

Note

Do Educational Institutions Score High on Their Sustainability Efforts?: A Case Study (and Grade) on Chemical Waste Management and Minimization in Teaching and Research Laboratories at the University of Minnesota

David Hanna*

INTRODUCTION

During a time when environmental issues flood the headlines of newspapers, magazine covers, and television broadcasts,¹ it is hard not to come across sustainable efforts by “concerned” corporations and institutions trying to proactively tackle these environmental issues.² With all the publicity asso-

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* Joint Degree Candidate, J.D. & M.S. in Chemistry, 2013, University of Minnesota Law School & Graduate School; B.S. in Chemistry, 2009, University of Pittsburgh. The author would like to thank Professor Hari Osofsky for her guidance and consultation while writing this Note, the staff and editors of MJLST for providing feedback, the Distefano group members in the Department of Chemistry for reviewing this Note, Professor Jane Wissinger for her inspiration in achieving a greener learning environment, and his friends and family for their unwavering support.

1. See, e.g., *Measure Seeks to Give Border Patrol Power to Circumvent Environmental Laws*, N.Y. TIMES, Nov. 14, 2011, at A21 (detailing a proposal to allow Border Patrol agents to get around environmental laws); Eric Marlapodi, *EPA Proposes New Mercury Standards for Power Plants*, CNN HEALTH (Mar. 23, 2011, 10:12 AM), <http://www.cnn.com/2011/HEALTH/03/16/us.epa.mercury/index.html> (outlining new guidelines issued by the Environmental Protection Agency for mercury and air toxins released from power plants); Muneeza Naqvi, *Himalayan Nations Agree on Climate Adaptation Plan*, YAHOO NEWS (Nov. 20, 2011), <http://news.yahoo.com/himalayan-nations-agree-climate-adaptation-plan-085546398.html> (discussing the collaboration of four Himalayan nations to work together to adapt to climate change due to threatening weather changes); *Predicting Future Threats for Global Amphibian Biodiversity*, SCIENCEDAILY (Nov. 17, 2011), <http://www.sciencedaily.com/releases/2011/11/111116132916.htm> (suggesting global climate change as the most likely cause of declining amphibian populations).

2. See JOEL BAKAN, THE CORPORATION: THE PATHOLOGICAL PURSUIT OF PROFIT & POWER 28 (2005) (“[The Corporation] remains, as it was at the time

ciated with the color green stamped on a product or plastered across a campaign,³ it is easy for the less sustainable acts by these entities to slip through the cracks and go unnoticed. Waste management and minimization in university and college teaching and research laboratories is one of these areas.

In the past decade, universities and colleges have prided themselves on taking steps towards a “sustainable future,” initiated through campaigns designed to utilize renewable energy resources and promote sustainability.⁴ For example, in the spring of 2011, the Office of Sustainability at Princeton University collaborated with the Department of Chemistry and the Lucid Design Group to install energy-monitoring dashboards into the Frick Chemistry Laboratory.⁵ These dashboards dis-

of its origins as a modern business institution in the middle of the nineteenth century, a legally designated ‘person’ designed to valorize self-interest and invalidate moral concern.”) *But see* R. Edward Freeman & Jeanne Liedtka, *Corporate Social Responsibility: A Critical Approach*, 34 BUS. HORIZONS 92, 96 (1991) (“Corporations are places where both individual human beings and human communities engage in caring activities that are aimed at mutual support and unparalleled human achievement.”).

3. *See, e.g., Future Friendly*, PROCTER & GAMBLE, <http://www.futurefriendly.com/Pages/Home.aspx> (last visited Sept. 21, 2012) (displaying blue skies, a green garden, and a virtual home that can be explored room by room to demonstrate how to conserve energy on Procter & Gamble’s company website); Matthew Wheeland, *McDonald’s New Green Strategy Extends to Its Signage*, GREENBIZ (Nov. 11, 2009, 1:18 PM), <http://www.greenbiz.com/blog/2009/11/24/mcdonalds-new-green-strategy-extends-its-signage> (explaining how McDonald’s restaurants in Great Britain, France, and Germany have incorporated deep hunter green into its signs to promote its environmentally green campaign).

4. *See* Bert Cohen, *Developing Educational Indicators that Will Guide Students and Institutions Toward a Sustainable Future*, in *ADVANCING SUSTAINABILITY IN HIGHER EDUCATION* 83, 92–93 (Larry H. Litten & Dawn Geronimo Terkla eds., 2007). For examples of university sustainability campaigns, see *Renewable Energy Campaign*, OFF. SUSTAINABILITY: U. UTAH, <http://sustainability.utah.edu/initiatives/renewable-energy/index> (last visited Oct. 10, 2011) and *It All Adds Up*, U. MINN., <http://www1.umn.edu/italladdsup/index.php> (last modified Aug. 30, 2012). For examples of college sustainability campaigns, see *History of the Clean Energy Committee*, EVERGREEN, <http://www.evergreen.edu/committee/cleanenergy/history.htm> (last visited Oct. 10, 2011) and *Environmental Sustainability at Goucher*, GOUCHER C., <http://www.goucher.edu/x23316.xml> (last visited Oct. 10, 2011).

5. *Report on Sustainability 2011*, PRINCETON U., <http://www.princeton.edu/reports/2011/sustainability/research/communication/s/> (last modified Oct. 28, 2011). For additional examples of sustainability efforts taken by Princeton University, see Emily Aronson, *Campus Sustainability Efforts Progress over Summer and into Fall*, PRINCETON U. (Sept. 29, 2011,

play electric, heating, and cooling data; show long-term electricity patterns; and provide information on how fume hoods promote energy efficiency and savings.⁶ The Office of Sustainable Energy and Environmental Initiatives at Brown University is taking steps towards campus waste management and reduction including: installing solar-powered trash compactors to lower carbon emissions and reduce the number of garbage bags used, recycling students' electronic devices (9.8 tons in 2003) and light bulbs (ten tons in 2011), and viewing undergraduate admissions applications online for the first time in 2011 (saving one ton of paper each year).⁷ Universities with large student enrollments are not the only institutions to promote campus sustainability; colleges with smaller class sizes are also taking green steps towards achieving a more environmentally-friendly campus. For example, with the recent addition of a solar parking pavilion next to the pre-existing photovoltaic (PV) array on the roof of the Adam Joseph Lewis Center for Environmental Studies,⁸ Oberlin College now houses the largest PV array in Ohio.⁹ Pomona College, located in Claremont, California, has also worked towards sustainability by increasing the amount of sustainable food purchased by dining services and reducing the amount of synthetic fertilizer used.¹⁰ Regardless of the size of their student population, many universities and colleges across the nation have taken some form of exemplary action to encourage campus-wide sustainability.

While these initiatives and steps taken are crucial in achieving a more sustainable future, waste management and minimization in university teaching and research laboratories is also an important and necessary part of improving sustaina-

12:00 PM), <http://www.princeton.edu/main/news/archive/S31/70/58K49/index.xml?section=featured> (discussing the 701 Carnegie Center Sustainability Fair and the "Drink Local" Initiative).

6. *Id.*

7. OFFICE OF SUSTAINABLE ENERGY & ENVTL. INITIATIVES, FACILITIES MGMT., BROWN UNIVERSITY SUSTAINABILITY PROGRESS REPORT 24–25 (2011), available at http://brown.edu/Facilities/Facilities_Management/docs/sustainability_report_2011_final.pdf.

8. *Energy*, OBERLIN C., <http://new.oberlin.edu/office/environmental-sustainability/progress/energy.dot> (last visited Nov. 20, 2011).

9. *Buildings and Grounds*, OBERLIN'S SUSTAINABILITY PORTFOLIO, http://www.oberlin.edu/sustainability/portfolio/buildings_and_grounds.html (last visited Oct. 2, 2012).

10. Cynthia Peters, *Pomona College's 2010–11 Sustainability Report Shows Progress in Water, Landfill Waste Reduction*, POMONA C. (Oct. 28, 2011, 4:03 PM), <http://www.pomona.edu/news/2011/10/28-sustainability-report.aspx>.

bility. Some institutions have already realized the potential harm of ignoring waste regulation in campus labs. Schools like Colgate University have created laboratory waste programs to control the amount of waste produced in university laboratories while still abiding by federal, state, and local laws and regulations.¹¹ Some educational institutions have developed narrowly-defined recommendations that target specific types of laboratories at their institutions. For example, Princeton University published a paper providing suggestions to prevent pollution in organic chemistry research laboratories.¹² Regardless of the approach, a waste management guide explains, “[b]y reducing wastes at the source, you are taking the most effective step towards eliminating wastes that would otherwise be released to the environment.”¹³ While acknowledging a waste management and minimization problem is an important first step, universities still have significant progress to make, as evidenced by the amount of chemical hazardous waste still generated by university teaching and research laboratories. Some schools with published waste information include the University of Florida, with approximately 132 tons of generated waste,¹⁴ and the University of California-Berkeley, with about 194.6 tons of hazardous waste produced in 2009.¹⁵ With over four thousand educational institutions and approximately eighteen million students enrolled in degree-granting educational institutions in the United States, the potential amount of unregulated laboratory waste being released into the environment is enormous.¹⁶

11. *Chemical Hygiene Plan*, COLGATE U., <http://offices.colgate.edu/chemmgt/CHP/m-hazwaste.html> (last visited Sept. 13, 2012).

12. See ROBIN IZZO SCOTT, *POLLUTION PREVENTION IN AN ORGANIC CHEMISTRY RESEARCH LABORATORY 2* (2000), available at <http://www.c2e2.org/robinscott.pdf>.

13. MICHELLE DAVIS ET AL., *LABORATORY WASTE MINIMIZATION AND POLLUTION PREVENTION: A GUIDE FOR TEACHERS 7* (1996), available at <http://denr.sd.gov/dfta/wp/P2/Documents/Labwaste.pdf>.

14. ENVTL. PROT. AGENCY, *STATE DETAIL ANALYSIS: THE NATIONAL BIENNIAL RCRA HAZARDOUS WASTE REPORT 73* (2009) [hereinafter EPA], available at <http://www.epa.gov/wastes/inforesources/data/br09/state09.pdf>.

15. UNIV. CAL. BERKELEY, *CAMPUS SUSTAINABILITY REPORT 19* (2011), available at http://sustainability.berkeley.edu/os/pages/reports/docs/2011_Campus_Sustainability_Report.pdf.

16. THOMAS D. SNYDER & SALLY A. DILLOW, *DIGEST OF EDUCATION STATISTICS 2009*, at 269, 278 (2010), available at http://nces.ed.gov/pubs2010/2010013_3a.pdf. See also Peter C. Ashbrook & Peter A. Reinhardt, *Hazardous Wastes in Academia*, 19 ENVTL. SCI. TECH. 1150, 1150 (1985).

This Note studies chemical waste management and minimization in teaching and research laboratories at the University of Minnesota (the University), one of the largest institutions by student enrollment in the country.¹⁷ By examining the issue of waste management and minimization at the University, this Note helps elucidate how universities and colleges have missed key areas of development and improvement of sustainability. Part II of this Note provides an overview on sustainability to help contextualize the role of chemical waste management and minimization. This Part discusses the federal and state legal infrastructure that governs waste management and minimization in university teaching and research laboratories in Minnesota and examines the regulations currently in place by the Department of Environmental Health and Safety (EHS). Finally, Part III evaluates this legal and regulatory framework and suggests proposals on how Minnesota lawmakers and regulatory agencies can model and incorporate the legal framework and infrastructure of other states into Minnesota's current waste management regime. By implementing this legal and regulatory framework while considering current university waste disposal and regulation, Minnesota can reduce a considerable amount of university chemical waste—an amount that contributed to the University of Minnesota's high ranking among Minnesota hazardous waste generators in 2009.¹⁸

II. A TECHNICAL, LEGAL, AND REGULATORY DISCUSSION OF WASTE MANAGEMENT AND MINIMIZATION IN UNIVERSITY TEACHING AND RESEARCH LABORATORIES

To understand the extent of sustainability efforts undergone in university and college teaching and research laboratories, this Note first examines the breadth and depth of the word “sustainability” and how the contextual setting can affect how the word is interpreted. One possible reason for low compliance

(“[H]azardous wastes are a problem for any school with a laboratory, regardless of size.”).

17. SNYDER & DILLOW, *supra* note 16, at 333 (ranking the university as the sixth largest degree-granting institution, according to information compiled in fall 2007).

18. See EPA, *supra* note 14, at 193. By generating 134 tons of hazardous waste, the University of Minnesota-Minneapolis Campus ranked alongside large corporations and pharmaceutical companies in Minnesota, notably Wolkerstorfer Co., Inc. (143 tons), Multek Flexible Circuits, Inc. (141 tons), and the Douglas Corporation (138 tons). *Id.*

with sustainability rules, regulations, and recommendations is the broad, vague definition and conception of sustainability, which allows law-abiding citizens ample room for interpretation.

Section A of this Part examines specific examples of how corporations, institutions, and individuals have defined and interpreted "sustainability." Sections B and C discuss the legal and regulatory approaches, respectively, that are in place for encouraging and mandating sustainability. Finally, Section D details current efforts by the University of Minnesota to create a greener laboratory experience for its students and the environment.

A. SUSTAINABILITY: GIVING IT THE ACKNOWLEDGMENT (AND ENERGY) IT DESERVES

With the words "sustainability," "sustainable," and "sustained" employed by corporations, institutions, and individuals in many different environmental contexts around the world, it should come as no surprise that the meanings of these words can vary from place to place, time to time, or profession to profession.¹⁹ Section One examines different approaches in defining "sustainability" to elucidate the discrepancies and idiosyncrasies that emerge when encountering the word. Then, Section Two looks at the definition of "sustainability" that the University currently utilizes in promoting its sustainability efforts.

1. What Do You Mean by Sustainability?

With political figures placing more emphasis on the significance of sustainability, sustainable development has become an important topic and has been covered in many books and important legal documents.²⁰ Even while writing broadly on the

19. See Becky J. Brown et al., *Global Sustainability: Toward Definition*, 11 ENVTL. MGMT. 713, 713 (1987) (including "sustainable development," "sustained use of the biosphere," and "ecological sustainability" as examples of how variants of the world "sustainability" are used).

20. See, e.g., Press Release, Office of the Press Secretary, The White House, President Obama Signs an Executive Order Focused on Federal Leadership in Environmental, Energy, and Economic Performance (Oct. 5, 2009), available at http://www.whitehouse.gov/the_press_office/President-Obama-signs-an-Executive-Order-Focused-on-Federal-Leadership-in-Environmental-Energy-and-Economic-Performance (instituting sustainability goals for Federal agencies to improve their environmental, energy, and economic performance); John C. Dernbach, *Sustainable Development: Now More Than Ever*, in

subject of sustainability, authors have defined “sustainability” differently based on their extracted analysis of their research on the topic. For example, in a report by the World Commission on Environment and Development, sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”²¹ In its report, the World Commission stresses the importance of human needs and aspirations in attaining sustainable development.²² An environmental law textbook on sustainability similarly emphasizes the role of humans and how their actions affect both the present and future; however, remedial action is more narrowly confined to the management of natural systems.²³ While the type of source arguably could account for this variance in definitions, this line of reasoning falls through the cracks when looking to other authors of similar source types. For example, instead of focusing solely on human needs and the past and future, another law textbook takes a different approach and emphasizes the environment and “its relationship to everything else we care about as a society” when dealing with sustainability issues.²⁴ Even when authors ascribe a broad definition to sustainability, one can easily understand how varying definitions of sustainability emerge with their idiosyncrasies in research and writing.²⁵

Other resources define sustainability more narrowly based upon the contextual situation. Defining sustainability by a particular profession is one common way of doing this.²⁶ When try-

STUMBLING TOWARD SUSTAINABILITY 45 (John C. Dernbach ed., 2002) (tackling the essential and challenging idea of sustainability).

21. WORLD COMM'N ON ENV'T & DEV., OUR COMMON FUTURE 43 (1987). This definition is one of the “most widely accepted definition[s]” of sustainability. Todd Barsanti, *Defining Sustainability for Designers*, RENOURISH (Aug. 9, 2011), http://www.re-nourish.com/?l=articles_detail&id=113.

22. WORLD COMM'N ON ENV'T & DEV., *supra* note 21, at 43–44.

23. SUSTAINABLE ENVIRONMENTAL LAW: INTEGRATING NATURAL RESOURCE AND POLLUTION ABATEMENT LAW FROM RESOURCES TO RECOVERY 158 (Celia Campbell-Mohn et al. eds., 1993).

24. Dernbach, *supra* note 20, at 45.

25. See Will Varey, *Defining Sustainability: An Integral Triptych (A Picture in Three Parts)* 29–30 (Jan. 10, 2005) (unpublished manuscript), *available at* <http://www.emrgnc.com.au/DefiningSustainability.pdf> (researching over 100 definitions of sustainability and finding varying degrees of definition and clarity).

26. See, e.g., Barsanti, *supra* note 21 (encouraging the definition of sustainability for designers to incorporate more work, research, development, and refining); see also SUSTAINABLE BUS. GROUP, <http://www.sbizgroup.com/> (last visited Dec. 10, 2012) (“We define ‘sustainable business practices’ as the opti-

ing to create a tailored definition of sustainability, Will Varey advocates a three-part framework: sustainability is “[w]hat is to be sustained] [for whose benefit] [and for how long].”²⁷

Varey’s approach and other tailored methods of defining sustainability necessitate spending more thought and time towards understanding the actors who are being affected or will be affected by the terms of the definition. While this does require more effort on the part of the definition’s creator, providing individuals or corporations with a clearer and more focused definition would likely result in higher compliance rates; ambiguity results in confusion and actor compliance that does not mirror the intended effects.

This discussion on defining “sustainability” helps elucidate that there is no single, unifying definition. The fact that sustainability has been defined both broadly and narrowly is an important consideration in examining the University’s approach to defining sustainability in Section Two of this Section and in Part III of this Note. Based on how the University of Minnesota incorporates sustainability into handling waste management and minimization in the teaching and research labs, a reevaluation of how the University defines sustainability might be necessary in attaining a higher level of sustainability in university teaching and research laboratories.

2. What Sustainability Means to the University of Minnesota

The context of where sustainability is employed is important in creating a definition that helps individuals, organizations, and corporations accurately interpret and incorporate its meaning into their daily practices. Educational institutions like the University have adopted sustainability campaigns and platforms where sustainability is defined in hopes of promoting sustainability on a college and university level.²⁸

mal use of human, financial and material resources for the long run, to produce the desired goods and services.”).

27. Varey, *supra* note 25, at 29.

28. See, e.g., *It All Adds Up*, *supra* note 4; see also *What is Sustainability?*, ARIZ. ST. U., <http://schoolofsustainability.asu.edu/about/what-is-sustainability.php> (last visited Feb. 5, 2012) (presenting several definitions of what sustainability means to professors teaching at Arizona State University); *What is Sustainability?*, U. MD., http://www.sustainability.umd.edu/content/about/what_is_sustainability.php (last visited Feb. 5, 2012) (providing a graphic depiction of what sustainability means to the University of Maryland); *What is Sustainability?*, VAND. U., <http://www.vanderbilt.edu/sustainvu/who->

For the University, “sustainability is a continuous effort integrating environmental, social, and economic goals through design, planning, and operational organization.”²⁹ The Regents of the University have acknowledged six principles to guide the institution in efforts toward campus sustainability: leadership, modeling, operational improvements, energy efficiency, education and outreach, and research.³⁰ For each of these principles, the University details how they can be incorporated into teaching, research, and outreach programs.³¹ Under the principle of Operational Improvements, one of the University’s four goals is to “[m]anage resources for their highest end use by reducing consumption, minimizing waste, and strongly supporting the reuse and highest value recycling of unwanted materials.”³² The University included several desired outcomes and measures of this proposed goal, including “[i]nformed purchasing and resource-use decisions,” “[r]ethinking waste-producing processes,” “[r]euse of existing resources by individuals and by institutional reuse programs,” and “[r]ecycling of a wide range of materials.”³³

The University’s definition of sustainability is important for this case study and proves significant in addressing whether improvement in sustainability should be grounded at the foundational level in prescribing what sustainability means for the University.

B. PLACING SUSTAINABLE UNIVERSITIES IN A LEGAL FRAMEWORK

To promote and carry out sustainable efforts on campus, the University must abide by the laws currently in place on both a federal and state level. This Section examines the legal

we-are/what-is-sustainability/ (last visited Feb. 5, 2012) (examining a broad definition of “sustainability” and then narrowly defining what “sustainability” means for institutions like Vanderbilt University).

29. UNIV. MINN., SUSTAINABILITY AND ENERGY EFFICIENCY 1 (2004), available at http://www1.umn.edu/regents/policies/administrative/Sustain_Energy_Efficiency.pdf.

30. UNIV. MINN., SUSTAINABILITY AND U 1 (2008), available at http://www.uservices.umn.edu/sustainableU/assets/pdf/2008_Sustainability_and_U.pdf.

31. *Id.*

32. UNIV. MINN., SYSTEMWIDE SUSTAINABILITY 16 (2009), available at http://www.uservices.umn.edu/sustainableU/assets/pdf/UM_Systemwide_Sustainability_Final_Report.pdf.

33. *Id.* at 35.

framework that governs sustainability on a university level.

Section One details federal laws and statutes regarding sustainability in university teaching and research laboratories. Section Two then examines the current state laws in Minnesota that the University must follow in regulating its laboratory waste. Finally, Section Three looks at current laws in other states regarding sustainability in institutional laboratories. While the University does not have to abide by laws in other states, it could learn from other states how their legal framework has effectively regulated and reduced the amount of waste at educational institutions in their respective states.

1. Federal Laws and Statutes Regarding Sustainability in Teaching and Research Laboratories

The primary federal statute for solid and hazardous waste management is the Resource Conservation and Recovery Act of 1976 (RCRA).³⁴ Once a waste is classified as a “solid” waste, the waste must then be evaluated to determine whether it is hazardous.³⁵ The waste is then be considered to be hazardous if it falls under one of two conditions: (1) the waste is determined to be on the list of predetermined hazardous wastes; or (2) the waste is determined to be ignitable, corrosive, reactive, or toxic.³⁶ If the particular substance falls under the category of hazardous waste, then it is subject to Subtitle C of the RCRA, which regulates hazardous substances from the time it is generated to the time it is treated and disposed.³⁷ If the solid waste does not fall under this category, then it is subject to subtitle D of the RCRA, which regulates nonhazardous solid waste disposal.³⁸ The RCRA gives the states the responsibility of developing, implementing, and enforcing solid waste management schemes.³⁹ The Environmental Protection Agency (EPA) is responsible for providing financial and technical assistance to the states.⁴⁰ While the RCRA does provide guidelines for waste generators in general, it does not provide guidelines and rules

34. See Solid Waste Disposal Act, 42 U.S.C. §§ 6901–6992k (2006).

35. 5 ROCKY MOUNTAIN MINERAL LAW FOUND., AMERICAN LAW OF MINING § 170.02[2] (2d ed. 2010).

36. 40 C.F.R. §§ 261.21–24, 31–33 (2011).

37. See 42 U.S.C. §§ 6921–6939e (2006).

38. 42 U.S.C. §§ 6941–6949a.

39. 42 U.S.C. §§ 6942–6949a.

40. See 42 U.S.C. §§ 6947–6949.

unique to university teaching and research laboratories.

The major federal law regulating waste management and minimization in college and university teaching and research laboratories is section 1161u(a)(1), a federal statute that addresses the allocation of funds for university institutions that apply for sustainability grants. The statute reads:

From the amounts appropriated to carry out this section, the Secretary, in consultation with the Administrator of the EPA, shall make grants to eligible entities to establish sustainability programs to design and implement sustainability practices, including in the areas of energy management, greenhouse gas emissions reductions, green building, waste management, purchasing, transportation, and toxics management, and other aspects of sustainability that integrate campus operations with multidisciplinary academic programs and are applicable to the private and government sectors.⁴¹

The statute later defines an “eligible entity” as “an institution of higher education.”⁴² While this statute does not specifically require colleges and universities to regulate the amount of waste in their research and teaching facilities, it does provide opportunities for universities like the University of Minnesota to obtain funds to help with waste management and minimization in its teaching and research laboratories.

2. Laws in Minnesota Regarding Waste Management and Minimization

As an educational institution in Minnesota, the University must abide by Minnesota laws that regulate waste management and minimization. This Section details the laws which govern waste management and minimization in Minnesota.

Minnesota grants the Minnesota Pollution Control Agency (MPCA) the legal authority to regulate air, water, and land pollution in Minnesota.⁴³ Section 116.07, Powers and Duties, gives the MPCA the authority to “adopt standards for the identification of hazardous waste and for the management, identification, labeling, classification, storage, collection, transportation, processing, and disposal of hazardous waste, recognizing that due to variable factors, a single standard of hazardous waste control may not be applicable to all areas of the state.”⁴⁴ This section also prohibits local governments from creating hazard-

41. 20 U.S.C.A. § 1161u (2008).

42. 20 U.S.C.A. § 1161u(a)(3).

43. MINN. STAT. ANN. § 116.01 (West 2012).

44. MINN. STAT. ANN. § 116.07 subd.2(d) (West 2012).

ous waste standards that conflict with the MPCA's standards.⁴⁵ Nowhere in this section does Minnesota address how the MPCA or any other regulatory entity should specifically address chemical waste disposal in university teaching and research laboratories.

In carrying out its responsibilities, the MPCA has adopted several rules pertaining to waste management and minimization. Under section 7045.0208, Hazardous Waste Management, a generator must manage hazardous waste by using one of several listed methods, including: treating or disposing of hazardous waste at an on-site facility or ensuring delivery of hazardous waste to a foreign country, a publically owned treatment works, a very small quantity generator collection program, a commercial storer of PCB waste, a universal waste handler or destination facility, or an off-site storage, treatment, or disposal facility.⁴⁶ The rule specifically states, "A generator must not dispose of or abandon hazardous waste or arrange for the disposal of hazardous waste at a location other than as provided under subpart 1."⁴⁷ Section 7045.0206, Generator Size Determination, provides the state with guidelines for what constitutes a generator.⁴⁸ Under this rule, a "large quantity generator" is an entity that generates 1,000 kilograms of hazardous waste or more in a calendar month, a "small quantity generator" is one that generates more than 100 kilograms and less than 1,000 kilograms of hazardous waste in a calendar month, and a "very small quantity generator" is one that generates 100 kilograms of hazardous waste or less in a calendar month.⁴⁹

The MPCA also includes several guidelines for evaluating hazardous waste. Under section 7045.0214, Evaluation of Wastes, "[a]ny person who produces a waste within the state of Minnesota or any person who produces a waste outside the state of Minnesota that is managed within the state of Minnesota, must evaluate the waste to determine if it is hazardous within 60 days of initially generating the waste."⁵⁰ Minnesota Rule 7045.0215, Timing of Waste Evaluation, indicates that waste evaluation must be of individual waste before combining

45. MINN. STAT. ANN. § 116.07 subd.2(a) (West 2012).

46. MINN. R. 7045.0208 (2012).

47. *Id.*

48. MINN. R. 7405.0206 (2012).

49. *Id.*

50. MINN. R. 7045.0214 (2012).

with other wastes.⁵¹ If wastes are combined, the generator must “evaluate the waste resulting from the mingling or combining within 60 days of the act of mingling or combining.”⁵² The combined waste must be managed as hazardous waste until it is determined to be classified as nonhazardous, as defined in MINN. R. 7045.0120.⁵³

3. Laws in Other States Regarding Waste Management and Minimization

States outside of Minnesota have sustainable measures and laws currently in place specifically for addressing waste management and minimization in university laboratories. Lawmakers and enforcers in Minnesota could learn from states like Arizona and Nevada as to how their legal frameworks have effectively regulated and reduced the amount of waste at educational institutions in their respective states.

Arizona and Nevada are two of the few states that have specific statutes addressing waste management and minimization in universities. Under the Pollution Prevention Technical Assistance Program, Arizona established a technical assistance program “to assist all persons in reducing to the fullest extent possible the amount and toxicity of the hazardous waste that is generated or toxic substances that are used in [Arizona].”⁵⁴ Among its responsibilities, the technical assistance program is to research and recommend hazardous waste management programs and cooperate with university programs to develop curricula and training that reduce hazardous wastes and minimize the use of toxic substances.⁵⁵ Additionally, Nevada’s waste reduction program, codified in section 444A.110 of the Nevada Revised Statutes, is another state statute that promotes waste minimization and management at the university level. Under this statute, Nevada grants the Division of Environmental Protection of the State Department of Conservation and Natural Resources the authority to “award grants to municipalities, educational institutions and nonprofit organizations for projects that enhance solid waste management systems and promote

51. MINN. R. 7045.0215 (2012).

52. *Id.*

53. *Id.* See also MINN. R. 7045.0120 (2012) (defining methods for determining what is hazardous waste).

54. ARIZ. REV. STAT. § 49–965 (LexisNexis 2011).

55. *Id.*

the efficient use of resources.”⁵⁶

These two instances are rare examples of states with laws that regulate waste management and minimization for university laboratories. The fact that there are not that many examples to choose from further supports the need for reform in addressing waste management and minimization in universities.

C. TAKING SUSTAINABLE MEASURES INTO YOUR OWN HANDS: A REGULATORY APPROACH

In addition to abiding by the laws and statutes put into place by both the federal and state governments, faculty, students, and staff at the University of Minnesota must also follow the rules issued by the Department of Environmental Health and Safety (EHS). The EHS is a “liaison between the University community and the regulatory agencies” and is “responsible for keeping up to date with changing regulations.”⁵⁷ The EHS works with community members “to prevent accidents, report unsafe conditions and protect the environment.”⁵⁸ This Section addresses some of the relevant regulations issued by the EHS that pertain to waste management and reduction in university teaching and research laboratories at the University of Minnesota.

With the goals of protecting employee health and safety, reducing hazardous chemical waste in the laboratory, and complying with federal, state and local regulations, the EHS chemical waste program is responsible for managing waste collection, treatment, and disposal of chemical waste.⁵⁹ Some of the specific duties of the program include: determining the proper methodology for disposal and treatment of chemical waste materials; maintaining records, reports, and manifests; scheduling pickups, transportation, and packing of chemical waste; and negotiating contracts for disposing and transporting chemical

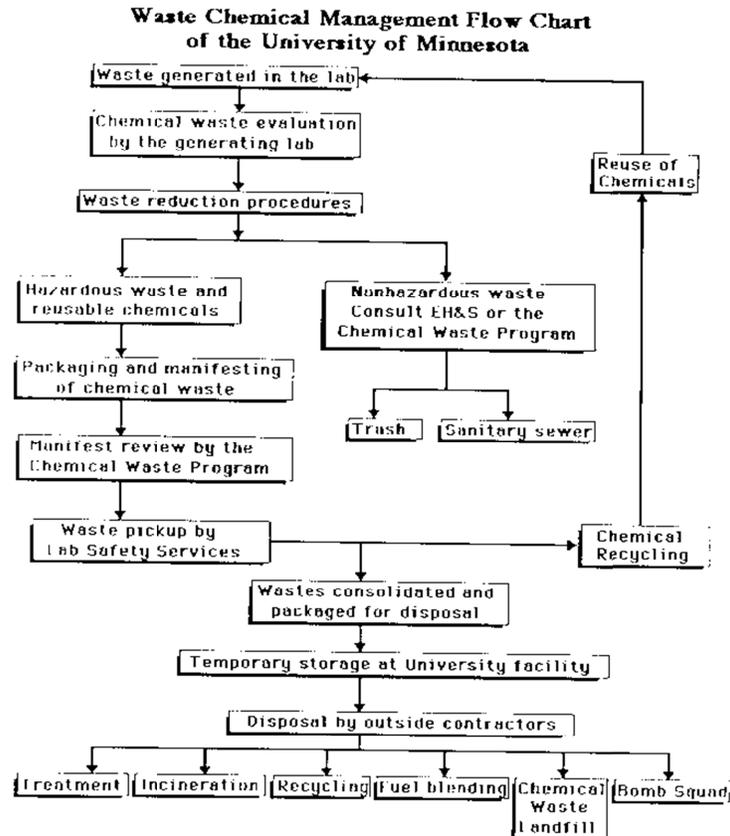
56. NEV. REV. STAT. ANN. § 444A.110 (LexisNexis 2011).

57. *Infrastructure*, U. MINN., http://www.dehs.umn.edu/ressafety_rsprg_infra.htm (last visited Apr. 1, 2012). Through the Assistant Vice President for Health, Safety and Transportation, the EHS reports to the Vice President of University Services. *Id.*

58. *Department of Environmental Health and Safety*, U. MINN., <http://www.dehs.umn.edu/> (last updated June 14, 2010).

59. UNIV. MINN., DEP'T ENVTL. HEALTH & SAFETY, HAZARDOUS CHEMICAL WASTE MANAGEMENT 1-3 (4th ed. 1990).

waste.⁶⁰ Published in *Hazardous Chemical Waste Management*, the following figure illustrates an overview of the chemical waste disposal steps at the University.⁶¹



Some particularly interesting features of this figure include the recycling and reuse of chemicals and how the differentiation between hazardous and nonhazardous waste affects the handling and management of the waste.⁶² If hazardous waste is incorrectly identified as nonhazardous, the waste could end up in

60. *Id.* at 1.

61. *Id.* at 4.

62. The EHS addresses chemical recycling and includes a list of certain chemicals that are desirable for recycling and can be sent free of charge to any interested University department or research laboratory, regardless of whether the container is opened or unopened. *Id.* at 25–26.

the trash or sewer, having serious implications for both humans and the environment.⁶³

In addition to waste management, the EHS also addresses waste minimization at the University. In *Hazardous Chemical Waste Management*, the EHS highlights the University's commitment to waste minimization:

The University of Minnesota is committed to the protection of human health and the environment. To meet these commitments, the University strongly encourages its employees to utilize chemical waste minimization techniques to reduce the volume and toxicity of chemical wastes produced at the University. An important benefit from waste minimization is that it will help reduce the University's escalating chemical disposal costs which are currently estimated at \$1.7 million annually and expected to rise with federal and state restrictions in the future. These disposal costs come out of research grants and operating funds.⁶⁴

This section of the guidebook then goes on to list several substitutions that *can* be made for hazardous chemicals so that non-hazardous or less toxic materials are used.⁶⁵

Through the EHS, the University has several recommendations that it could follow to manage and reduce the amount of waste generated in university teaching and research laboratories. Part III of this Note evaluates the success of recommendatory language like the language used by the EHS in encouraging waste management and minimization at the University.

D. THE UNIVERSITY OF MINNESOTA'S CURRENT APPROACH TO SUSTAINABLE TEACHING AND RESEARCH LABORATORIES

Several departments and programs at the University have already taken commendable steps toward creating a greener laboratory experience for its students and the environment. This Section utilizes the operations of the Department of Chemistry at the University to highlight the type of activities currently in place to create a more sustainable campus.

The Department of Chemistry has instituted several programs and policies to help its undergraduate students address some of the waste management and minimization concerns at

63. See Lesley Rushton, *Health Hazards and Waste Management*, 68 BRIT. MED. BULL. 183, 187-88 (2003).

64. UNIV. MINN., DEP'T ENVTL. HEALTH & SAFETY, *supra* note 59, at 23.

65. *Id.*

the University. For example, at the beginning of the *Laboratory Manual for Organic Chemistry 2311*, a section on “Handling Hazardous Waste” discusses the different types of wastes and highlights specific ways for managing each type of waste, including liquid organic hazardous waste, solid organic hazardous waste, strong acids, 10% Pd/C waste, and Magnesium Turnings waste.⁶⁶ At the end of each experiment, the manual includes a section on “Waste Disposal,” detailing how each chemical should be disposed of at the end of the laboratory experiment.⁶⁷ Designed to minimize waste and promote green chemistry, experiments like “Green Synthesis and Hydrogenation of a Di-Substituted Chalcone” employ two-step reactions where one lab period is spent synthesizing a product that can then be subsequently used in another lab period for a different experiment.⁶⁸ By doing this type of multi-step synthesis, the University is saving money on reagents by not having to purchase additional compounds for a totally new experiment and minimizing the amount of waste by only having to dispose of products once, even though the students performed two different experiments.

The Department of Chemistry is also taking noteworthy steps in minimizing hazardous waste use through collaboration with the organic chemistry laboratory course and research groups. For the experiment “Green Oxidation of Borneol to Camphor with Oxone,” students synthesize the compound camphor utilizing green oxidation conditions.⁶⁹ Dr. Jane Wissinger, Organic Lab Director, continually collects the camphor synthesized by her students each semester and gives it to Dr. Andrew Harned for use in his research group.⁷⁰ The Department of Chemistry is preventing the disposal of a significant amount of waste that would not be circumvented without this collaboration.

Further, the University has created an outreach program entitled the Minnesota Technical Assistance Program (MnTAP)

66. JANE E. WISSINGER, *LABORATORY MANUAL FOR ORGANIC CHEMISTRY 2311*, at 3–4 (8th ed. 2008).

67. *E.g., id.* at 22–23 (describing hazardous waste disposal after synthesizing *t*-butyl chloride).

68. *See id.* at 105–10.

69. *Id.* at 119–22.

70. *See* Patrick T. Lang et al., *Oxidation of Borneol to Camphor Using Oxone and Catalytic Sodium Chloride: A Green Experiment for the Undergraduate Organic Chemistry Laboratory*, 88 *J. CHEMICAL EDUC.* 652, 655 (2011).

that helps “Minnesota businesses develop and implement industry-tailored solutions that prevent pollution at the source, maximize efficient use of resources, and reduce energy use and costs to improve public health and the environment.”⁷¹ In 2011, MnTAP assisted approximately 230 companies and engaged forty in making changes that decrease their environmental footprint while saving money.⁷² Through MnTAP, the state had environmental reductions of “5.15 million [pounds] of waste, 13.9 million gallons of water, and 7.7 million [kilowatt hours] and 2.2 million therms of energy.”⁷³

III. GRADES ARE IN!: EVALUATING THE SUSTAINABLE EFFECTIVENESS OF LEGAL AND REGULATORY EFFORTS IN UNIVERSITIES AND COLLEGES

This Note is an attempt to address sustainability on the university and college level. While the proposals suggested in this Part are meant for the state of Minnesota and are framed around the current legal and regulatory framework in place in Minnesota, the recommendations could just as easily be applied with modifications to other state legal frameworks as well.

Section A of this Part comments on the laws and regulations currently in place for university teaching and research laboratories, specifically the University of Minnesota. Based on Section A’s evaluation, Section B recommends proposals for Minnesota lawmakers to consider adopting in helping these laboratories become more sustainable in their current waste management and minimization approaches.

A. COMMENTS ON THE LEGAL AND REGULATORY MEASURES CURRENTLY IN PLACE FOR UNIVERSITY TEACHING AND RESEARCH LABORATORIES

If Minnesota’s lawmakers and educational institutions would like to more effectively manage and reduce the waste in institutional teaching and research laboratories, they must first examine how successful their current laws and regulations have been in promoting waste management and minimization. This Section of the Note evaluates the laws and regulations

71. *About MnTap*, U. MINN., <http://www.mntap.umn.edu/us/aboutmntap.htm> (last visited Apr. 1, 2012).

72. *Id.*

73. *Id.*

currently governing waste management and minimization at the University.

Section One comments on the effectiveness of EHS waste guidelines and its lack of enforcement mechanisms, while Section Two notes how the recommendatory language of the EHS falls short of achieving its ultimate goal of waste minimization. Finally, Section Three evaluates the University's broad definition of sustainability and how it cannot efficiently address specific sustainability issues.

1. EHS Waste Guidelines Lack Enforcement Mechanisms to Regulate Waste Disposal

This Section analyzes the waste guidelines the EHS provides for the University to regulate its waste disposal. While the EHS provides the University with specific rules for handling the different types of waste, it does not offer an enforcement mechanism to ensure chemicals are disposed in the correct location.

While providing guidance as to what qualifies as hazardous chemical waste and nonhazardous chemical waste, the EHS does not include an enforcement mechanism to make sure the chemicals placed in the designated container or poured down the drain are correctly characterized and belong in that disposal location. As a current graduate student working in a chemistry research group and as a graduate student teaching assistant for CHEM 2311 Organic Chemistry Lab, the author continually sees undergraduate and graduate students place chemicals in a hazardous chemical container or pour chemicals down the drain when the students are unsure of their chemical classification. Undergraduates unsure of proper waste disposal want to dispose of the chemicals immediately so that they can proceed with the rest of their lab clean-up and get out of the lab so that they can be on time to their next class. Similarly, graduate students are under constant pressure to produce results for their advisors—results that do not include time spent to ensure proper disposal of waste into its respective waste container.⁷⁴

The ramifications of these careless waste disposal practices

74. See Kirsten G. Studien, *Turn Off the Bunsen Burner*, HARV. CRIMSON (Nov. 2, 2000), <http://www.thecrimson.com/article/2000/11/2/turn-off-the-bunsen-burner-pin/> (“Students are still under pressure to produce results, knowing that if they don’t, both their own future and their advisor’s reputation will suffer.”).

are extremely unfortunate. If hazardous waste is incorrectly identified as nonhazardous, the waste could end up in the trash or sewer, with serious implications for both humans and the environment.⁷⁵ While a student's occasional mistake or two do not add up to a significant amount, the aggregate of thousands of undergraduate and graduate student mistakes each semester does.

2. EHS Recommendatory Language Falls Short of Achieving the Ultimate Goal of Waste Minimization

This Section examines the language issued by the EHS to minimize waste production. Unfortunately, its recommendatory language falls short of achieving its ultimate goal of minimizing waste.

As described in Part II, Section C, the EHS includes a section on waste minimization to reduce the amount of waste produced at the University of Minnesota. However, the EHS provides suggestions for waste reduction at best; there is no enforcement mechanism or compulsory language that requires students or researchers in university laboratories to make these substitutions. Using language like "strongly encourages" will not result in 100 percent compliance without a financial incentive in place. From an undergraduate laboratory instructor's perspective, why require the use of expensive, environmentally-friendly chemicals when there are strict budgetary limitations and better ways of spending the money? Some examples include updating outdated equipment or expanding facilities to accommodate growing class sizes.⁷⁶ Similarly, from a graduate student advisor's perspective, why require students to substitute expensive chemicals such as those suggested by the EHS, when research grants are becoming more difficult to receive and funding could be better spent on an additional graduate student or better instrumentation?⁷⁷

75. UNIV. MINN., DEP'T ENVTL. HEALTH & SAFETY, *supra* note 59, at 4.

76. See generally Jenna Ross, *A Measured Enrollment*, STAR TRIB., Oct. 14, 2011, at B1 (describing plans to expand the enrollment at the University of Minnesota to increase class sizes in the sciences).

77. See Jim Giles & Meredith Wadman, *Grants Fall Victim to NIH Success*, 443 NATURE 894, 894 (2006) (discussing the decline in funding for research as a result of the increase in applications).

3. University of Minnesota's "Sustainability" Definition Is Too Broad to Address Specific Sustainability Issues

This Section comments on the University's use of a broad definition of "sustainability" in promoting campus sustainability. By crafting a definition that does not acknowledge very detailed sustainability issues, the University allows important sustainability issues like waste management and minimization in university teaching and research laboratories to go unregulated.

While the University deserves some commendation for including a goal within its sustainability campaign to "manage resources for their highest end use" through waste minimization and consumption reduction, this tailored goal leaves its scope open for interpretation.⁷⁸ Nowhere does the University address the specific type of waste this goal is intended to address. While Part II, Section A, Section Two of this Note includes some of the University's desired outcomes and measures in creating this sustainability goal, these detailed outcomes and measures do not provide any insight into the type of waste it is seeking to regulate.⁷⁹ From non-hazardous wastes (paper, soda cans, regular solid waste) to hazardous chemical and biological wastes with separate classifications (flammable, corrosive, reactive, toxic, and lethal), the University generates many different forms of waste—forms that the University failed to acknowledge in defining and narrowing its definition of "sustainability."⁸⁰ Without acknowledging the targeted type of waste, how are waste producers of the targeted waste supposed to know that they are producing an abnormal amount of that waste that is dangerous for the environment?⁸¹ Even if the goal distinguished the targeted type of waste, how are waste gener-

78. See *Systemwide Sustainability*, *supra* note 32, at 16.

79. See *supra* notes 28–33 and accompanying text.

80. See *Waste Management and Disposal*, U. MINN., http://policy.umn.edu/Policies/Operations/Safety/ENVIRONMENT_PROC05.html (last updated June 17, 2009). See also UNIV. MINN., HAZARDOUS WASTE GENERATION AND COLLECTION AT THE UNIVERSITY OF MINNESOTA 1–3 (2012) available at http://www.facm.umn.edu/prod/groups/userservices/@pub/@userservices/@fm/documents/content/userservices_article_343966.pdf (last visited Feb. 6, 2012) (describing the types of waste generated by the University of Minnesota).

81. See MC ANDERSON ET AL., IF ONLY I KNEW: INCREASING RECYCLING HABITS NOW, AND PLANNING FOR THE FUTURE 2–3 (2009), available at http://www.arch.virginia.edu/globalsustainability/Reports/F09_EducatingUVAaboutRecycling.pdf.

ators supposed to know the level of waste that they are not to exceed? Studies have shown that humans act more on quantifiable goals.⁸² Bill Hewlett, co-founder of Hewlett-Packard, commented on numeric-goal setting: “You cannot manage what you cannot measure And what gets measured gets done.”⁸³

By crafting a definition for “sustainability” and creating a campaign with goals to promote a sustainable campus, the University, along with many other institutions across the country, has taken the initial steps of acknowledging a problem that needs to be solved. However, to be a frontrunner in change and distinguish itself from other universities and colleges, the University cannot continue to rely on these broad definitions and goals of sustainability.

B. ROOM FOR IMPROVEMENT: PROPOSING WAYS TOWARD A MORE SUSTAINABLE FUTURE

The following is a list of proposals for Minnesota lawmakers and regulatory agencies to consider in addressing the technical, legal, and regulatory issues of waste management and minimization in its university teaching and research laboratories. By incorporating these proposals into its current legal framework, Minnesota can provide institutions like the University with precise rules to regulate and minimize its waste in teaching and research laboratories.

Section One proposes that the MPCA encourage and eventually mandate a collaboration between teaching and research laboratories to effectively regulate the amount of waste generated. Section Two recommends the EHS and Minnesota lawmakers adopt more compulsory language that addresses waste management and minimization in university teaching and research laboratories. Section Three proposes the University and Minnesota to seek out ways to fund increased enforcement of waste management and regulation. Finally, Section Four recommends the MPCA adopt and build on the University’s current definition and goals of “sustainability” to address specific, key problems of campus sustainability.

82. *Goal Setting*, MY STRATEGIC PLAN, <http://mystrategicplan.com/resources/goal-setting/> (last visited Feb. 6, 2012).

83. *Id.*

1. Proposal to Coordinate Between Teaching and Research Laboratories

This Section of the Note presents a way to minimize waste in university teaching and research laboratories at the University. By encouraging and eventually mandating collaboration between teaching and research laboratories, the University and other educational institutions could reduce a significant amount of waste generated through its undergraduate teaching courses.

In Part II, Section D, this Note describes the collaboration between Organic Lab Director Dr. Jane Wissinger and Department of Chemistry Faculty Member Dr. Andrew Harned, in which the organic chemistry laboratory students synthesized camphor that was then utilized in Dr. Harned's research group.⁸⁴ This collaboration resulted in the Department of Chemistry saving money on the amount of reagents purchased and on the amount of waste generated. This Note proposes that the MPCA utilize its legal authority granted under section 116.07 to mandate this collaborative approach for all educational institutions with both teaching and research laboratories.⁸⁵ The MPCA could require lab instructors of these educational institutions to work with faculty advisors of research groups prior to an academic year and determine what starting materials and reagents research groups will need for the upcoming academic year. Then, the lab directors could look at types of reactions required for these compounds and incorporate them into their lectures. While this approach would initially require a considerable amount of work for the lab directors, they could recycle their experiments for a few years, given the typical graduate student project length of two to three years. On the flip side, depending on how many steps it would take to complete the synthesis of the desired compound, lab directors would not need to come up with as many different experiments and the departments would significantly decrease the amount of waste generated in the laboratories.

The MPCA could rely on and mandate the EHS and similar departments at other state institutions to ensure educational institutions comply with this type of proposed MPCA-instituted rule. College and university departments like the EHS that regulate and monitor waste disposal could include specific

84. See *supra* notes 69–70 and accompanying text.

85. MINN. STAT. ANN. § 116.07 (West 2012).

guidelines for what information lab directors and research groups need to report in meeting this collaboration requirement.⁸⁶ By reporting to a single entity within a university, that entity could then see what types of compounds are being used across departments at particular institution and then encourage an interdisciplinary collaboration to compensate for deficiencies in a particular department where there is not overlapping waste generation between teaching and research laboratories.

2. Proposal to Incorporate More Compulsory Language into MPCA's Rules

This Section of the Note proposes to increase the amount of departmental and individual participation in managing and minimizing waste generated in teaching and research laboratories at the University. Unfortunately, not all of the University's undergraduate and research professors have taken as proactive of a role as the Department of Chemistry's Dr. Jane Wissinger and Dr. Andrew Harned. This proposal recommends that the MPCA include regulatory language that requires universities to make considerable effort towards waste management and minimization in university teaching and research laboratories.

This Note recommends that the MPCA utilize its legal authority granted under Section 116.07 to incorporate a statutory section that requires its educational institutions to reduce the amount and toxicity of waste.⁸⁷ The MPCA could again rely on state departments like the EHS to implement and enforce compliance. For example, instead of utilizing non-compulsory language like "strongly encourages," the EHS could rewrite its waste minimization guidelines for the University to read: "The University of Minnesota is committed to the protection of human health and the environment. To meet these commitments, the University requires its employees to utilize chemical waste minimization techniques to reduce the volume and toxicity of chemical wastes produced at the University."⁸⁸ The MPCA could include waste minimization floors in its regulations, with amount requirements depending on the size of the educational

86. *E.g.*, *Section 7—Waste Reduction Procedures*, U. MINN., http://www.dehs.umn.edu/hazwaste_chemwaste_umn_cwmgbk_sec7.htm (last updated June 14, 2010) (establishing a reporting requirement).

87. *See* MINN. STAT. § 116.07 (West 2012).

88. *Section 7—Waste Reduction Procedures*, *supra* note 86.

institution.

In working towards meeting the goals of this legal mechanism, Minnesota lawmakers could create a state technical program that works directly with university programs to develop curricula and training that manages and minimizes waste production. While the University has created and utilized the MnTAP to successfully reduce waste generation, this program is geared towards businesses in the state and is not grounded in a legal framework.⁸⁹

Using Arizona's Section 49-965 as a model, Minnesota's statute could require the creation of a technical assistance program "to assist all persons in reducing to the fullest extent possible the amount and toxicity of the hazardous waste that is generated or toxic substances that are used."⁹⁰ By implementing this type of statutory language, the technical assistance program could work directly with institution departments like the EHS to develop curricula and training that manages and minimizes waste production.

The creation of statutes or rules with mandatory language ensures that university teaching and research laboratories in Minnesota take significant steps towards waste management and minimization. However, financial concerns might be a problem for some institutions, especially small colleges. To address this issue, universities could apply for federal funding through Section 1161u "Sustainability Planning Grants Authorized" and show how the funds would be used to manage and reduce waste generated in university teaching and research laboratories. Additionally, Minnesota lawmakers could create a statute similar to Nevada's Section 444A.110 and provide funds for educational institutions for "projects that enhance solid waste management systems and promote the efficient use of resources."⁹¹ Minnesota could include a penalty provision in this statute stating that funds could come from institutions who fail to meet its waste management or minimization goals through the proposals outlined in this Section.

3. Proposal for Increased Funding for Enforcement Mechanisms

This Section examines the problem of enforcing waste management and minimization in university teaching and re-

89. *About MnTap*, *supra* note 71.

90. ARIZ. REV. STAT. ANN. § 49-965 (LexisNexis 2011).

91. NEV. REV. STAT. ANN. § 444A.110 (LexisNexis 2011).

search laboratories and recommends the University to seek out opportunities to fund enforcement mechanisms so that the current laws and proposals of this Note could be successfully enforced.

For example, the University could apply for federal funding through the “Sustainability Planning Grants Authorized.”⁹² Under this funding, the University could explain in its application that the institution would use the grant money for “waste management” and “toxics management.”⁹³ By utilizing the money to provide compensation for hiring employees to either circulate the teaching and research laboratories more frequently or to more carefully access the contents of hazardous and nonhazardous waste, the University would be regulating waste and thus satisfying the requirement of receiving the grant money.⁹⁴

Alternatively, in addition to seeking out funding in the community and allocating a portion of the money generated by the sustainability campaign at the University for this type of increased enforcement, the University could also utilize some of the money saved from the implementation of the proposals in this Note. For example, Section One of this Note proposed the collaboration mandate between teaching and research laboratories. Besides reducing a significant amount of waste generated through its undergraduate teaching courses, the money saved from not having to synthesize or make the same compound twice could be put in a fund for paying waste management and minimization enforcement expenditures.

4. Proposal for the MPCA to Define “Sustainability” for Colleges and Universities

Finally, this Section of the Note provides a recommendation for the MPCA to incorporate and modify the University’s current definition of “sustainability” and the broad goals associated with its sustainability campaign. The Note recommends the MPCA to utilize its legal authority granted under section 116.07 to incorporate a statutory definition that addresses specific, key problems of campus sustainability and provide quan-

92. 20 U.S.C.A. § 1161u (2008).

93. *Id.*

94. *Id.*

tifiable goals that can be adjusted as necessary.⁹⁵

To revise and more narrowly define the University's version of "sustainability" and its campaign goals, this Note recommends the MPCA to adopt an approach similar to Will Varey's framework, as examined in Part II, Section A, Section One.⁹⁶ Following Varey's model, sustainability is "[what is to be sustained] [for whose benefit] [and for how long]."⁹⁷ Here, the MPCA would fill in the "for whose benefit" piece. However, this Note proposes a more tailored approach in which the "for whose benefit" is replaced by a specific University actor, like the Department of Chemistry or the Department of Biochemistry, Molecular Biology and Biophysics. The MPCA could then fill in the "what is to be sustained" and the "and for how long" parts with specific goals that could be adjusted from year to year depending on progress made by the respective actor of "for whose benefit." The key part in filling in "what is to be sustained" and "and for how long" is that the MPCA include defined, quantifiable goals that can be understood by the relevant parties.⁹⁸ For example, in proposing a sustainability goal or definition for the Department of Chemistry, the MPCA could state: sustainability is producing less than x tons of hazardous waste in the Department of Chemistry for the 2012–2013 academic school year.

While it would take a considerable effort to gather the information needed to fill in the quantities part of the formula, the MPCA would establish defined, quantifiable goals for its educational institutions' departments, organizations, and individuals to understand and meet. By following Will Varey's framework, waste management and minimization in teaching university and research laboratories could be acknowledged and addressed—issues that were missed when using a broad definition and goal of sustainability.

IV. CONCLUSION

While universities have taken important initiatives and steps in waste management and minimization, this Note has identified areas where improvement is still needed in Minnesota's statutes and rules regulating university teaching and research laboratories. The creation and modification of existing

95. MINN. STAT. ANN. § 116.07 (West 2012).

96. See *supra* note 27 and accompanying text.

97. Varey, *supra* note 25, at 29.

98. See *Goal Setting*, *supra* note 82.

rules and the coordination between teaching and research laboratories could result in the reduction of hazardous waste being released into the environment. The successful implementation and enforcement of waste management and minimization at an institution as large as the University could result in a significant reduction of waste released into the environment, both due to minimization techniques and due to proper characterization of the type of waste being disposed. Regardless of the state, adopting some form of these recommendations and proposals sets an example and model for other states to follow. Over time, state lawmakers could tackle additional problems that have slipped through the cracks at their state institutions and ultimately play a pivotal role in helping our world achieve a sustainable future.