

ROYALTY BASED COMPENSATION SYSTEMS
FOR
GOVERNMENT INVENTORS AND INNOVATORS

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BACKGROUND

For the past 23 years, the Government of Canada has had an award program to encourage the disclosure of inventions made by public servants.

Past

In 1973, the Federal Government enacted the PUBLIC SERVANTS INVENTIONS ACT (R.S., c. P-31, s. 1) to cover inventions made by public servants where ownership was vested in Her Majesty.

Under this Act awards to the inventor could be made. Section 10 states: "Subject to the regulations, the appropriate minister may authorize the payment of an award to a public servant who makes an invention that is vested in Her Majesty by this Act, in such amount as the appropriate minister and the public servant may agree on or as the appropriate minister determines".

The accompanying Public Servants Inventions Regulations elaborated on the awards that could be made. Under the title "Awards to Inventors" section 13 states:

(1) In addition to any other award that may be paid under this section in respect of an invention vested in Her Majesty, an award may be paid by the appropriate Minister to each inventor of the invention

(a) upon the filing by Her Majesty of the first application for a patent for the invention in the patent office of the first country in which an application for a patent for the invention is filed by Her Majesty, in the amount of

(i) \$50. if there is only one inventor, or

(ii) \$95. divided by the number of inventors, if there is more than one inventor; and

(b) upon the issuance of the first patent in respect of the invention that is issued by the first country that issues a patent in respect of the invention, in the amount of

(i) \$50. if there is only one inventor, or

(ii) \$95. divided by the number of inventors, if there is more than one inventor.

(2) Where any money is received by Her Majesty upon the sale, license or other disposal of an invention vested in Her Majesty by the Act, an award or awards may be paid to the inventor, based on the total amount from time to time so received, but such award or awards shall not in the aggregate exceed 15 per cent of the amount so received.

(3) Where Her Majesty has made use of an invention vested in her Majesty by the Act, an award or awards may from time to time be paid to the inventor, but such award or awards shall not in the aggregate exceed the sum of \$5000. except with the approval of Treasury Board.

Subsection (5) allows for the payments under both subsections 2 and 3, where an invention is both used internally by the Crown, and also results in revenues to the Crown. Subsection (6) allows for a payment not to exceed \$5000., except with the approval of Treasury Board, to an inventor for an invention with potential value to the Crown in some manner.

From the wording used above, it is clear that payments are to be made only to the inventor of an invention vested in Her Majesty. While not explicitly spelled out, it could be argued that the inventor, for the purposes of an award, is the person(s) named in the patent application.

Present

On June 2, 1993, the Treasury Board approved a revised policy of awards for Public Service inventors. At the same time Section 13 of the Public Servants Inventions Regulations was revoked. This new policy of awards is called the Award Plan for Inventors and Innovators.

The Award plan for inventors and innovators encourages Public Servant inventors in science and technology to pursue, through the transfer of technology, the commercialization of their inventions and to promote within the government laboratories, the practice of collaborating with Canadian industry.

The authority to make awards under this revised plan is still the Public Servants Inventions Act. In the Human Resources volume of the Treasury Board Manual, Appendix A the following is written:

In accordance with Section 10 of the Public Servants Inventions Act, "the appropriate Minister may authorize the payment of an award to a public servant who makes an invention that is vested in Her Majesty". Payments to an inventor may be made for the life of the inventor but must cease at the inventor's death.

The amount of award for inventions used by the Crown remains at a maximum of \$5000. unless permission is received from Treasury Board to exceed.

The major change is in the amount of awards made from royalty or license fees which are considered to be ex gratia awards and subject to reconsideration at any time.

Under a new formula, the amounts to be awarded for each invention should be based on the revenues from the invention (e.g. royalties, license fees, etc.) and should be:

(i) not less than 15 per cent of revenues, and

(ii) not more than:

- 100 per cent of revenues where revenues are \$1,000. or less, or

- the greater of \$1,000. or 35 per cent of revenues where revenues are greater than \$1,000.

If there is more than one inventor for any one invention, the award should be divided among the eligible inventors.

Awards are to be made annually based on revenues received, but no individual is to receive an annual award or awards derived from a single invention, which exceeds the highest salary current at the time of payment, of the SE-RES 2 classification.

Again, the wording of the plan focuses on inventors not innovators, despite the word "innovators" appearing in the title.

The purpose of this paper is to briefly outline royalty based compensation programs employed by departments and agencies in the Canadian federal government, in Canadian and American universities, and industry and present options that can be considered in adopting such a compensation system.

CANADIAN GOVERNMENT EXPERIENCE

Table 1 provides a 1995 summary of planned and proposed award practices of various government departments and agencies. Natural Resources Canada (NRCan) and the Communications Research Centre (CRC) have finalized policies and guidelines on awards to inventors. Agriculture and Agri-Foods Canada (AgCan), the Department of Environment, the National Research Council (NRC), and the Department of National Defence (DND) have draft policies which are still being reviewed and developed.

Fisheries and Oceans (F&O) has not developed a departmental policy but they are applying the 1993 Treasury Board policy as stated. Atomic Energy of Canada Limited (AECL) is a Schedule III agency under the Financial Administration Act and is exempt from the 1993 Treasury Board award policy.

In the case of one government department, a sub-unit within the department is not applying the award policy because of philosophical objections to government scientists receiving royalty awards.

Range of Recipients

As can be noted from Table 1, most government departments have or are adopting the practice of giving awards to not only the inventor(s) but also to anyone else who contributed significantly to the success of the commercialization of the invention.

Although there are some minor differences in the NRCan divisions (CANMET, Geomatics Canada and Canadian Forestry Service), the scope of the policies is basically the same. The range of licensing revenues used for awards is 15% to 35%, in accordance with the Treasury Board policy.

CANMET and Geomatics Canada guidelines suggest that within this range, 15% be allocated to "conception and reduction to practice" of the invention; an additional 10% be awarded for essential participation in the "development" stage; and a further 10% for essential participation in the "commercial validation and production preparation" stage. The guidelines state further that "an innovator is someone who played an essential part in either the development of a new product or its commercial validation and production preparation and should be awarded a share of 10% of the total royalties for each stage of the new product/process development in which he or she was involved".

Forestry Canada guidelines suggest that the first 15% should go to the named inventor(s) on the PSIA forms and the remaining 20% should be shared by significant team members, including the inventor and collaborators, with the actual amount each receives to be determined by the contribution of each in the various stages of development and participation in the commercialization and technology transfer efforts.

Table 1. Summary of Government Award Practices

	Policy Documents	Percent Range	Dollar Range	Number of Awards/Yr	Recipients	Approval
AgCan	Proposal in draft	15-35	\$1000-20,000	25	Inventor Innovator	Mgr Resp. Centre
CANMET	Yes	15-35	\$100-7,000	NA	Inventor Innovator	ADM
GEOMATICS	CANMET Policy		\$200-9,000	None since 93	Broad	Small awards: DG Main awards: ADM
CFS	Yes	15-35	\$100-2,500	10	Broad	DG
NRC	Proposal in draft	15-35	\$500-20,000		Inventor TT Team	President
DND	Proposal in draft	\$1000: 35% Over \$1000: 25% for 2 yrs; 30% for 3yrs; 35% after 5yrs	\$100-16,000	30-40	Inventor	DPatA
F&O	None	\$1000: 100% Over \$1000: 25%	\$,1000-5,000	15	Inventor	DM
CRC	Proposal in draft	15%	\$2.50-7,000	46	Inventor TT Team	President
AECL	None	None \$500 patent filing; \$500 when patent granted		12/yr	Inventor	Automatic
Health Can	In development	NA	NA	1	NRC defn	NA
DOE	Proposal in draft	15%-35%	\$100-56,000	11-14	Broad	Mgr Resp. Centre

In effect, Natural Resources Canada suggests that the inventor(s) receive 15% of royalties and the remainder be shared by those involved in the development and commercialization of the invention. The latter group could, but does not necessarily include, the inventor(s).

The proposed AgCan guidelines state that the Responsibility Centre Manager shall determine the amount of the award, which must be within the 15% to 35% limits as outlined in the Treasury Board policy. The preamble notes that "eliminating the flexibility could minimize the 'cost' to the department, if the percentage were fixed toward the lower end of the allowable range". The proposed AgCan policy states that technology transfer and commerce officers could also receive awards, if their contributions far exceed the scope of their normal duties.

NRC's draft policy current percent range would comply with the Treasury Board policy, however they are considering increasing the percentage of royalties shared with the innovation team to 50%.

At present DND pays 15% of royalties to the inventor. Their draft policy proposes that 35% percent of revenues be paid for royalties up to \$1000; for royalties over \$1000, payment be \$350 plus 25% of royalties over \$1000 for the first two years; \$350 plus 30% for the next three years and \$350 plus 35% after five years. The DND definition of "inventor" includes producers of software and other work that can be copyrighted, but does not extend to marketing personnel.

F&O pays the inventor 100% of the first \$1000 of royalties and 25% of royalties over \$1000.

CRC's policy is to pay a maximum of 15% of royalties to the named inventor with an addition 25% being allocated to paying for the costs of operating a technology transfer activity (e.g. for patent and licensing costs, etc.).

Atomic Energy of Canada Limited does not pay a percentage of royalties to inventors as they are not covered under the revised Treasury Board Policy. They award \$500 to the inventor on patent filing and another \$500 when a patent is granted.

Impact of the Royalty/Licensing Revenue on Operating Budgets

Revenues earned from licensing Crown-owned intellectual property are not deducted from a department's or a laboratories operating budget. In most departments and agencies, these funds are considered a "bonus" over and above their A-base.

In general, revenues earned from royalty or license fees are returned to the department in the year following the year in which they are earned. NRCan, however, has an arrangement with Treasury Board whereby they estimate the royalty/license fee

earnings for a calender year and these are provided in that year. The royalty/license fees earned are not deducted from the department's operating budget as may be the case for revenues generated from "fee-for-service" or "contracting-in" activities. [C.R.C. and N.R.C. are allowed to keep these fee-for-service revenues with no corresponding reduction in their operating budget allocation; in the case of C.R.C. they receive the fee-for-service revenue within a month of receiving payment from a client, but there is a cap of \$5 million on what they can retain in one year.]

Distribution of the Revenue Stream

In addition to the present or proposed distribution of revenues received from licensing fees and royalty payments among the inventor(s) and innovation team, there is the question of the distribution of any remaining funds. It is in this area where departments differ quite considerably.

In most departments and agencies, the bulk of the remaining funds are allocated back to at least the research branch, division, or institute that is responsible for the invention, if not the originating laboratory. This practice is followed (or is proposed to be followed) by:

Agriculture and Agri-Foods Canada

Communication Research Centre

Environment Canada

Health Canada

National Research Council

Natural Resources Canada

Other departments retain the revenues in their headquarters, and the funds are used throughout the department, but do not necessarily go back to their research and development activities. Departments following this policy are:

Fisheries and Oceans

Department of National Defence

Transport Canada (T.D.C., a contracting agency)

REWARD PRACTICES AT UNIVERSITIES

Information on reward practices at Canadian and U.S. universities to recognize commercialized innovations was obtained from telephone interviews, policy documents provided by the institutions or available through the Internet, and from a literature review of practices at major U.S. universities (Katterman 1995). The amount of detail therefore varies. Information obtained is summarized below.

Canadian Universities

At most Canadian universities contacted, including the University of Toronto, University of Waterloo, Queen's University, University of Calgary, Simon Fraser University and the University of Alberta, ownership of an invention vests with the inventor. At the University of British Columbia and McMaster University, as a condition of employment, ownership of inventions is vested with the university. McMaster University is, however, moving to a policy similar to that of the University of Toronto.

At the universities where ownership is vested with the inventor, the inventor can patent and license the invention him/herself or may use the technology transfer related facilities of the university. The latter are usually called Industrial Liaison or Technology Transfer offices. At the University of Toronto, the Innovations Foundation, a subsidiary corporation of the university, facilitates transfer of technology to the private sector. At the University of Calgary, an independently incorporated company, University Technologies International Inc., (UTI) in which the university is a major shareholder, has been set up to provide intellectual property services to university personnel and to other institutions (e.g., Foothills Hospital).

If the researcher decides to use university or university-related facilities, and if the university decides the invention is worth pursuing, the inventor assigns the patent to the university in return for a percentage of any revenues. The technology transfer office then files for a patent, markets the invention, arranges licenses, royalties etc. In the case of the University of Toronto, the university retains 75% of the net revenues, and the inventor, 25%. If, however, the inventor retains rights to and commercializes their invention, the University of Toronto still receives 25% of net royalties.

At UBC, where the university automatically retains rights to inventions they feel to be viable, the net income is split 50:50 between the inventor and the university. In cases where the university does not believe that the invention has commercial potential, the rights to the invention are returned to the inventor.

At the University of Calgary, UTI is now tending to negotiate deals where a percentage of the royalties go to the researcher's faculty and a percentage to the researcher.

The universities have various arrangements for distribution of their share of net royalties. Funds can be put in a fund under the authority of the VP Research (e.g., Simon Fraser) or can be distributed among the inventor's department and faculty and to general revenues (e.g., Toronto). At U.B.C., half of the universities share goes to general university funds and the rest goes to the relevant faculty. The University of Calgary receives income as a shareholder of the University Technologies International Inc. but it was unknown how the university uses the income.

Thus of the Canadian universities examined, the share of the royalty stream provided to the academic inventor ranged from 25 to 75% depending on how much of the university technology transfer facilities were used.

American Universities

Royalty revenues in American universities are beginning to be a significant source of income. In 1993, the top ten royalty earning universities and colleges earned \$170 million. A major impetus to the growth of this revenue source was the passage in 1980 of the Bayh-Dole Act which gave universities ownership of inventions resulting from federally sponsored research (Katterman, 1995).

The arrangements for distributing royalties at universities in the U.S. are similar to those at Canadian universities. If the inventor uses the university's facilities for patenting and licensing inventions, the rights are assigned to the university. In most cases, the university recovers the costs involved in patenting, marketing and licensing the technology and the net revenues are distributed among the inventor for personal use, and the inventor's faculty/department and special president/deans accounts to be used for research and academic purposes. A portion may go into general university operating accounts. In the University of California system, 25% of the royalty revenues are remitted to the State of California.

Some universities base percentages of royalties on gross income, but provisions for recovering costs associated with patenting and licensing are incorporated into agreements.

The percentage to the inventor for personal use is either a fixed percentage (e.g., Iowa State University, M.I.T., and Stanford University); or based on a sliding scale depending on the amount of the royalties (usually a lower percentage to the inventor and a higher percentage to the university and/or departments/faculties as the revenues increase (e.g. University of California system, Columbia, Univ. of Washington, Harvard)

FIGURE 1

**ROYALTY-SHARING FORMULAS* OF THE TOP 10 U.S. UNIVERSITIES
(ranked by total royalties from FY1993)**

1. **University of California system** (FY1993 royalties received: \$45,440,022)
 - Subtract costs of patenting and an administrative fee from gross royalties
 - First \$100,000 net royalties:
 - 50% to inventor for personal use
 - 25% to state of California
 - 25% to inventor's campus for academic and research uses
 - Next \$400,000 net royalties:
 - 35% to inventor for personal use
 - 25% to state of California
 - 40% to inventor's campus for academic and research uses
 - Over \$500,000 net royalties:
 - 20% to inventor for personal use
 - 25% to state of California
 - 55% to inventor's campus for academic and research uses
 2. **Stanford University** (FY1993 royalties received: \$31,200,000)
 - Subtract 15% of gross royalties for patent and licensing expenses
 - Net royalties:
 - 33 1/3% to inventor for personal use
 - 33 1/3% to inventor's department for academic and research uses
 - 33 1/3% to inventor's school/college for academic and research uses
 3. **Columbia University** (FY1993 royalties received: \$21,088,217)
 - First \$100,000 gross royalties:
 - 40% to inventor for personal use
 - 20% to inventor's lab for research use
 - 40% divided among university, department, school, and to pay patent/licensing costs
 - Over \$100,000 gross royalties:
 - 20% to inventor for personal use
 - 20% to inventor's lab for research use
 - 60% divided among university, department, school, and to pay any remaining patent/licensing costs
 4. **University of Wisconsin, Madison** [Wisconsin Alumni Research Foundation] (FY1993 royalties received: \$15,822,400)
 - \$1,500 to inventor for filing the patent
 - Gross royalties:
 - 20% to inventor for personal use
 - 15% to inventor's department for academic and research uses
 - 65% to pay patent/licensing costs and to university
 5. **University of Washington** [Washington Research Foundation] (FY1993 royalties received: \$14,755,000)
 - Subtract patent costs and 15% of gross royalties for administrative costs
 - First \$10,000 net royalties: 100% to inventor for personal use
 - From \$10,000 to \$40,000 net royalties:
 - 50% to inventor for personal use
 - 18.75% to inventor's department for academic and research uses
 - 6.25% to inventor's college for academic and research uses
 - 25% to a general university research support fund
 - Over \$40,000 net royalties:
 - 30% to inventor for personal use
 - 15% to inventor's department for academic and research uses
 - 5% to inventor's college for academic and research uses
 - 50% to a general university research support fund
 6. **Michigan State University** (FY1993 royalties received: \$14,150,029)
 - Subtract patenting costs from gross royalties
 - First \$1,000: 100% to inventor for personal use
 - Next \$100,000 net royalties:
 - 33 1/3% to inventor for personal use
 - 33 1/3% to inventor's academic unit for academic and research uses
 - 33 1/3% to university for academic and research uses
 - Next \$400,000 net royalties:
 - 30% to inventor for personal use
 - 30% to inventor's academic unit for academic and research uses
 - 40% to university for academic and research uses
 - Next \$500,000 net royalties:
 - 20% to inventor for personal use
 - 20% to inventor's academic unit for academic and research uses
 - 60% to university for academic and research uses
 - Over \$1 million net royalties:
 - 15% to inventor for personal use
 - 15% to inventor's academic unit for academic and research uses
 - 70% to university for academic and research uses
 7. **Iowa State University** (FY1993 royalties received: \$11,600,000)
 - Subtract patenting and other expenses from gross royalties
 - Net royalties:
 - 33 1/3% to inventor for personal use
 - 33 1/3% to inventor's college for academic and research uses
 - 33 1/3% to university for academic and research uses
 8. **Massachusetts Institute of Technology** (FY1993 royalties received: \$5,808,000)
 - Gross royalties:
 - 28.3% to inventor for personal use
 - 71.7% shared by university and inventor's department, and to pay expenses
 9. **University of Florida** (FY1993 royalties received: \$5,666,412)
 - Subtract patenting costs from gross royalties
 - First \$100,000 net royalties:
 - 50% to inventor for personal use
 - 50% to university for academic and research uses
 - Next \$100,000 net royalties:
 - 40% to inventor for personal use
 - 60% to university for academic and research uses
 - Over \$200,000 net royalties:
 - 30% to inventor for personal use
 - 70% to university for academic and research uses
 10. **Harvard University** (FY1993 royalties received: \$5,430,000)
 - Subtract patenting and administrative costs from gross royalties
 - First \$50,000 net royalties:
 - 35% to inventor for personal use
 - 15% to support inventor's research
 - 15% to inventor's department for academic and research uses
 - 20% to dean for academic and research uses
 - 15% to president for academic and research uses
 - Over \$50,000 net royalties:
 - 25% to inventor for personal use
 - 20% to support inventor's research
 - 20% to inventor's department for academic and research uses
 - 20% to dean for academic and research uses
 - 15% to president for academic and research uses
- * Formulas also apply to more than one inventor.

Source: Association of University Technology Managers survey, 10/94, and interviews with administrators at individual schools

Royalty-sharing arrangements of the top ten U.S. royalty earning universities are described in Figure 1. A major point of significance is that in eight of the ten universities, a percentage of the royalty revenues ranging from 15-33% goes back to the originating laboratory or academic department where the invention originated.

AMERICAN GOVERNMENT LABORATORIES OR AGENCIES

U.S. CRADA Legislations

On March 7, 1996, the U.S. Congress passed Public Law 104-113, the "National Technology Transfer and Advancement Act of 1995", which amends the Stevenson-Wydler Technology Innovation Act of 1980 with respect to inventions made under cooperative research and development agreements (CRADA).

For the purposes of this paper, a key change in the law is the maximum amount of money a public servant can earn in any one year from royalties is now \$150,000., up from \$100,000. Another major change is that surplus funds, after payments to individuals, can be used to support further R&D activities.

The following is the text of a key section (Section 14 (1)) of the new law.

(1) Except as provided in paragraphs (2) and (4), royalties or other payments received by a Federal agency from the licensing and assignment of inventions under agreements entered into by Federal laboratories under section 12, and from the licensing of inventions of Federal laboratories under section 207 of title 35, United States Code, or under any other provision of law, shall be retained by the laboratory which produced the invention and shall be disposed of as follows:

(A)(i) The head of the agency or laboratory, or such individual's designee, shall pay each year the first \$2,000., and thereafter at least 15 percent, of the royalties or other payments to the inventor or coinventors.

(ii) An agency or laboratory may provide appropriate incentives, from royalties, or other payments, to laboratory employees who are not an inventor of such inventions but who substantially increased the technical value of such inventions.

(iii) The agency or laboratory shall retain the royalties and other payments received from an invention until the agency or laboratory makes payments to employees of a laboratory under clause (i) or (ii).

(B) The balance of the royalties or other payments shall be transferred by the agency to its laboratories, with the majority share of the royalties or other payments from any invention going to the laboratory where the invention occurred. The royalties or other payments so transferred to any laboratory may be used or obligated by that laboratory during the fiscal year in which they are received or during the succeeding year --

(i) to reward scientific, engineering, and technical employees of the laboratory, including developers of sensitive or classified technology, regardless of whether the technology has commercial applications;

(ii) to further scientific exchange among the laboratories of the agency;

(iii) for education and training of employees consistent with the research and development missions and objectives of the agency or laboratory, and for other activities that increase the potential for transfer of the technology of the laboratories of the agency;

(iv) for payment of expenses incidental to the administration and licensing of intellectual property by the agency or laboratory with respect to inventions made at that laboratory, including the fees or other costs for the services of other agencies, persons, or organizations for intellectual property management and licensing services; or

(v) for scientific research and development consistent with the research and development missions and objectives of the laboratory.

(C) All royalties or other payments retained by the agency or laboratory after payments have been made pursuant to subparagraphs (A) and (B) that is unobligated and unexpended at the end of the second fiscal year succeeding the fiscal year in which the royalties and other payments were received shall be paid into the Treasury.

Government owned, contractor operated laboratories are obligated to follow these new rules as well.

Lockheed Martin - Oak Ridge National Labs

The Oak Ridge National Laboratories (ORNL) in Oak Ridge, Tennessee are a government owned, contractor (Lockheed Martin) operated research facility.

At ORNL, each person who is named on a patent application receives \$500, regardless of whether the patent is ever issued.

ORNL also has a Royalty Distribution Program. Twenty five percent of all royalties are shared among employees. Fifteen percent of the royalty received from any one license goes to the inventor(s). The 15% is divided among inventors if there is more than one.

The other ten percent goes into a pool and is distributed among two groups: people who invented something but for some reason their inventions cannot be licensed (e.g., used by government); and people who provided some significant technical or other support to the commercialization process, e.g. a technician who works closely with a company who licenses the technology. Payments can also be given to personnel involved in marketing the technology whose efforts go beyond that normally expected. This ensures that a large number of people benefit from the royalties. A formula, based on a person's contribution to technologies, is used to determine the amount of a reward. Royalty payments continue to be made to retirees but not to people who leave and take another job.

If a patent is issued, there is an inventors forum. For a first patent, the inventor receives a pin in the form of a silver acorn. Another award is given to recognize five patents and a gold pin is presented to recipients of 25 or more patents. An awards night is held annually. This consists of a dinner, award presentation and recognition of the Inventor of the Year.

Lockheed Martin, the private sector contractor, also has a major dinner and awards presentation at which ORNL personnel are well represented among award recipients.

National Institute of Standards and Technology

A spokesperson in the NIST Office of Technology Commercialization in Gaithersburg, Maryland, said that NIST awards 30% of the revenue stream from licensed technology to the inventor. The remaining revenues go into general NIST overhead. They are not returned to the originating laboratory.

Recipients continue to receive royalties after they leave the government. There is an award ceiling of \$100,000 per year per patent. [The recent passage of the National Technology Transfer and Advancement Act of 1995, raises the award ceiling to \$150,000. and calls for revenues after royalty payments to employees and technology transfer expenses, to be returned to the originating laboratory].

Battelle - Pacific Northwest Laboratories

Battelle's and the Pacific Northwest Laboratory's (PNL) "Recognition and Reward R&R) Programs" were implemented in 1989 to recognize and reward creativity and innovativeness of their active full-time and hourly employees, including retirees. (See Appendix One)

Employees of the Pacific Northwest Laboratories, as well as others who work for a GOCO, are not public servants and are therefore not covered by the U.S. government standard royalty programs. The contractor negotiates a similiar, but not necessarily identical program of royalty payments with its federal government department client.

The PNL Program consists of two elements; recognition, and reward. Under the recognition element, inventors or software developers each receive a cash award of \$300. upon issuance of a patent or the creation of "Validated Software", plus they are honoured at an annual "Recognition Dinner". This payment is made because of the usual lengthy time delay between patent issuance and the beginning of royalty or license fees based on the technology or software.

The second element is reward where the program provides for monetary incentives to eligible employees who make key contributions to the development and commercialization of one or more pieces of IP through licensing or sales transactions.

Under their "Transactions Awards", recipients receive a one time cash award, given at management discretion, designed to reward each Key Contributor upon successful signing of a license or other contractual IP transactions. The cash award begins at \$100. and increases in \$50. increments, up to \$1000. It does not have to be awarded, and usually is not.

Under royalty sharing, Key Contributors defined as inventors/creators, developers, innovators and leaders, share, in proportion to their contribution, in a royalty pool that results from 10% of the gross royalties, license fees, and other lump sum payments. Royalty cheques are paid out quarterly. The royalty/license fee stream continues until either twenty years has passed or a recipient has received one million dollars per agreement. Personnel whose main job is to market and find firms to sell technology/software to, are specifically excluded from the royalty sharing program.

In her study of royalty payment schemes, Caudron, (1994) reports that from 1990 to 1992, Battelle paid out approximately \$200,000 to key contributors, and in the first six months of 1993, payouts exceeded the payouts for all of 1992.

A spokesperson for PNL mentioned during a recent telephone conversation that Westinghouse, which is the contractor for the clean up of the nearby Hanford nuclear site, has just put in

place a royalty sharing scheme for the scientific/technical personnel involved with that clean up.

SRI International

At another government contractor run organization, SRI International at Menlo Park, California, a royalty based compensation plan has been in effect since 1978. There, scientists share a pool of funds worth 25% of license and royalty fees. One of their scientists who developed software to enhance ultrasound imaging has earned over one million dollars in royalties. The director of technology marketing at SRI stated, "The royalty program plays a significant role in encouraging productivity". An additional feature of the SRI royalty program is that 35% of funds from royalties and license fees go to the department where the technology originated. This money is used to buy additional equipment, etc.

AMERICAN COMPANIES

Despite the apparent success of royalty based compensation, a 1992 survey of industry by William M. Mercer, Inc. showed that only 7% of U.S. firms offer such compensation packages (Caudron, 1994). John McMillan, managing director of William Mercer, Inc., who supports royalty compensation programs, notes that the lack of wide spread use of such programs is due in part to organizations having to answer some important questions in applying them. The questions include:

- What are we trying to encourage?,
- What percentage of profits should be returned to the employees?,
- How do we determine who is eligible?, and What kind of message will this send to employees who don't receive royalties?

McMillan believes that by "basing an incentive not on an invention's technical elegance, but on its commercial acceptance, you get the developer to focus on what the customer really wants". He believes that this focus will speed up the technology transfer process.

In a review of royalty compensation programs, Shari Caudron (1994) believes that by sharing the commercial rewards that come from a successful product, firms will retain, and more effectively motivate their creative scientific staff to be involved in new product development.

DISCUSSION

The following discussion deals with the various issues that the Federal Government should address if there is to be a consistent royalty award and distribution mechanism across all Canadian government departments and agencies. In addition, there is a serious question regarding the legality of payments suggested under the 1993 Treasury Board Policy.

Legalize Royalty Payments to Innovators and Software Developers

To effectively encourage public servants to invent, develop and commercialize government developed technology or technical know-how, more than just the inventor should share in the rewards. Providing rewards and incentives to key contributors in the innovation team, in some form, is a desirable goal. (e.g. share of royalty/license stream to the inventor and developers of the IP, and a one or two-time cash bonus for the commercialization or marketing team).

The definitions of who these key contributors are should be clearly spelled out in a royalty-based reward policy. For example, the "inventor" should not be limited to just the persons named on a patent. Where appropriate it may include the technician(s) who worked closely with the principal scientist or engineer to produce the invention.

However, in the opinion of one N.R.C. manager and this author, a serious question arises whether the 1993 Treasury Board policy on granting awards to innovators as well as inventors is legal. It draws its authority to pay awards from the Public Servants Inventions Act which specifies that the awards go only to inventors. It is also questionable whether award payments for software development that is normally protected under copyright, and for development or commercialization activities are covered.

The N.R.C. spokesperson said that it was intended that the Public Servants Inventions Act and/or the Financial Administration Act would be modified to incorporate awards to innovators and others involved in developing new technology-based intellectual property; this was never done.

Several departments are already interpreting the 1993 policy as allowing for payments to inventors and innovators, and personnel involved in the commercialization process.

Recommendation

It is therefore recommended that Treasury Board modify the Public Servants Inventions Act and/or the Financial Administration Act such that payments to the innovation team that produces commercializable Intellectual Property is completely legal.

In addition, modifications to the Act must also enable the team members, other than the inventor(s) to continue receiving their share of the royalties even if the inventor(s) die.

The Acts should also be modified to explicitly take into account royalties or license fees earned from software products, with the distribution of such revenues being the same for patented technology.

The 1993 Treasury Board Policy on Award Plan for Inventors and Innovators be modified to specifically make reference to the innovation team, and make clear that the intent is to share the 35% royalty stream with the total innovation team.

Royalty Revenues Returned to the Laboratory of Origin

The potential for a negative impact on the morale of colleagues in the laboratory by an individual receiving a large patent award will be greatly reduced if the laboratory in which the royalty recipient works shares in the license revenue stream. Scientific personnel who have no opportunity to develop commercial patents will see that they can still benefit from their colleague's success in developing a profitable technology through provision of research resources to buy new equipment, hire new employees, or to fund their research. If, however, the revenues from royalties or license fees are swallowed up by headquarters and used for other purposes, the risk of jealousies developing and reduction in cooperation or collaboration among laboratory personnel will grow.

As noted in this review, many organizations, including the U.S. Government, that have a royalty-based reward system ensure that a significant percentage of the royalty stream is returned to the originating laboratory.

Recommendation

The Public Servants Inventions Act and the 1993 Treasury Board policy specifically require departments to return a significant portion of the royalty/license stream to the originating laboratory or research branch.

Automatic Royalty Award

The award of some fixed percentage of a royalty/license stream to the pertinent groups of key contributors should be automatic, and not subject to individual or departmental interpretation. There are instances at the moment where units within government laboratories have been defying the 1993 policy with impunity, except for the distress they cause their employees. This will reinforce the government's stated policy of encouraging

its scientists and engineers to engage in technology development and transfer activities.

There should be no uncertainty in the minds of the innovation team that they will share in the revenues generated by their innovation if it is successfully marketed. The decision should not be subject to the personal whims of senior managers.

The actual amounts awarded to each group should be decided in consultation with scientific/engineering staff (not just managers) but, in line with other departments, the "inventors" should receive 15%.

Recommendation

The 1993 Treasury Board policy should be modified to remove the discretionary nature of the royalty/license fee awards so that there is no uncertainty regarding the award; if royalties are received, awards are paid out.

Transparency of Process

The recipients of royalty or license fee awards should be provided with a financial statement showing how the size of their award was calculated.

Although the royalty/license fee awards are an ex gratia payment, the government is entering into a business deal with its staff to share income from licensing revenues, or from internal savings.

So that the positive impact of receiving a financial reward is not undermined by uncertainty about whether a recipient is getting their fair share, the government should provide recipients with a statement of how it arrived at the amount paid each year.

A financial statement will avoid any suspicions that the government is not dealing fairly with the award recipients. In an earlier study, the author talked to several award recipients and they commented that they are in contact with the firms who are licensing their technology and have a rough idea on how well it is selling. If there are discrepancies between anecdotal data from the firm on sales and the financial statement provided by the department to the recipient, it would signal the need for a further review.

Recommendation

The 1993 Treasury Board policy be modified to include the requirement that royalty/license fee recipients are provided with

a financial statement each year describing how the royalty awards were determined.

Multi-year Awards for Internal Use

Government inventors/developers should receive monetary awards for the internal use of their inventions or software products for as long as the invention or software is providing substantive benefits to a government department.

The 1993 Treasury Board policy on royalty awards calls for an award, up to \$5000. (higher with TB approval) for an invention that is used internally within government. There is some confusion whether it is a one-time award or is annual, as long as the invention is still being used, and still providing the benefits it did when initially introduced. Generally the interpretation is that it is a one-time award.

There is not any inherent difference between the use of an invention by an external private sector user versus an internal one, except that monitoring the continual flow of benefits of internal use might be a bit more difficult. This would be especially problematic if the government use was in a department, other than the one in which it was invented. A special monitoring activity would have to be set up similiar to cross-licensing agreements between companies.

Despite these extra monitoring difficulties, there is no valid reason why an government inventor/developer should not share in the cost savings or other benefits that an internally used invention generates for the life of its application and use.

Recommendaton

The Public Servant Inventions Act and the 1993 Treasury Board Policy should be modified to allow for multi-year awards on the internal use of inventions or software products, for as long as the government is gaining measurable benefit from the internal use.

Portability of Awards

Where the key inventors and developers are moved along with their program to a new laboratory site, the "non-personnel award" revenue from the license should be transferred to the new site.

Where only the key inventor(s) move to a new laboratory facility, they should bring with them a small percentage of the "non-award" revenue to their new laboratory. This will prevent jealousy and resentment building up in their new colleagues.

Recommendation

The 1993 Treasury Board policy should be modified to allow for portability of the "non-personnel" award part of the royalty/license fee stream.

Reward Delivery Mechanism

The award of a royalty or license fee cheque to a public servant should be an event that is celebrated.

Simply getting a cheque in the mail does not convey any feeling that what the inventor or development team has done is something for which their department is proud.

Depending on the nature of the invention, or the amount of the royalty cheque, the appropriate level in the organization should hand deliver the cheque along with a suitable covering letter. Adopting a practice from the private sector in having a particular ceremonial occasion marking the continued revenue flowing into the laboratory would be appropriate.

Recommendation

That departments be encouraged to emphasize the importance of the revenue flows coming into the laboratory from patent royalties and license fees in some public manner, and take the occasion to reinforce that the whole laboratory is benefiting from the revenue, not just the members of the innovation team.

CONCLUSION

Something as important as a royalty-based award program should not be subject to individual interpretation or the philosophical whims of senior managers. Furthermore, there should be a consistent application of the award program across all departments and agencies. The American approach, as noted in their recent amendments to their technology transfer act, in which the distribution of royalty/license revenues are clearly spelled out while leaving some discretion in the amount of awards to people, other than the inventor, should be seriously considered for adoption.

The sharing of the royalty/license fee stream with the whole innovation team is much fairer and is more likely to develop strong productive teams. The allocation of any remaining revenues after the direct costs, to further research in the originating laboratory will ensure that those researchers not directly involved in the development of the technology will not harbour any jealousies toward the innovation team and will cooperate with them.

Having Treasury Board policies that senior public servants feel free to ignore damages not only the credibility of Treasury Board, but also undermines the morale and trust of other public servants who expect to be treated in a fair and consistent manner.

REFERENCES

Caudron, Shari, "Motivating Creative Employees Calls for New Strategies", Personnel Journal, May, 1994, pp. 103-106

Katterman, Lee, "University Technology Offices Focus Effort on Overcoming Academic 'Cultural Barriers'", The Scientist, Vol. 9, No. 12, 1995