DPF) technology at INCO's Stobie mine" Proposal for the Diesel Emissions Evaluation Program (DEEP), >120 pages,

March 1999

10. W.N. Howell "Regional chloralkali trends" Internal corporate report, ICI Forest Products, Montréal, 69 pages (including 20 pages extracted from a consultant report for comparison), July 1992
11. Bill Howell "Lime soda project analysis" Internal corporate report, ICI Forest Products, Montréal, 9 pages (condensed output of a major process/costing/market analysis), February 1992
12. Bill Howell "Employee survey and assessment of the progress of Total Quality Management at ICI Forest Product's head office", Internal corporate report, ICI Forest Products, Montréal ?month? 1990 (No longer have this in my possession)
13. Bill Howell "North American chloralkali forecast" Analysis/ presentation for major clients, ICI Forest Products, Montreal, >60 pages of material adapted per client, August 1990
14. Bill Howell "Historical trend regressions - a simple approach" Internal analysis & communications with chemical industry market experts, ICI Forest Products, Montreal, 19 pages, February 1990
15. Bill Howell "Survey/ forecast of hydrogen peroxide utilization for pulp and paper" Internal corporate report, ICI Forest Products, Montréal ?date? 1989 (No longer have this in my possession)
16. **W.N. Howell, J.A. Golding "Bench Scale Mixer-Settler Study of the extraction and stripping of uranium from solution" Hydrometallurgy, v19 pp11-30 1988 (published)**
17. W.N. Howell "Methods of boiling oleum" and "Jet pump usage in an oleum boiling process" Internal assessments, C-I-L Research Center, Mississauga, 19 pages, April 1987
18. Bill Howell "Translation and analysis of data from the Rheometrics Pressure Rheometer (RPR)" Internal corporate report, Canadian Fracmaster, Calgary, 57 pages, December 1986
19. Bill Howell "Preliminary design and costing of a pipe rheometer" Internal corporate report, Canadian Fracmaster, Calgary, 37 pages, November 1986
20. Bill Howell "Frictional pressure loss charts for hydraulic fracturing fluids" Internal corporate report, Canadian Fracmaster, Calgary, 23 pages, October 1986
21. Bill Howell "A process for the production of UF4 at uranium milling sites" CANMET report (not officially finalized before I started a new job - initial stages completed, project was thereafter terminated) with Gord Ritcey's collaboration, 52 pages, May 1986
22. Bill Howell "The recovery of zinc from sulfate leach liquors" CANMET report (not officially finalized before I started a new job - although it was complete) with Ron Molnar's collaboration, 43 pages, May 1986
23. **W.N. Howell "Physical and chemical aspects of the solvent extraction of uranium by a tertiary amine" M.A.Sc. Chemical Engineering, University of Ottawa, 345 pages, September 1985**
24. W.N. Howell and B.H. Lucas "Iron removal from ferrous chloride leach liquors" CANMET divisional report MRP/MSL 85-74 (TR), Energy Mines & Resources Canada, Ottawa, 32 pages, May 1985
25. W.N. Howell and B.H. Lucas "Fluid bed leaching of uranium (two-zone process)" CANMET divisional report MRP/MSL 85-1 (CF), Energy Mines & Resources Canada, Ottawa, 45 pages, May 1985
26. **W.N. Howell, G.M. Ritcey, and J.A. Golding "Physical and chemical aspects of uranium extraction from H2SO4 leach solutions and stripping with ammonium sulfate@ poster session, International Solvent Extraction Conference (ISEC'83), 9 pages, March 1983**

Home projects :

As noted in the section "Extra-Job Mega-Activities" above, my home projects are far more sophisticated and advanced than anything that I have run into at work. Naturally, given the liberty of leisure, they also tackle far "greater" issues for the whole of science and humanity as compared to anything at work (the "SPINE" project on social media being an exception – but even there my reports were almost entirely due to my hobby expertise). For those reasons, they should NOT be considered to be light, or lesser, than my projects at work over my career, but it is true that I had far less time to commit to my "hobby" projects, and essentially no "after-tax, out-of-pocket" cash other than purchasing a huge number of [home computers, software, books] and travelling to an annual scientific conference.

Many of the following are posted on my personal website, although perhaps a majority are not

simply because I haven't gotten around to posting them all. Furthermore, the list is FAR from complete, especially for earlier years, and for a number of current projects in development (even if I have done some reports).

1. Howell 2011 - Confabulation Theory, Plausible next sentence survey (version 110903 Howell, 31pp 100% finished), http://www.gcpedia.gc.ca/gcwiki/images/9/95/Howell_2011_-_Confabulation_Theory%2C_Plausible_next_sentence_survey.doc - Confabulation Theory: next plausible sentence - This is my home project from 2007-08, which I think is a wonderful example to "blow the lid off thinking" on semantics. Note that this is also posted on my home website, having been the last small part of a home project, albeit with "cleanup" of the document here at NRCan. If you are interested in this type of thing - try this out on your colleagues, friends or family… Even if you don't want to do the exercise through your friends, the concept of Confabulation itself is advanced enough to get you thinking. (I circulated this to several SPINE team members). (posted 06Sep2011, authored by Howell as a home hobby 2007-08)
2. Howell 110417 comments on Vaughan 10Apr11 Solar, Terrestrial, & Lunisolar.link
3. Howell 110702 Solar Activity theory history - follow-up on Charbonneau .odt
4. Howell 120115 War timelines.ods
5. Howell 2007 - A Preliminary note on Holocene climate.pdf
6. Howell - Alta Potato Growers Association FULL version Nov07.pdf .ppt
7. Howell - A Preliminary note on Holocene climate 2007.odt
8. Howell - Are we ready for global cooling 14Mar06 longer version. Pdf doc & ppt
9. Howell - Charvatova's hypothesis & Isotopic solar proxies Aug08.odt
10. Howell - Civilisation, solar insolation .pdf ods pdf
11. Howell - Climate Change, back to reality after 20 years of D-cubed thinking.odt
12. Howell - Climate Change situation Jun04.pdf
13. Howell - Climate Change situation Jun04.ppt
14. Howell comments on Scherer et al - Interstellar-Terrestrial Relations, Variable Cosmic Environments, the Dynamic Heliosphere 060706.doc
15. **William Neil Howell "Genetic specification of recurrent neural networks: Initial thoughts", Proceedings of WCCI 2006, World Congress on Computational Intelligence, Vancouver, paper#2074, IEEE Press, pp 9370-9379, 16-21 July 2006**
16. Bill Howell "Are we ready for global cooling?" - A short presentation to Toastmasters – Dows Lake, Ottawa, 14Mar06. Needs corrections and comments! (some time later...)
17. Bill Howell 2006, "Genetic Specification of Recurrent Neural Networks: Initial Thoughts", Presentation in the Special Session on Neural Network Models and Applications in Bioinformatics, Neuroscience, and Neuro-Genetics, World Congress on Computational Intelligence 2006, Vancouver, 21-27Jul06 (available from author)
18. Bill Howell "Genetic specification of recurrent neural networks, draft concepts and implications" draft document, unpublished, Ottawa Jan06, precursor to the IJCNN06 paper above
19. **D. Prokhorov, D. Levine, F. Ham and W. Howell, guest editors "IJCNN2005", Neural Networks, Volume 18, Issues 5-6, Pages 457-860 (July-August 2005)**
20. Bill Howell "Junk DNA and Neural Networks: conjecture on directions and implications", Workshop on Artificial Neural Networks, Bioinformatics and Neuroinformatics - A Synergistic Approach , International Joint Conference on Neural Networks 2005, Montreal 31Jul-04Aug05 (unpublished in rough draft form only!!)
21. Howell - complexity and post-rational, non-symbolic, and classical thinking.odp
22. Howell - critique of Gore, An inconvenient truth .ods pdf
23. Howell - critique of Jared Diamonds Guns and Collapse.odt
24. Howell - End of Enlightenment 02Aug09 .odp 25Sep09.pdf
25. Howell - Glaciation models for the last 6 million years .odt .pdf .png
26. Howell - Glaciation models for the last million years graphs.pdf
27. Howell - Historical timelines and the sun - astronomical & climate cycles.pdf
28. Howell - horizons sun-bary vectors -3000 BC to 3000 AD.ods

29. Howell - influenza and solar-climate phase relations.odt
30. Howell - Influenza pandemics, the sun and the barycenter.odt
31. Howell - Landscheit, trimmed Ephemeris data.pdf
32. Howell - Laskar etal 2004 Milankovic data.ods
33. Howell - Mega-Life, Mega-Death and the Sun, the rise and fall of civilisations 070128.pdf Toastmasters 070404.odt
34. Howell - Mega-Life, Mega-Death II public version.odp
35. Howell - notable Canadians & climate science.ppt
36. Howell - Paillard-Parrenin threshold models of glaciation - quick results of models .odt .pdf
37. Howell - Paillards model and Milankovic rollover.odt
38. Howell - Pandemics and solar storms.ods
39. Howell - Pandemics and the sun.pdf
40. Howell - Ring around the rosies 061004 .doc .ppt
41. Howell - Rotary Club 22May07 - superposition of 2 slides.pdf
42. Howell - Rotary Club lessons learned - adapted presentation 22May07 .pdf .ppt
43. Howell - Rotary club post-interpretation, CO2 is a time-lagged fuzzy thermometer.pdf
44. Howell - Selected pandemics & epidemics 070122 .ppt .pdf .png
45. Howell - solar inertial motion - NASA-JPL versus Charvatova.pdf
46. Howell - Solar influence over mega-life & mega-death Jan07.ppt
47. Howell - Solar insolation for civilisations.pdf
48. Howell - Solar presentations 13Oct06.pdf
49. Howell - Wilson Jul08 - Which came first The chicken or the egg (Length of Day & PDO, NAO) 13Nov09.xcf
50. Howell - Wolfe's sand due time series 13Nov09.xcf
51. Howell 120115 Wars & battles of history - Charvatovan alignment.png.link
52. Howell - radioisotopes and history 091004 .jpg .xcf .jpg
53. Bill Howell, "Ring around the rosies" - A short presentation about Pandemics and the Sun to Toastmasters – Hard Disk Cafe, Calgary, 04Oct06.
54. Bill Howell "Q'Nial for the Amiga" User's guide and reference for a computer language implementation ported from Unix by the author (5 year, part-time project!), 25 pages, November 1990

enddoc