Sustainability Project Fund Application

Applicant/Project Leader: Christian Bouchard

Contact Information:
Name: Christian Bouchard
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Project Title: Hazardous waste minimization

Budget Requested: 11 600$

Project Group -

- Christian Bouchard, Manager WMP (514) 398-5066
- Student to be hired
- Wayne Wood, Associate director EHS, (514) 398-4563

I. Project Overview

Project description and objectives:

In an effort to properly characterize hazardous material and reduce the amount of hazardous waste sent for incineration (thus minimizing costs related to disposal), a student would be hired to be in charge of three different projects:

1. **Converting solvent based Liquid Scintillation Cocktail (LSC) users to Eco-friendly cocktail.** *Right now there is no control on LSC purchases. Therefore we have to treat the LSC as hazardous and send it for incineration. By switching as many users as possible to the "eco-friendly" water based LSC, we can better characterize our waste and treat it as non hazardous, reducing the costs and minimizing the negative impact of solvent based LSC on the environment. Here is the description of the project:*

    a. Create a checklist;
    b. Identify the labs that are using LSC;
    c. Using the checklist, visit the labs to determine which LSC is being used;
    d. Compile the results in order to draw conclusions;
    e. Write a report that includes recommendations on what should be the next step;
    f. Implement the recommendations.

2. **Minimizing biomedical waste by autoclaving and diverting non hazardous waste from the bio box to the proper waste stream.** *Over the last 5 years, the amount of biomedical waste containers has doubled. In an effort to reduce that number, we need to identify what material is going in the box and if we can divert*

some of it to another waste stream. This would reduce the amount of hazardous material disposed by the university. Here is the description of the project:

a. Create a checklist;
b. Identify the labs that are producing biomedical waste;
c. Using the checklist, visit the labs and analyse their work procedure;
d. Compile the results in order to draw conclusions;
e. Write a report that includes recommendations on what should be the next step;
f. Implement the recommendations.

3. **Minimize chemical waste produced by repetitive procedures.** The Waste Management Program is responsible for collecting all chemical waste on campus. We noted in the last few years that we do get a lot of the same chemicals coming from the same location over and over, suggesting that a procedure is repetitive. In order to minimize the amount of chemical waste, we can change some of those processes to a more "eco-friendly" product that is not considered hazardous to the environment.
   a. Create a checklist;
   b. Identify the labs that have repetitive procedures generating hazardous chemical waste;
   c. Using the checklist, visit the labs and analyse their work procedure;
   d. Compile the results in order to draw conclusions;
   e. Write a report that includes recommendations on what should be the next step;
   f. Implement the recommendations.

<u>Project eligibility:</u>

- *How will the project contribute to building a culture of sustainability on campus?*
  - There are over 850 labs at McGill using all kinds of hazardous materials. The changes proposed will affect several hundreds of staff and students and will change their fundamental behaviours regarding disposal of radioactive, chemical and biomedical waste. We are attacking the root of the problem which makes it easier to manage afterward. By implementing these changes, we are reducing our negative impact on the environment due to hazardous material disposal, helping building a culture of sustainability in all the labs on campus
- *Provide any supporting information that demonstrates a need for the project on campus.*
  - On average, we dispose of 20 drums (45 gallons each) of small vials containing LSC. That's about 280 Litres of LSC per year. Since we don't have a way to determine if it is hazardous or not, we have to assume it is and send it for incineration. With this project, we will be able to divert the LSC from incineration and use a cocktail that is biodegradable and safe for the environment
  - With the number of labs going up on campus, the amount of biomedical waste is going to increase in the next few years. Over the last 5 years we already noted an increase in number of waste containers picked up weekly. By characterizing our biomedical waste properly, we will be able to minimize our hazardous waste disposal and possibly divert some of it from the landfill. Also, by autoclaving the

waste not only we divert it from incineration but we might be able to reuse/recycle it.

- One reason why McGill's flammable hazardous waste is expensive to dispose of is its water content. By characterizing our chemical waste and substitute hazardous material by non-hazardous material, we will be able to reduce the amount of waste send for incineration and treat the remaining water based waste as non hazardous, reducing costs and impact on the environment. Another popular chemical that is widely used is ethidium bromide. There are alternative non hazardous chemicals that can be used and we need to verify to which extend we can remove this very toxic product from the labs.

Timeframe/Milestones:

- **Phase one - Converting solvent based Liquid Scintillation Cocktail (LSC) users to Eco-friendly cocktail:**
  - Timeframe: June 1st 2010 to August 31st 2010;
  - Milestones:
    - Create a checklist (by June 15th);
    - Identify the labs that are using LSC (by June 30th);
    - Using the checklist, visit the labs to determine which LSC is being used (by July 31st);
    - Compile the results in order to draw conclusions (by August 6th);
    - Write a report that includes recommendations on what should be the next step (by August 13th);
    - Start implements the recommendations (until August 31st).
  - Measure of performance: We will compare the stats that we have for the last few years related to LSC disposal with the ones we get from the project;
  - Sharing the results: A report will be written and presented to ULSC and SCE.

- **Phase two - Minimizing biomedical waste by autoclaving and diverting non hazardous waste from the bio box to the proper waste stream:**
  - Timeframe: September 1st 2010 to January 31st 2011;
  - Milestones:
    - Create a checklist (by September 15);
    - Identify the labs that are producing biomedical waste (by September 30th);
    - Using the checklist, visit the labs and analyse their work procedure (by November 15th);
    - Compile the results in order to draw conclusions (by November 22nd);
    - Write a report that includes recommendations on what should be the next step (by December 31st);
    - Start implementing the recommendations (until January 31st 2011)
  - Measure of performance: We will compare the stats that we have for the last few years related to biomedical waste disposal with the ones we get from the project;
  - Sharing the results: A report will be written and presented to ULSC and SCE.

- **Phase three - Minimize chemical waste produced by repetitive procedures.**
  - Timeframe: February 1st 2011 to May 31st 2011;
  - Milestones:
    - Create a checklist (by February 30th);
    - Identify the labs that have repetitive procedures generating hazardous chemical waste (by March 15th);
    - Using the checklist, visit the labs and analyse their work procedure (by April 15th);
    - Compile the results in order to draw conclusions (by April 23rd);
    - Write a report that includes recommendations on what should be the next step (by April 30th);
    - Implement the recommendations (by May 31st).

Stakeholders:

- **Waste Management Program:** Will benefit from this project by minimizing costs related to hazardous waste disposal and also diverting it from the environment;
- **EHS** (3610 McTavish): will provide expertise especially for phase two (biomedical)

II. Project Implementation

Tasks and Responsibilities:

- *I included the information in timeframe/milestones.*

V. Financials

- *Please provide details of the budget that is being requested in the tables below (expanded as required).*

Detailed expenses:

Expense Description	**Estimated Cost**
Student salary phase one	Around 60 daysx7hours=420 hours @ 10$/h=4200$
Student salary phase two	18 weeks, around 10 hours per week = 180 hours @ 10$/h = 1800$
Student salary phase three	16 weeks, around 10 hours per week= 160 hours @ 10$/h = 1600$
Biological indicators for autoclaving (200)	2000$
Eco friendly LSC cocktail (8L)	1000$
Non-hazardous replacement chemicals (SYBR safe (ethidium bromide replacement) 12L	1000$

Detailed revenues:

Revenue Source	**Amount Requested**	**Confirmed?**
Sustainability Projects Fund	11 600$	No

VI. Additional information:

- *I, Christian Bouchard, have a bachelor degree in biochemistry and worked in a lab before starting in the waste management business. I know some of the process that are used in labs and truly believe that some of them can be changed in order to be more sustainable. Ethidium bromide is a good example. This product is used by most of the labs because it is easy to buy and cheap to buy. Problem is the product is highly toxic. Same thing for LSC used in scintillation counters. These processes can be changed but in order to do that you need time and money. With the help of the sustainability fund, such a project is now a possibility. Hopefully we can get a McGill student to work on it and make our University a better place to work.*

- *I attended several conferences on hazardous waste management and had many success stories about chemical substitution and green chemistry all across North America and I think McGill is ready to try implementing some of those changes. My contact network will definitely help keeping the project in the right direction by avoiding mistakes made by other institutions in the past.*