Audit of Discovery Grants Program

Corporate Internal Audit Division
Natural Sciences and Engineering Research Council of Canada
August 29, 2012

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1 EXECUTIVE SUMMARY

Background

The Natural Sciences and Engineering Research Council of Canada (NSERC) supports scholarly endeavors in Canada's post-secondary institutions. NSERC funds students in their advanced studies, promotes and supports discovery research, and fosters innovation by encouraging Canadian companies to participate and invest in post-secondary research projects in the natural sciences and engineering (NSE). NSERC is a departmental agency of the Government of Canada and reports to Parliament through the Minister of Industry.

The Discovery Grants (DG) Program supports ongoing programs of research with long-term goals, rather than single short-term projects or collections of projects. These grants recognize the creativity and innovation that are at the heart of all research advances, whether made individually or in teams. Furthermore, the DG Program helps promote and maintain a diversified base of high-quality research capability in the NSE in Canadian universities, fostering research excellence, and providing a stimulating environment for research training.

Why it is important

The DG Program is NSERC's largest and longest-standing program and accounts for about one-third of NSERC's annual budget. The DG Program provides approximately $340 million in grant funding on an ongoing basis, and due to its funding budget and program value, was identified in NSERC's *2011-14 Risk-Based Audit Plan* as one of the programs to be audited. It is considered a "flagship" program for NSERC and its public exposure is higher by nature than some of NSERC's other grant programs. Finally, an internal audit of the DG Program has never been conducted.

Audit objective and scope

The objective of the audit was to assess whether an effective management control framework and management practices are in place in the DG Program to ensure program efficiency with regards to:
- program management;
- internal controls; and
- risk management.

The scope of this audit included a review of the current roles, responsibilities and accountabilities within this grants program. The scope also allowed for a review of the controls and processes in place to ensure consistency and efficiency throughout the DG Program's processes. Associated programs—such as Discovery Accelerator Supplements and Research Tools and Instruments Grants—were not examined, as they were considered either too small in terms of dollar value or had a different program objective. It should be noted that DG Program budget management was also excluded from the scope of this audit due the upcoming audit on Budget Management planned for 2013-14.

Key audit findings

The DG Program audit is the first program audit conducted by NSERC's Corporate Internal Audit (CIA) Division. While a few of the findings are unique to the DG Program, it is important to note that several findings may also be common to other program areas.

The DG Program is a long-standing program (30-plus years) and has existed since the inception of NSERC. To deliver the DG Program, three functional areas are involved:

- the Research Grants (RG) Division within the Research Grants and Scholarships (RGS) Directorate is responsible for the front-end of the program (application intake to awarding the grants);
- the Finance and Awards Administration (FAA) Division is responsible for both the post-award administration of the grant and the payment process; and
- the Information and Innovation Solutions (IIS) Division is responsible for the technical aspects, including the awards management systems/databases and access rights to these systems.

The core activity of the program is the peer review process that is a complex activity involving numerous steps and thousands of assessments. Despite the complexities, the audit noted that program processes were applied with a focus on consistency that resulted in a fair and transparent assessment of applications. A well-developed set of procedures that are continuously reviewed to improve overall program efficiency, coupled with relevant and timely training of external stakeholders, contributed to increased DG Program process consistency. In addition, external stakeholders expressed positive appreciation of the program staff for their responsiveness and professionalism. Once grants are awarded and payments are made, a continuous financial monitoring program, which is managed by FAA Division, provides information on ongoing eligibility of researchers and assesses the institutions' financial control frameworks.

The audit also noted a number of areas where improvements were needed.

1. The DG Program is currently being delivered by three functional areas. The program areas manage processes from application intake to the granting of the awards. Once the awards are granted, FAA Division is seen as a partner and assumes ownership from payment through to the post-award administration. The IIS Division enables the program areas by providing technical support. The current state of this model exhibits limited corporate interaction between the three functional areas that are involved in the delivery of the DG Program. Since each functional area has its own individual set of operating protocols and internal controls, rather than an integrated approach, control gaps were found. The audit concluded that the current condition of the delivery model does not promote a holistic and integrated approach, which impacts the clarity of responsibilities, accountabilities, program-related internal controls and the management of program risk.

2. Roles, responsibilities and authorities surrounding NSERC Award Management Information System (NAMIS)[1] data were unclear. Due to the lack of clarity, tasks[2] that are often the responsibility of the owner were found to be deficient.

3. A number of key internal control weaknesses related to NAMIS were identified. Among the weaknesses, the audit noted that user access control management was not robust, password management did not demonstrate best practices, historic audit trail verification was limited, and data change management for certain levels of information lacked approval mechanisms.

4. Functional areas have managed risk within their own sphere of influence. Consequently, risk management is being practiced sporadically across functional areas and the end-to-end delivery of the DG Program has not established an integrated and systematic corporate risk management process to regularly review risks that could impact the program and its objectives. Information generated by one area was not readily shared with the other functional areas and, as a result, decision-making with a holistic view of the program is limited.

Conclusion

The DG Program is a longstanding "flagship" program that is well established and has been successfully delivered over the years. The RG team has established a rigorous peer review process and also exhibits a good continuous improvement process. The audit noted many positive findings in areas that form the foundation of this program; however, there are a few systemic issues that need to be addressed.

The current delivery model of having three functional areas, each responsible for delivering a part of the program, needs to be better integrated and interactions between the functional areas should be improved to support an integrated and holistic approach. This issue is central and is one of the contributing factors to some of the internal control weaknesses.

NSERC should review its delivery model and strengthen the existing program governance to ensure program owners/partners assume appropriate program accountability and authority that includes the responsibility for setting up internal control and risk management frameworks associated with the end-to-end delivery of the DG Program.

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[1] The NSERC Award Management Information System (NAMIS) is a Windows-based application that supports the processing of research grant, research partnership, and scholarship applications throughout their life cycle. It is also used to manage other NSERC information.

[2] The data owner is the person responsible for protecting the data, to ensure that only the appropriate people have access to it, and that the type of access they have is appropriate. Requests for access to data should be routed through the owner for approval. Access Control Lists should be periodically reviewed by the owner to ensure that people who once had approved access, but have since changed jobs or roles, haven't been accidentally left on the access list. And the owner is responsible for ensuring that the access control mechanisms are adequate to prevent accidental loss or theft.

2 BACKGROUND

The Natural Sciences and Engineering Research Council of Canada (NSERC) Research Grants and Scholarships (RGS) Directorate is home to a variety of programs that support research and research training in the natural sciences and engineering (NSE). The *NSERC Class Grant Terms and Conditions for Grants and Scholarships*, approved by Treasury Board in October 2006, encompasses many ongoing programs including the Discovery Grants (DG) Program.

The DG Program provides approximately $340 million in grant[3] funding and supports ongoing programs of research with long-term goals in the NSE rather than a single short-term project or collection of projects. These grants recognize the creativity and innovation that are at the heart of all research advances, whether made individually or in teams. Researchers are free to work in the mode most appropriate for the research area. All the funds are managed through the institution where the research is conducted.

The DG Program is a key NSERC program used to deliver on its strategic objective of Discovery—lead the advancement of knowledge in science and engineering, and ensure that Canadian scientists and engineers are leaders and key players in the global knowledge community. The DG Program is considered critical to the achievement of NSERC's mandate and it is a "flagship" program for NSERC and the research community. Its public exposure is higher by nature than some other grant programs. The DG Program is the cornerstone of NSERC and it provides foundation funding to about 10,000 researchers who currently hold a DG. More specifically, this program helps to:

- promote and maintain a diversified base of high-quality research capability in the natural sciences and engineering in Canadian universities;
- foster research excellence; and
- provide a stimulating environment for research training.

3 AUDIT OBJECTIVE AND SCOPE

The objective of the audit was to assess whether an effective management control framework and management practices are in place to ensure program efficiency with regards to governance, internal controls and risk management.

The scope of the audit covered the following strategic areas of the DG Program:

1. Roles and responsibilities – The program demonstrates an effective framework with clearly defined roles, responsibilities, accountabilities and authorities.

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[3] The Treasury Board Secretariat (TBS) *Policy on Transfer Payments* defines a grant as a "transfer payment subject to pre-established eligibility and other entitlement criteria. A grant is not subject to being accounted for by a recipient nor normally subject to audit by the department. The recipient may be required to report on results achieved."

2. Processes and Internal Controls – The award process demonstrates an effective set of controls that ensure fair and consistent management of public funds.

3. Risk Management – The program systematically monitors and reviews its processes and activities in order to mitigate emerging risks and identify areas for continuous improvement.

Associated programs—such as Discovery Accelerator Supplements and Research Tools and Instruments Grants—were not examined, as they were considered either too small in terms of dollar value or had a different program objective. It should be noted that the DG Program budget management was also excluded from the scope of this audit due the upcoming audit on Budget Management planned for 2013-14.

The audit work was conducted over a seven-month period between May and November 2011, using Corporate Internal Audit (CIA) Division resources combined with the services of a consultant from Spearhead Management Canada. The review focussed on information available between August 2009 and August 2011.

4 AUDIT METHODOLOGY

The CIA Division used the following methodology to conduct its work:

- File and document review of various sources of information—including committee meeting minutes, previous reviews, planning documentation, project plans, policies, guidelines, training material, NSERC Web site, etc.
- Development of a process map for the DG Program to identify steps and essential control points.
- Test of systems (and controls) used within the DG Program.
- Interviews with external key stakeholders—including university Research Grants Officers, applicants, referees[4], and the Evaluation Group Chairs and members.
- Interviews with internal key stakeholders involved in the delivery of the DG Program—including the Vice-President of the Research Grants and Scholarships (RGS) Directorate, Directors, Team Leaders, Program Officers, Program Assistants, and several employees and managers from the Program Operations section, the Finance and Awards Administration (FAA) Division and the Information and Innovation Solutions (IIS) Division.

The audit was carried out and completed using standards set by the Institute of Internal Auditors (IIA). The conclusions were drawn based on the assessment of audit findings against the three criteria used for this audit.

In the professional judgment of the Chief Audit Executive, sufficient and appropriate audit procedures have been conducted and evidence gathered to provide a high level of assurance on the findings contained in this report. The conclusions were based on a comparison of the situations as they existed at the time against the audit criteria. This internal audit was conducted

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[4] An external referee is the proposed or selected person chosen to provide expert feedback on an application.

in accordance with the Treasury Board Policy on Internal Audit and the Institute of Internal Auditors International-Standards for the Professional Practices of Internal Auditing.

5   KEY AUDIT FINDINGS

5.1   Program Management

Three functional areas are involved in the end-to-end delivery of the program—the Research Grants (RG) Division, which is part of the Research Grants and Scholarships (RGS) Directorate; the Finance and Awards Administration (FAA) Division and the Information and Innovation Solutions (IIS) Division. The RGS Directorate consists of five organizational divisions, four of which are responsible to deliver the front-end portion of the Discovery Grant (DG) Program. Of the four divisions, three are discipline-based and client-facing, and the fourth provides logistical and budget management support to the DG Program and other RGS Directorate programs.

The FAA Division manages the post-award activities related to the DG Program, which includes the post-award administration of a grant over its life cycle, and the payment process. The award administration team within FAA Division is responsible for managing post-award activities—such as transfers, deferrals, terminations, etc. That same team is also responsible for providing researchers and institutions with interpretation on the use of grant funds, disseminating information on the use of grant funds, and annual confirmation of ongoing eligibility. Within the FAA Division, the Accounting Services team is responsible for the financial control framework for the DG Program and other NSERC programs, and the processing and the accounting of all financial transactions.

Once grants are awarded, institutions also have a role to play in the management of the delivery of grants, as stated in the *Memorandum of Understanding (MOU) on the Roles and Responsibilities in the Management of Federal Grants and Awards.* Among other things, the MOU indicates that institutions must have appropriate and effective policies, administrative systems and controls to ensure that the research is conducted in compliance with all applicable legal, ethical, accountability and financial management standards. To ensure that institutions have an adequate financial control framework (how they manage the researcher's funds), the Financial Monitoring team conducts financial monitoring visits at Canadian institutions.

The IIS Division is responsible for support in the areas of system development, maintenance, network support, and information technology (IT) security services to the NSERC user community. In relation to the DG Program and other NSERC programs, the IIS Division supports the NSERC Awards Management Information System (NAMIS)[5] and enables Internet and extranet connectivity.

There are a number of permanent internal RGS Directorate standing committees and working groups that exchange operational information, discuss issues, make decisions and update policies and procedures. The hierarchical committee structure also exhibits a common thread of attendance between committees. Information is shared up and down the committee structure—

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[5] The NSERC Award Management Information System (NAMIS) is a Windows-based application that supports the processing of research grant, research partnership, and scholarship applications throughout their life cycle. It is also used to manage other NSERC information.

either by having one member participate in a higher level committee or by providing committee updates. The Committee on Grants and Scholarships (COGS) is an external committee that meets twice a year and provides advice to the Vice-President of the RGS Directorate on program policy matters and monitors the subset of programs related to the People and Discovery portfolio, which includes the DG Program.

5.1.1 Operational tasks, activities and processes that support the delivery of the DG Program are well defined and documented, which promotes consistency throughout the peer review process.

Consistency can be described as the reliability or uniformity of successive results or events—the quality of achieving similar results, doing things in the same way, and having the same standards. The RG team has been working hard to achieve consistency within and between the 12 Evaluation Groups (EGs) involved in peer review. The core activity of this program—the peer review process—is a complex activity that involves numerous steps and thousands of assessments (see Appendix I for details on the steps leading to the announcement of results). This process benefits from the volunteer work of hundreds of experts from academia, government and industry, from Canada and abroad.

Despite the complexities, the audit noted that a concerted effort is made to consistently apply the assessment of applications in a fair and equitable manner. Equally important, the end-to-end review process is supported by appropriate resource and reference material, and detailed guidelines and procedures are in place and used by internal staff and external reviewers. These resources cover the entire competition life cycle. Additionally, new RG employees generally receive some mentoring from senior staff throughout the competition cycle during their first year at NSERC; furthermore, their participation in working groups provides ongoing reinforcement of common practices and application of policies and guidelines. NSERC's *Peer Review Manual* is regarded as the key information resource and is available on NSERC's Web site. This comprehensive document is used throughout the competition cycle by applicants, EG members and Chairs, Program Assistants (PAs), Program Officers (POs), and external referees. The *Peer Review Manual* details all the requirements of the DG Program competition cycle, from August until the end of April. The NSERC Web site was also recognized as a valuable repository of information for external stakeholders.

The auditors concluded that internal staff and external stakeholders had accurate and timely information at their disposal and received all the required support to accomplish their duties. The audit also concluded that a well-developed set of procedures, coupled with relevant and timely training (orientation and calibration sessions) of external partners, contributed to increased consistency throughout the competition life cycle. It is also relevant to note that interviews conducted with external stakeholders indicated that DG Program employees are regarded as professional, thorough and efficient.

5.1.2 A continuous improvement process exists to address operational issues.

The material reviewed during the course of the audit revealed that the RG team has continuously reviewed its processes in an effort to improve efficiency and the delivery of DGs, and also to maximize the realization of opportunities. The DG Program recently underwent some major changes as a result of the 2008 *Report of the International Review Committee on the Discovery Grants Program*, such as a new two-stage assessment process that was

implemented in time for the 2009 competition year. Similarly, a newly designed peer review conference model was implemented in 2010, which was aligned with the recommendations of the *Grant Selection Committee (GSC) Structure Review,* published in 2008. These changes were made with the intent to provide a more dynamic distribution of funds.

In addition to these major changes, many recent and ongoing operational and logistical changes were initiated and/or completed with the intent of improving efficiency. Due to the recent implementation and/or ongoing nature of the following changes, the audit was not able to comment on their efficiency:

- Two new DG Program on-line tutorial videos are available on NSERC's Web site.
- A new module for the electronic data capture of applications was implemented in August 2011. All applicant information submitted through On-line Services is now automatically captured and transferred into the NSERC Award Management Information System (NAMIS).
- A three-phase project on the modernization of monitoring is underway and should be completely implemented by the end of 2012. One of the main goals of this project is to provide a higher level of assurance of the grant funds administration controls at eligible institutions.
- A new one page form related to the criteria of Highly-Qualified Personnel (HQP) was added to the application process to address research community feedback.

In addition to these initiatives, NSERC's *Peer Review Manual* is reviewed every summer in order to improve content and clarify information. The audit determined that the DG Program team actively demonstrates a commitment to continuous improvement.

5.1.3 *State of the current delivery model does not promote a comprehensive, end-to-end view of the program.*

The current delivery model has the three functional areas previously described—the RG, FAA and IIS Divisions—responsible for the end-to-end delivery of the DG Program. The RG program area accepts and processes applications, manages the peer review process, and then awards the grants. Once the grants are awarded, the FAA Division, seen as a partner in delivering the program, assumes the responsibilities of transferring funds to institutions, and conducts post-award reviews. The IIS Division provides overall IT support and maintenance of the IT systems, including NAMIS. The audit noted that there was limited interaction between these key stakeholders regarding the end-to-end management of the DG Program. Each area has their own individual set of operating protocols and internal controls rather than a holistic, integrated framework. As a result, a comprehensive view of the program is not always possible. Issues such as internal control gaps (identified under the "Internal Controls" section of this report) may be a by-product of how this delivery model is currently implemented. The three functional areas need an overarching governance framework to ensure that key issues, risks and decisions that could impact more than one functional area are dealt with in an integrated, program-wide manner.

5.1.4 *There is unclear accountability and authority over the NSERC Awards Management Information System.*

NAMIS was designed as a corporate resource to support the management and monitoring of the life cycle of NSERC's granting process, capture grant applications, manage the peer review process, record final award decisions and manage the funding of successful awards for DG and

other NSERC programs. NAMIS tracks the funding status throughout the duration of a grant. In addition, the system also provides an automated interface with the Financial, Procurement and Asset Management (FPAM) system. NAMIS is used by hundreds of NSERC employees to administer the DG Program and other NSERC programs.

The NAMIS data base contains information from thousands of applicants and institutions. The audit found that although NAMIS is NSERC's central grant and scholarship management system, and is vital to the delivery of NSERC's programs, both system and data accountability has not been formally assigned since its implementation. With the new Client Relationship Management (CRM) system being put into place, addressing the issue of system and data accountability will be critical in the future management of the CRM system.

Recommendation 1: It is recommended that NSERC develop a revised delivery framework that facilitates comprehensive and end-to-end program management. The framework should clearly define accountabilities of key stakeholders to ensure appropriate governance and management controls are put in place.

5.1.5 *NSERC's ability to determine whether institutions are using the General Research Fund for its intended purpose is limited.*

The "Administrative Matter" chapter of the 2010 *Tri-Agency Financial Administration Guide* states that:

> *NSERC allows residual funds from prior years to be retained by the institution under certain conditions determined by their Finance and Awards Administration Division and that these funds be transferred to a General Research Fund (GRF) managed by the institutions. The Agencies expect that the institution's president will use these funds for the broad purpose of enhancing the quality of research in the natural sciences and engineering, or in the social sciences and humanities, as applicable. Funds from the General Research Fund may be used to provide small start-up grants to new professors, bridge funding to professors who are between applications, additional funds to professors in support of their research, etc. Funds must be spent in a timely manner.*

DGs are normally awarded for a period of five years. DGs can be renewed, and if a new grant is approved, residual funds are carried from one grant to the next. If a DG is not renewed, and the awarded funding has not been fully spent within the stated period, institutions can do one of two things with the residual funds: 1) return the residual funds to NSERC or to the Receiver General of Canada; or 2) submit a request to NSERC asking to transfer the residual funds into the institution's General Research Fund (GRF). The institution must support this transfer request with a justification. The post-award administration team receives, assesses and processes these requests. Generally, these transfer requests to GRF are accepted and approved by NSERC. Annually, institutions are required to submit the statement of account for their respective GRF account encompassing opening balances, annual transfers to the account, annual disbursement and closing balance. FAA Division monitors the institutional balances annually and seeks action plans from institutions with large balances.

The audit determined that over the years, institutional GRF accounts have grown to a grand total of approximately $17 million (as of November 2011) and some of the larger institutions'

GRFs reach up to $1 million. Currently, NSERC has a very limited ability to determine whether institutions are using the GRF for its intended purpose—to enhance the quality of research in the NSE. When the finance monitoring team visits an institution, a sample of transactions is selected from the general ledger of the GRF. The monitoring team's sample review is focused on the financial control framework and not on the intended purpose of the expenditures in the GRF account. Consequently, NSERC cannot be sure that institutions' GRF expenditures are in accordance to the original intended purpose.

Recommendation 2: It is recommended that NSERC review the reporting requirements of institutions to include additional details and/or expenditure plans related to the GRF.

5.2   Internal Controls

Internal controls are broadly defined as processes designed to provide reasonable assurance regarding the achievement of objectives related to effectiveness and efficiency of operations and compliance with laws and regulations.

5.2.1   NAMIS user access control management could be more effective.

The management of user access to NAMIS is granted based on job profiles. The management of this access resides with the Data Administration Group within the IIS Division and is administered by two employees. The audit noted constraints around the ability to effectively manage certain access profiles due to the limitations of automated tools and functionality. When access control administrators want to verify user access to NAMIS, they must print the access profiles of each employee within NSERC and then manually review the individual profiles. The audit also noted that this time-consuming process relies on managers to notify the Data Administration Group about which profiles to add or remove from NAMIS. The results of a user access sampling test revealed that approximately 10 percent of employees who have left NSERC still have active accounts in NAMIS.

5.2.2   NAMIS password management does not demonstrate IT best practices.

Password systems are the simplest form of authentication. In order to protect password systems, the following best practices should be in place:

- Original generic passwords should not be used permanently and users should be prompted to select a new personal password on their first log-on/access.
- Password aging should be strictly enforced, and require periodical refreshing to ensure they do not remain in use for too long.
- Password strength should be enforced intelligently and users should be encouraged to use upper- and lower-case letters, numbers, and symbols in their passwords (rather than dictionary words).

The audit team tested a sample of NAMIS user passwords and found that a high percentage (43 percent) of NAMIS users still used the original generic password that is assigned to all employees by the IIS Division. The NAMIS system does not have an automated process in place to prompt users to change the assigned password to a unique personal password at their first log-in attempt. Furthermore, an automated process to systematically prompt users to change their passwords periodically is not in place. The significant weaknesses mentioned

could potentially result in unauthorized NAMIS access under false identities, and represents a certain level of risk to the integrity of data.

5.2.3 The NAMIS audit trail is limited.

IT audit trails should provide a chronological log of access to a system; a record of additions, changes, and deletions to that system; and also a record of the names of users who accessed the system, the time of the access, and what action was performed. These logs are meant to be inalterable to ensure the presence of a reliable and logical audit trail—an indicator of good corporate internal controls.

The NAMIS audit trail is quite rudimentary considering the system manages over $1 billion of grants funding. The current audit trail in NAMIS retains the time stamp and User ID of the last person to make changes in the system, but does not record the specific field(s) or data that were altered. Additionally, the audit trail does not retain a historical record of any previous NAMIS changes, modifications, or user accesses. Due to the criticality of this finding, the CIA Division immediately informed the IIS Division, and the IIS team has initiated a solution to address this deficiency.

5.2.4 NAMIS-data change management lacks approval mechanisms for certain levels of information.

In every modern IT system, there are times when data residing in the main database requires manual intervention for modification. This change process normally requires a strict set of rules to govern who can make the change, what changes are allowed, who needs to authorize the changes, and how changes are logged.

At NSERC, any staff member can email a change request to a generic service desk email address. The MARVAL[6] tracking system then sends a confirmation email to the client acknowledging that the request was logged, and also sends a service request to the IIS team. The MARVAL tracking system permanently stores the precise nature of the request and all original emails. Although some of the requested changes affect critical data related to eligibility (i.e. change in file status, creation/deletion of file ID, etc.), documented approvals of requests are not always required.

Database administrators (DBAs) process the numerous requests for NAMIS information modification. The audit noted that over a 13-month period, there were over 1,000 requests to amend NAMIS information. Auditors found that most of the changes reported in the selected sample had no major impact on critical data and grant amounts; however, compounded with other system weaknesses identified previously, the current change management process represents an additional level of risk to the integrity of NAMIS data.

Recommendation 3: It is recommended that NSERC develop a robust internal control environment related to NAMIS that includes user access management, password management, audit trail capability and data change approval mechanisms to ensure the integrity of all program information.

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[6] The IIS Division tracks all submitted requests using MARVAL's Open Pursuit tracking system.

5.2.5 *Verification of financial data transferred from NAMIS to the Financial, Procurement and Asset Management system is conducted to ensure the effectiveness of the transfer.*

NAMIS captures all award information, including the amount and duration of a grant. In order to issue award payments, information must be transferred from NAMIS into FPAM since both systems work independently from one another. This transfer of financial data from NAMIS to FPAM is done through a utility/function in NAMIS. The FAA team initiates this transfer on a weekly basis and uses internally developed tools that validate the accuracy and completeness of the data transfer. Although these validation exercises do not reconcile at the individual grant level, they do reconcile total amounts awarded at the institutional level. The quality of the data transferred is dependent on the quality and integrity of the information extracted from NAMIS. For that reason, it is crucial that the internal control weaknesses—such as who can create, access and modify NAMIS data—be addressed to ensure that the data from NAMIS is accurate and reliable.

5.2.6 *The Finance and Awards Administration Division has a continuous monitoring program in place.*

As stated in the MOU, each institution agrees to monitor the ongoing eligibility of grant holders and advise NSERC of any changes in eligibility status. As such, institutions become active partners in the assessment of the researchers' eligibility and the payment of grant funds to researchers.

The FAA Division has a continuous financial monitoring program that provides updates on grant spending (via the Grants in Aid of Research, Statement of Account [Form 300]) and annual eligibility assessments once grants have been awarded. The information gathered from these exercises helps identify which researchers are no longer eligible for DG funding, which results in a freeze of their subsequent year installments. This requirement is an additional step to ensure that funds are being awarded to eligible applicants throughout the duration of the grant. The fact that the validation of eligibility is conducted by a third party—institutions with a signed MOU—increases the validity of the information.

5.2.7 *Enhancements are underway for the 5-year financial monitoring review plan.*

The FAA Division conducts site visits as part of the ongoing financial monitoring at institutions that have signed a MOU[7] with NSERC and receive NSERC funds. In 2006, the FAA Division developed a five-year plan that identified approximately 10 site visits for each year of the plan. This plan was mainly based on two criteria: 1) the level of combined funding from NSERC and the Social Sciences and Humanities Research Council of Canada (SSHRC); and 2) the ratings (fully satisfactory, satisfactory or unsatisfactory) that the institutions received during prior monitoring visits.

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[7] Each university that manages NSERC grants needs to follow the *Memorandum of Understanding* (MOU) *on the Roles and Responsibilities in the Management of Federal Grants and Awards*. This MOU describes the basic requirements for obtaining and maintaining institutional eligibility to administer research funds.

The monitoring reviews are conducted using comprehensive tools, and assess whether the institutions' financial controls are effective and respect the terms and conditions specified in the MOU. The criteria for selecting institutions for the current monitoring review schedule are heavily based on the amount of annual funding institutions received back in the 2006-07 fiscal period. If this approach is maintained, only approximately 60 percent of institutions[8] will be monitored, and a high percentage of smaller institutions may never be visited or reviewed. In recognition of the weakness, the FAA Division has already partnered in the tri-agency three-phase "Monitoring Review Modernization" project. This project is underway and should be fully implemented by the end of 2012. The main goal of the project is to provide a "higher level of assurance" that grant fund administration controls are in place and effective.

5.3   Risk Management

Risk management is the identification, assessment, and prioritization of risks followed by the coordination and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events, or to maximize the realization of opportunities. All organizations face risks while making decisions, both at the strategic and operational level. A formal risk management process must be documented and systematically monitored in order to continuously address emerging risks.

5.3.1   The Risk Management Framework within the Discovery Grants Program is limited.

The governance of the RG Division consists of four internal committees/working groups and one external committee, including:
1. Committee on Grants and Scholarships (COGS) – external members;
2. Research Grants and Scholarships (RGS) Management Committee;
3. Grants Management Table (GMT);
4. Program Officers Working Group (POWG); and
5. Program Assistants Working Group (PAWG).

A review of the committees' Terms of References (ToRs) revealed that risk management is limited in the operational committees/working groups. Due to the absence of ToRs for the two key strategic/senior management committees (RGS Management Committee and GMT), the CIA Division was unable to conclude whether risk management is part of their mandate. A review of the meeting minutes from these two committees supported the fact that the RG Division has not developed an integrated and systematic risk management process to regularly review risks that could affect the mandate and objectives of the program, including both internal and external operational processes.

The current approach to risk management does not provide management with the assurance that all risks are assessed and considered during the planning and decision-making processes. Considering the current TBS *Policy on Transfer Payments* requiring "that transfer payments be managed in a manner that is sensitive to risks," the RGS Directorate needs to strengthen its risk management framework.

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[8] As of October 2011, the total number of institutions managing NSERC grants was 96.

Recommendation 4: It is recommended that the Vice-President of the RGS Directorate lead the development and implementation of an integrated and systematic risk management process that responds to issues and potential risks to the organization's objectives[9] while enabling an effective decision-making process[10].

5.3.2 Information gathered during the monitoring visits conducted by the Finance and Awards Administration Division could be used more effectively.

The monitoring team produces a comprehensive institute-level report at the end of each monitoring visit that outlines key control weaknesses. NSERC's senior management is provided with a high-level report that summarizes recent monitoring review findings three times per year. The audit noted that the FAA Division does not conduct a formal, holistic analysis of these results that could identify common trends or risks. Considering the fact that since August 2009 approximately 50 percent of institutions failed the monitoring exercise (i.e., received an overall "unsatisfactory" rating), a holistic analysis could be highly beneficial for NSERC management to help explain and understand the reasons behind these "unsatisfactory" ratings. With this information in hand, management could enhance program decision-making, risk management and communication with institutions.

Recommendation 5: It is recommended that the Director General and Deputy Chief Financial Officer of the FAA Division produce a holistic report highlighting the trends and risks gathered from the financial monitoring exercises. This report should be shared with NSERC management to provide an end-to-end comprehensive view of the administration of NSERC funds.

6 CONCLUSION

The Discovery Grants (DG) Program has existed for more than 30 years and a high degree of consistency of processes is evident. The core activity of this program—the peer review process—is a complex activity that involves numerous steps and thousands of assessments. Despite the complexities, the audit noted that program processes were applied with a focus on consistency, resulting in a fair and transparent assessment of applications. Once grants have been awarded, a continuous financial monitoring program exists to provide updates on grants spending and eligibility of researchers. In addition, the DG Program has continuously reviewed its processes with the intent of improving efficiency and the delivery of grants.

The audit noted many positive findings that form the foundation of this program; however, there are several systemic-level issues that need to be addressed. The current delivery model—three functional areas, each responsible for delivering a part of the program—needs to be better integrated and interactions between the functional areas should be improved to support an integrated and holistic approach. This issue is central and is one of the contributing factors to some of the internal control weaknesses. NSERC should strengthen the existing program delivery model to ensure program owners assume appropriate program accountability and authority that includes the responsibility for setting up internal control and risk management frameworks associated with the end-to-end delivery of the DG Program.

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[9] Source: Treasury Board of Canada Secretariat (TBS) *Guide to Integrated Risk Management*
[10] Source: TBS *Framework for the Management of Risk*

7 MANAGEMENT RESPONSE TO AUDIT RECOMMENDATIONS

ITEM	RECOMMENDATION	ACTION PLAN	TARGET DATE

1.	It is recommended that NSERC develop a revised delivery framework that facilitates comprehensive and end-to-end program management. The framework should clearly define accountabilities of key stakeholders to ensure appropriate governance and management controls are put in place.	• NSERC / SSHRC have adopted the "8A's" Delivery Model for Grants as its end-to-end framework for the deployment of Microsoft CRM and related systems. The 8A's cover the high level processes that categorize all business activities that are typical of Grants & Contributions (G&C's) program delivery. Section 7.1 illustrates graphically these functions within their corresponding functional areas and the corresponding Council equivalents.
		
		• Clear roles and responsibilities of the various business units have been defined for each of the "A's":
		  o Staff training – in advance of program/functions on-boarding
		  o Implementation – as programs/functions are on-boarded
		  o Compliance monitoring
		
		• The President's Management Committee and the Executive Management Committee will have governance and management oversight roles.
			Framework complete
			
			As per program & functions on-boarding schedule over 2013 to 2015
			
			Ongoing
			
			Ongoing

2.	It is recommended that NSERC review the reporting requirements of institutions to include additional details and/or expenditure plans related to the GRF.	• The timely use of GRF grant funds is monitored on an annual basis via the Agencies' grant accounts reconciliation exercise. The results of this monitoring will be reported to the VP RGS, VP RPP and to the CFO. • The Agencies' financial monitoring review function	

		includes in the scope of the review sample testing of expenditures charged to GRF grant fund accounts to assess institutions' adherence to the principles of grant fund administration and use.	Complete work by Dec 2012
		• A review of the reporting requirements of institutions will be completed with details on the expenditure plans related to the General Research Fund (GRF).	Discussion at SMC through Jan 2012
3.	It is recommended that NSERC develop a robust internal control environment related to NAMIS that includes user access management, password management, audit trail capability and data change approval mechanisms to ensure the integrity of all program information.	• Prior to the Discovery Grants Audit - April 2011 - the need for the development of audit trail capability, user access management processes and a TB compliant password policy within NAMIS were identified.	
		• A cost assessment coupled with a risk evaluation found that the cost to re-code NAMIS was prohibitive. The recommendation to address user and password management in the new CRM solution was approved by the VP CASD March 2011.	
		• A complete Point in Time (PIT) audit function was developed and deployed in AMIS in May 2011 and in April 2012 in the NAMIS system, facilitating a complete audit trail for data changes.	Complete May 2012
		• Identified as a key requirement of the CRM and SharePoint implementations, all user administration procedures are being reviewed and formalized along with a Threat Risk Assessment.	January 2013
		• Two new monitoring tools have been implemented within the production environment to audit the use of privileged administrative accounts. Further, a central password vault has been implemented to audit and track the use of all privileged system accounts and to monitor activities.	Complete April 2012

		• Identified as a key requirement of the CRM and SharePoint implementations, password standards have been established in line with industry best practices.	Complete April 2012
		• Identified as a key requirement of the CRM and SharePoint implementations, a bi-agency data management working group has been established to provide recommendations and options for data management and integrity considerations.	January 2013
		• A financial control framework which includes the requirement for the CRM to have audit trails for changes and transactions is being developed.	March 2013
4.	It is recommended that the Vice-President of the RGS Directorate lead the development and implementation of an integrated and systematic risk management process that responds to issues and potential risks to the organization's objectives[11] while enabling an effective decision-making process[12].	• Risk Management related to Discovery Grants and other programs is now formally built into the annual risk register review process.	Complete
		• Risk Management is now a standing item on the agenda of the joint RGS and RPP Management Committees, which meet jointly at least twice a year, to ensure consistency in approach.	Complete

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[11] Source: Treasury Board of Canada Secretariat (TBS) *Guide to Integrated Risk Management*
[12] Source: TBS *Framework for the Management of Risk*

5.	It is recommended that the Director General and Deputy Chief Financial Officer of the FAA Division produce a holistic report highlighting the trends and risks gathered from the financial monitoring exercises. This report should be shared with NSERC management to provide an end-to-end comprehensive view of the administration of NSERC funds.	• The Agency is in the process of implementing a new modernized financial monitoring review function to make it more efficient, effective and comprehensive in meeting the needs of both the Agency and the institutions that administer recipients' grant and award funds. • The results of the Financial Monitoring reviews are presented to NSERC Council's Executive Committee and will now also be presented to senior executives. • A holistic report highlighting the trends and risks gathered from the financial monitoring exercises will be completed.	 April 2013 April 2013

7.1 8A's Delivery Model for Grants

8A's Delivery Model for Grants

Arrange	Advertise	Apply	Assess	Award	Admin	Audit	Acquit

Council-Equivalent

| Program Design	Announce	Application Submission & Receipt	Competition Review	Competition Results	Award Administration or Post-Award	Program Audit	Award Administration or Post-Award
• Gs&Cs program dev't and set-up (e.g., forms, procedures, rules, checklists)	• Creation of promotional content • Publication of info for public access	• Intake of applications (self assessment, NoI, full application)	• Review and evaluation of submissions (pre-screening, technical, activity and financial assessments) • Approval process	• Agreement negotiation and generation • Review Agreement • Section 32 approvals (Expenditure Initiation/ Availability of Funds)	• Project monitoring • Receipt & review of recipient reports • Claims Processing • Section 34 and 33 approvals	• Audit & Performance reviews • Program Evaluation • Monitoring and reporting	• Close-out procedures • File archiving, retention and disposal

8 APPENDIX I – PEER REVIEW PROCESS OVERVIEW

To ensure that only excellent research is funded, and that all applicants are treated fairly, funding decisions are based on an international peer review process that involves 12 Evaluation Groups (EGs). Peer review involves the assessment of applications by impartial experts in a specific field. Supporting global excellence is the ultimate goal of all NSERC grants. The practice of basing funding decisions on the results of a thorough, expert assessment of detailed proposals is fundamental to NSERC's values, risk management, stewardship and accountability. In early 2007, this system was recognized by the Independent Blue Ribbon Panel on Grant and Contribution Programs, established by the President of the Treasury Board of Canada Secretariat, as "a well-developed system of peer review-based research grants that has been generally praised by the recipients of this funding."

Figure1. Example of Evaluation Groups and their Sections (some sections show cross- discipline panels of reviewers)
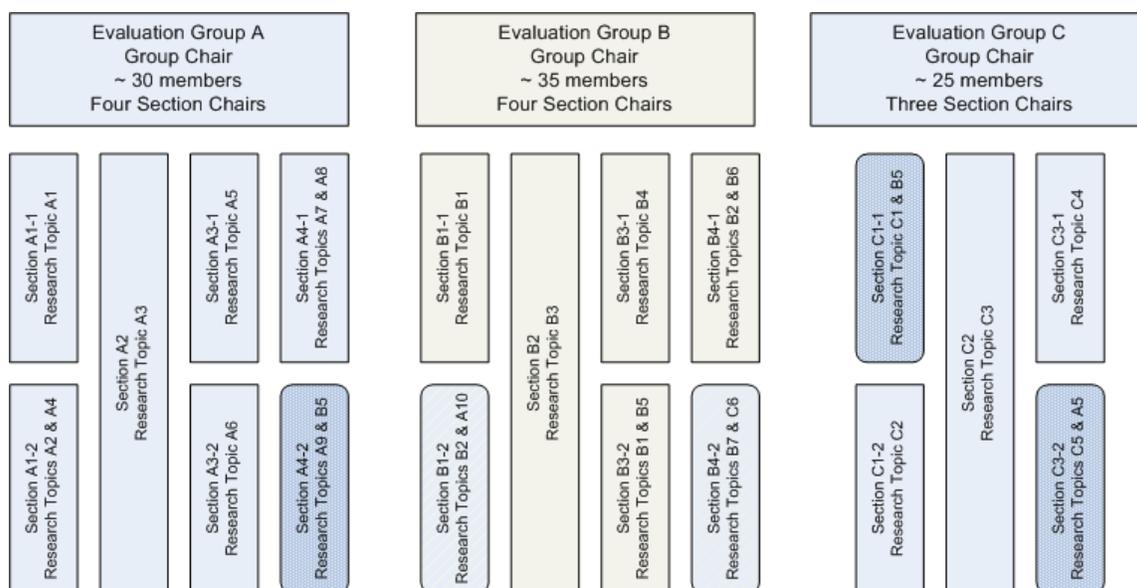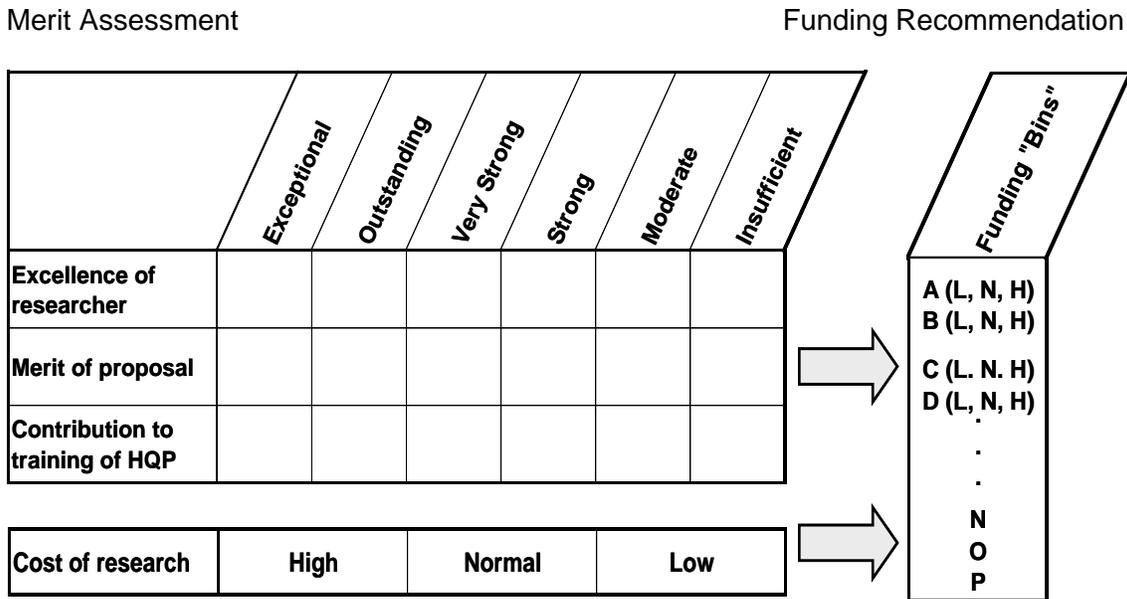

Both committee members and external referees devote considerable time and effort, on a volunteer basis, to review applications and make award recommendations. Every year, approximately 7,000 experts act as referees and provide detailed, written evaluations of the merit of applications. In addition, approximately 400 experts from universities, government and industry—from Canada and around the world—participate as members of NSERC's peer review committees.

The new two-stage assessment process (see Figure 2), implemented in 2009, separates the scientific evaluation of proposals—called the Peer Review—from the funding recommendations. New, formal Discovery Grant (DG) Evaluation Indicators were developed and implemented by NSERC and support this refreshed assessment approach. Each application is now assessed on each of the following three criteria: 1)

Excellence of researcher; 2) Merit of proposal; and 3) Training of Highly Qualified Personnel (HQP). Each criterion has an equal weight when being assessed. Once all applications have been evaluated, the Executive Committee of each of the 12 EGs—composed of EG Chairs, Section Chairs and Program Officers—meet and recommend to the NSERC President an EG-specific funding scenario divided into "bins"[13]. Ultimately, a final, multi-year DG funding list is produced and signed by the NSERC President.

Figure 2: Two-Step Review Process

Merit Assessment   Funding Recommendation

	Exceptional	Outstanding	Very Strong	Strong	Moderate	Insufficient		Funding "Bins"
Excellence of researcher								A (L, N, H)
Merit of proposal								B (L, N, H)
								C (L. N. H)
Contribution to training of HQP								D (L, N, H)

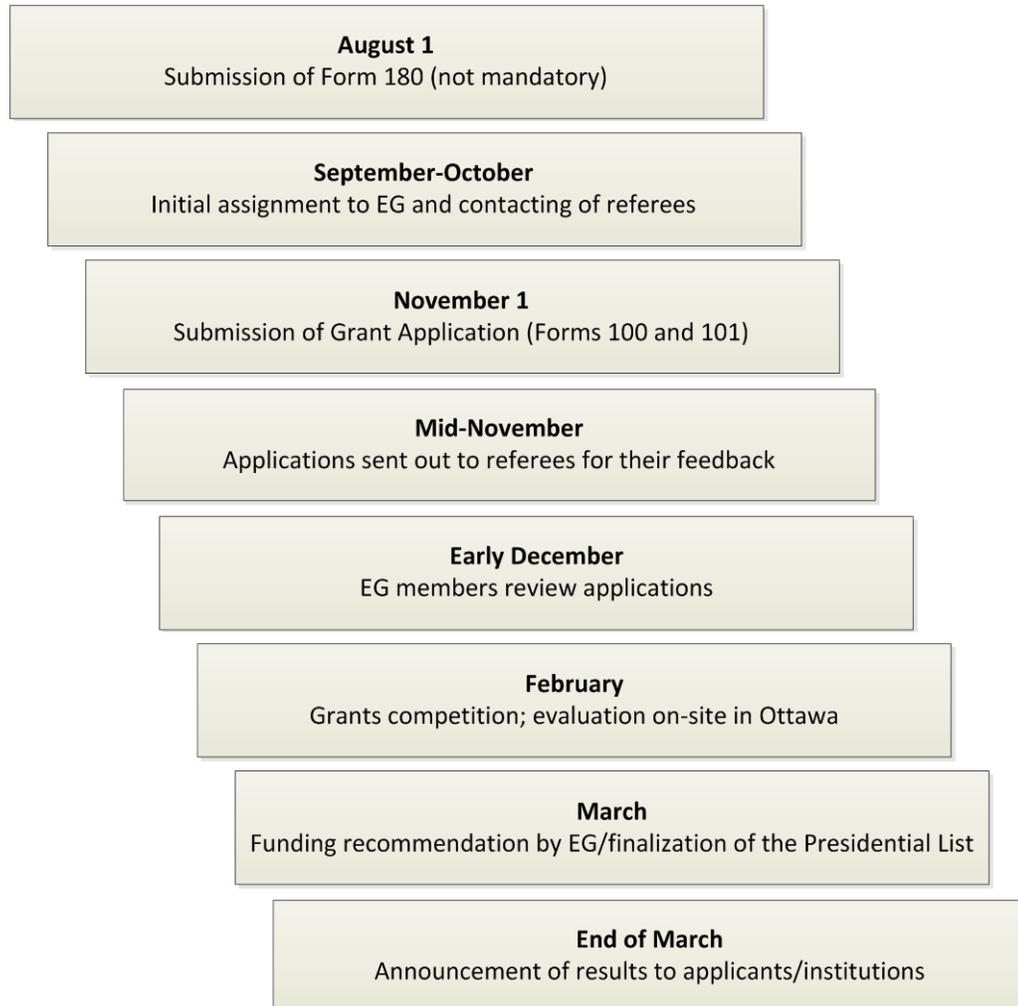| Cost of research	High	Normal	Low

N
O
P

The NSERC Award Management Information System (NAMIS) is designed to manage and monitor the information of NSERC's grants and scholarships throughout their life cycle, including information related to DGs. NAMIS captures DG data from the letters of intent, the initial grant applications, the peer review information and results, and the financial management and award administration of awards. NAMIS also allows NSERC to monitor funding status, and provides an automated interface with NSERC's Financial, Procurement and Asset Management (FPAM) system. NAMIS is the key award management system used by all NSERC employees involved in the DG Program—including Program Assistants, Program Officers, Team Leaders and Directors.

Logistical processes around the DG Program are an enormous undertaking. The focus of employees is to ensure the competition cycle, which runs from August until April of the

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[13] After all the applications have been evaluated, they are automatically assigned to quality categories, also referred to as "bins," based on the ratings they received. All applications of similar quality are grouped together in the same bins. The quality bin determines the amount of funding an application will receive.

subsequent year is successfully delivered. Figure 3 shows the major steps in the life cycle of a DG application.

Figure 3: Lifecycle of a Discovery Grant Application

August 1
Submission of Form 180 (not mandatory)

September-October
Initial assignment to EG and contacting of referees

November 1
Submission of Grant Application (Forms 100 and 101)

Mid-November
Applications sent out to referees for their feedback

Early December
EG members review applications

February
Grants competition; evaluation on-site in Ottawa

March
Funding recommendation by EG/finalization of the Presidential List

End of March
Announcement of results to applicants/institutions

9 AUDIT TEAM

Chief Audit Executive: Phat Do
Audit Principal: Benjamin Cyr
Auditor: Alice Hanlon