Green Cleaning Products for Dining Hall Kitchens

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Intro and Statement of Issue

The Blueprint for a Green Campus, the University's working document on sustainability, states that the main goal of the University of Colorado at Boulder is "a vision of a growing, dynamic campus which steps lightly upon the earth and satisfies additional demands for energy, transportation, and resources through increased efficiency rather than increased consumption (Blueprint, 2001)." Currently, the Department of Housing is utilizing certain hazardous chemicals that are harmful to both the environment and the workers. Lauren Heising, Department of Housing's Coordinator of Sales and Nutrition, requested that alternative chemicals be researched to better the overall health of the workers and decrease the amount of destruction to the environment. We explored alternative solutions for the chemicals currently used in the dining service kitchens, specifically degreasers and oven cleaners, in order to ensure a 'greener' environment.

The following is extensive research, consisting of background information on green chemicals and sustainability, a revised list of what CU should look for in cleaning products, alternative chemicals for dining services, and a call to action for the University of Colorado at Boulder.

What are 'Green' Chemicals?

A superior green cleaner is one that lessens its environmental impacts at every stage of its life cycle, including its packaging (Green Seal, 1998). These chemicals should be biodegradable and non-toxic. Biodegradability refers to the rate at which the active ingredients that perform the cleaning break down. If these chemicals biodegrade slowly or incompletely, they can threaten our environment (Green Seal, 1998). It is recommended that we look at chemicals that are easily biodegradable, meaning they quickly and harmlessly break down. These chemicals should also be non-toxic to human and aquatic life when used at its normal concentrations and must meet federal requirements. The chemicals should be concentrated or contain less than 20% water by weight in order to reduce the cost of shipping and packaging (Green Seal, 1998). At the same time, the chemical should also be effective when diluted. If it is concentrated, there is less weight, and therefore costs less to package and ship. A 'green' product should not contain chlorine bleach or any other chlorine-related chemicals and should have "Volatile Organic Compound (VOC) concentrations of no more than 10% of the weight of the product, when diluted for use" (vonBleichert, personal communication, 2005). VOCs and chlorine are known to be carcinogens and can cause serious health-related effects. These chemicals should not contain petroleum-based solvents or glycol ethers or any other petroleum based surfactants because these are "non-renewable resources, that are extremely flammable and toxic when inhaled" (vonBleichert). Finally, the chemicals should have a pH of around 7, which is neutral and also the pH of pure water. Lastly, a 'green' chemical's packaging should be made of recycled or recyclable materials.

Background on Sustainability

Hazardous waste generated by the CU campus has drastically increased over the past ten years (Blueprint, 2001). To reduce the amount of hazardous waste entering the environment, the Blueprint for a Green Campus proposed eight action steps towards minimizing hazardous wastes, such as implementing a central chemical procurement system, which would allow the University to gain more knowledge of each of the chemicals purchased upon the time of acquisition, and other programs that would reduce waste and produce more efficient chemical waste disposal methods. Much of these hazardous materials have come from chemical byproducts, chemical handling supplies, and solvents. In the Residential Halls, housekeeping converted to a new line of cleaning products in 2002 that are less toxic and less corrosive. By seeking these new alternatives, many of the items used can be

recycled and reused; however, many of these harmful chemicals are still utilized in the dining halls of the Residential Halls. These hazardous chemicals not only endanger the health of the workers who handle them, but also impact the water, air, and land. The chemicals pollute the environment due to their pH levels, container/packaging, or Volatile Organic Compounds, which all have the ability to contribute to the pollution on campus.

The products used in the dining halls are similar to the products used in the households of Boulder, Colorado. Implementing new standards that are more sustainable for the environment at CU Boulder will, consequentially, provide structure for the community. The 2005 Campus Sustainability Summit held at the CU Boulder campus, gives students the opportunity to see how their actions can impact the environment. William McDonough, one of the leaders in Sustainability issues and the author of the renowned Cradle-to-Cradle (McDonough, 2002), spoke at the session with an important underlying message: "All sustainability is local. Global sustainability is the sum of the sustainability of local communities." As a whole, the CU community and city of Boulder can combine their efforts for a more sustainable future through the education and utilization of 'green' products.

Goals/Experimental Design

The goal of this study is to research specific alternatives of 'green' cleaning products that can be implemented into the Department of Housing's kitchens. Edward von vonBleichert, General Professional III, Facilities Management, has already begun to categorize certain chemicals used by Facilities Management based on their hazardous level to the environment and to the workers using them. Such an inspection is missing from the Department of Housing, and it is from that standpoint that we started researching. It was requested that oven cleaners and degreasers be the primary focus of our report- the Department of Housing already has satisfactory 'green' cleaning products for other kitchen cleaning areas.

The current list of Department of Housing's dining chemical products was provided to us. The only degreaser used was a Citrus Degreaser, in which many of the hazardous levels were not in the range of the acceptable 'green' products. Oven cleaners had three products, including Derma-Pro Antimicrobial, System Suds, and Dawn/Lemon Dawn (Heising, personal communication, 2005). We met with Ed von vonBleichert in order to gain a direction for the project. The first step was the integration of the list of dining's chemical products into the list of Facilities Management's chemicals (Appendix C), in order to suggest certain chemicals already researched and used by Facilities Management to the Department of Housing. The alternative products recommended by this group were then added to the integrated list, in which degreasers and oven cleaners were the primary focus.

Many potential 'green' products, specifically degreasers and oven cleaners, were introduced to us at the Green Products Expo at the Campus Sustainability Summit, sponsored by the University of Colorado Environmental Center (Colorado Sustainability). Materials Safety Data Sheets (MSDS), which are required by federal law, contain all of the specifications, ingredients, flash point, and certain hazardous information of every cleaning product. MSDS forms were collected and then imcorporated into the master, integrated spreadsheet, based on the following categories: HMIS/NFPA Ratings of Health, Fire, and Reactivity, pH, flash point, waste disposal method, ventilation, SARA Title III Ranking, incompatibility with other substances, effects of overexposure, any hazardous substances in the chemicals, % volatility by volume, APE's, and Polymerization.

Next, we created an updated list of the University of Colorado's criteria for 'green' cleaning products based on many documents provided to us. We obtained a spreadsheet of 12 different state environmental agencies, federal departments, and other organizations' health criteria for 'green' products, many of the criteria and concerns were repeats for many organizations. After viewing the spreadsheet and taking the repeats into consideration, we created a list that summarizes what CU should try to avoid in future products.

In the process of this, it was also necessary to research the sustainability programs at other universities and states in order to observe their successes and difficulties, and to understand the effects of their programs. Another important branch of this project was to interview some of the staff working at the dining halls to see the chemical products that they use, and what they think of these products.

Dining Hall Research

In order to fully understand the effects of the current products used by the Department of Housing, it is vital to interview the staff working in the dining halls of the dormitories. Having such knowledge facilitates the project, allowing the group to sufficiently understand the problems of the current products and perhaps their detrimental effects on the health of the employees. Libby Dining Hall was visited first, where the staff that comes in contact with the chemicals were interviewed. One of the chemicals we were introduced to was not a degreaser or an oven cleaner. It was from Chemical Systems Technology and was a type of concentrated ware-wash detergent. According to the staff, it did cause itching upon contact with the skin. Gloves were worn to handle the chemical, but no goggles.

We were already familiar with many of the products that Housing used due to the spreadsheet provided to us by Lauren Heising. However, after speaking with more staff, we realized that many of the chemicals on the spreadsheet had been replaced and updated. For example, the Citrus Cleaner, listed under degreasers, was replaced by a chemical from APC Industrial, which was a heavy-duty cleaner/degreaser. No phosphates were included, and the chemical was biodegradable. Also, the greatest surprise was oven cleaners. We discovered that this kitchen no longer utilized any. It is only used for extremely grimy situations. Another common chemical was Dawn. Other than that, Dining tried to cut back on many of the detrimental chemicals we saw on the spreadsheet.

Next, Farrand Dining Hall was visited, in which we discovered much of the same thing. Farrand has stopped using oven cleaners because when they do, they have to stop production, which is difficult to do during school hours so they only use it for major messes during holiday breaks. There is one cleaner, Pulsar that is utilized, but merely for the tile and linoleum floors. The other Dining Halls do not use this, due to different floor types. Dawn is also a popular product at Farrand. Citrus degreasers are used at Farrand, mainly because the smell covers up the spill, and gloves are utilized to handle this.

In addition to researching the chemicals for each dining hall, it is necessary to understand the training that each staff receives for the chemicals they use. Currently, all units are given two copies of each MSDS forms for every chemical. Most of these forms are in English only, which cause problems when around half of the employees speak Spanish. Once a year, there is also generalized training on chemical use for the staff. After that, it is up to each dining center manager to work with his/her employees on more specific training, such as the purpose of the products, the specific precautions to take, person protective equipments to use, and others.

Vapor Degreasers

When we researched alternative degreasers, we found that vapor degreasers could be a possible alternative rather than using chemicals. We found two types of vapor degreaser that could possibly be used in the dining halls. One type of vapor degreaser has a vapor immersion unit with two solvent-filled pumps. Another version is the ultrasonic-equipped degreaser; this vapor degreaser completely removes oils and soils. Both types of degreasers require a chlorinated degreaser solvent. The types of solvents are TCE, methylenchloride, and perchloroethlylene. The vapor degreasers are designed with the tank of solvent at the bottom and the vapor zone above the solvent. The cooling coils are placed above the vapor zone to prevent water loss. The heating coils must be used to prevent temperature fluctuations and vapor loss; however this requires large amounts of heat. There is a chance of toxic gases being emitted from this machine if not used properly. If a gas is exposed or an electric heating element is not working properly, fire or formation of toxic gases can occur. These machines also require a clearance of space where they are not near gas-heated ovens, space heaters, open flames or hot surfaces. Also exposure to high concentrations of chlorinated solvent causes suppression of the central nervous system. During the 1980s and 1990s, vapor degreasers developed a poor reputation because of these possible hazardous outcomes if improperly used.

This common type of vapor degreaser would not work well in the dining halls at CU Boulder. The vapor degreasers would have to be installed in the kitchens, where they would be near ovens, open flames, and hot surfaces. This could be an accident waiting to happen in the kitchens. The machines would have to be assessed often to insure that they are running properly so that workers and students would not be exposed to hazardous chemicals leaking into the air. This alternative would not fit well into the dining halls at CU because of all the precautions needed to maintain this type of degreaser.

Other Universities/States

A total of eight universities/state agencies were emailed, in order to gain information about their sustainability programs, and the successes/failures of these programs. Below is a list of those who received email requests to contribute to the project, along with their contact information.

Universities/States	Contact Name	Contact Information
Yale University	Cyril May Robert Young	cyril.may@yale.edu robert.young@yale.edu
University of Maine	David Fowler Anita Wihry	david.fowler@umit.maine.edu anita.wihry@umit.maine.edu
UC Santa Cruz	Coleen Douglas Peter Phillips	coleen@ucsc.edu peterp@ucsc.edu
University of British Columbia	Brenda Sawada	brenda.sawada@ubc.ca
University of North Carolina at Chapel Hill	Cindy Pollock Shea	CPShea@fac.unc.edu
Johns Hopkins University	Royce Faddis Larry Schugam	crf@resource.ca.jhu.edu lschugam@peabody.jhu.edu
University of Massachusetts	Roberta Potter	rpotter@mail.aux.umass.edu
State of Massachusetts	Eric Friedman Marcia Deegler Dmitriy Nikolayev	Eric.Friedman@state.ma.us Marcia.deegler@state.ma.us Dmitriy.nikolayev@state.ma.us
State of Vermont	Doug Kievit-Kylar	doug.kievit-kylar@anr.state.vt.us
State of Colorado	Sustainability Program	cdphe.ppp2@state.co.us

The responses received from each, if any reply was received at all, were at times helpful, but mostly uninformative. A synopsis of each school's reply is provided below.

Yale University

An email sent to Cyril May, a graduate student and recycling coordinator at Yale, received a reply, in which he said that Yale's Custodial Services Department has been researching cleaning products for years, and many of the products that are not necessarily labeled "green" are only so because they use less toxic/more biodegradable chemicals (May, email, 2005). Yale is hoping to test newer items during a pilot project that will be launched this spring; unfortunately, the cleaners for this project have yet to be discussed (May, email, 2005). A forwarded email was sent to Robert Young, director of Custodial Services, and yielded no reply.

University of Maine

The University of Maine has recently adopted a newly certified 'green' cleaning program, contracting with Butcher's, Inc., of Marlborough, Massachusetts to buy cleaning products that are certified by Green Seal. An email to David Fowler yielded a reply. He informed us that the University of Maine uses products, such as "Carpet Complete" from Envirox, which is used to clean one million square feet of carpet space. (Fowler, email, 2005). Unfortunately, he did not provide additional information on other products used or the effects of the program. Further contact attempts failed.

UC Santa Cruz

An email sent to Coleen Douglas resulted in another contact: Peter Phillips, the UC Santa Cruz Custodial Services Principal Supervisor. Emails to Phillip did not produce any reply. Douglas mentioned another resource, the Western Association of Colleges and University Housing Operations (WACUHO). However, after contacting Lauren Heising at Housing Services, it was realized that this email list is mostly for obtaining information on Residence Life and so was unnecessary for this project. She provided another email list, The National Association of College and University Food Services (NACUFS), in which questions were soon posted about the usage of "green" cleaning products. No responses have yet to be received from the post.

University of British Columbia

Brenda Sawada, the Manager of UBC SEEDS, replied with information about her school's green cleaning products. The University of British Columbia has just moved into a test phase with Enviro Solution (contact: Sawchuk@Enviro-Solution.com, Website: www.enviro-solution.com). They received information about Enviro Solution from the University of Toronto, Mississauga, in November of 2004, in which they spoke highly of the products. They will soon be in pilot mode with the products. (Sawada, email, 2005). After receiving her email, another email was received from Mike Sawchuk from Enviro Solution. He welcomed us to look at the Enviro Solutions website, which is easy to navigate and contains a list of certain products that they offer.

University of North Carolina at Chapel Hill

An email sent to Cindy Pollock Shea yielded no reply.

Johns Hopkins University

Emails sent to Royce Faddis and Larry Schugam yielded no reply.

University of Massachusetts

An email sent to Roberta Potter yielded no reply.

State of Massachusetts

An email sent to the Commonwealth of Massachusetts yielded a reply from Eric Friedman, the Director of State Sustainability. Friedman works to help the state agencies, including the universities, to green their operations. (Friedman, email, 2005). The state purchasing agency, the Operational Services Division, has established a statewide contract for green cleaners, mainly using the Green Seal standards to purchase. (Friedman, email, 2005). These products include general purpose, bathroom, floor and glass cleaners, and disinfectants. He provided further contacts (Marcia Deegler and Dmitriy Nikolayev), as well as the Massachusetts environmental purchasing website at http://www.mass.gov/epp/enviro.htm.

State of Vermont

An email to Doug Kievit-Kylar, the Pollution Prevention Planner at the Vermont Agency of Natural Resources, received a reply. Vermont's efforts to promote EP (Environmentally Preferable) products dates back to 1994, when they developed and employed a "unsophisticated" screening tool based on one that was created by King County (Kievit-Kylar, email, 2005). Based on this criteria, Vermont was able to select a whole suite of "green" cleaners for inclusion on the State Contract, but because they had not "required that vendors ensure that formulators list ALL chemical components of their products, we likely missed those chemical constituents that are claimed as proprietary." (Kievit-Kylar, email, 2005). Thus, these products were not much of an improvement from former products used.

Over the years, Vermont has been able to develop a much more sophisticated screening tool based on their design and required full disclosure. Currently, they are in the process of soliciting vendors for the "latest and greatest EP Cleaners." (Kievit-Kylar, email, 2005). Also, private and public entities are working together at the upcoming Statewide Custodial Conference to put together an educational package for distribution. In addition to all their work, a consumer survey on the obstacles and barriers to the purchase of EP Products, including "green" cleaners has been completed.

State of Colorado

An email sent to the Colorado Sustainability Program yielded a reply. We were told that currently there is no Colorado standard or certification for 'green' cleaning products. However, the state does use Green Seal certification, and believe that it is "the best standard out there and provides a wide range of green cleaning choices." (Dale, email, 2005). A web address was provided: www.greenseal.org/certproducts.htm#cleaners.

An email was also sent to Ed von vonBleichert to see if he had any leads about state requirements for Colorado. We received a reply that he did not know of any criteria.

Distributors/Research

Using the 'Green Chemicals' criteria, we researched different companies that distribute and make chemicals specifically those that meet or exceed the criteria. Feedback was received from Ecolab, a company that specializes in commercial cleaning and sanitizing solutions. Their products are supplied to over 170 countries. Ecolab's Ecologic Environmentally responsible products are consistent with the Green Seal's Environmental Standards for industrial and institutional cleaners (Green Seal 37). Their line of products includes Oasis 139G All-Purpose Cleaner Concentrate and Geosystem 9000's line of dishwashing cleaners. The all-purpose cleaner is a non-caustic, non-corrosive, multipurpose daily cleaner that uses a high level of surfactants for food service areas. It is used for removing grease, oils and tough soils. The Oasis Pro 18G All-Purpose Concentrate is also a multipurpose daily cleaner and can be used not only for grease and oils but also on walls, floors,

countertops, equipment, tiles, sinks, etc. This all-purpose cleaner meets Green Seal's environmental standards for lodging properties (Green Seal 33). The Geosystem 9000's line of dishwashing products include: Silver Fusion Presoak, Crystal Fusion Rinse Additive for exceptional sheeting action which produces spotless wares wash after wash, Solid Fusion Machine Detergent, and MAG Fusion Manual Pot and Pan Detergent. This company also provides hands-on training to all the employees in both English and Spanish.

We also contacted other companies like EcoProducts, which is a company located in Boulder and claim to specialize in green chemicals. Another company we contacted was Rochester Midland Corporation. Neither company sent us any feedback.

Pricing

Ecolab's pricing for the products they offer was provided by Greg Bantugan, Street Sales Development Manager of Ecolab.

Code	Product	Size	Price
16890	Solid Fusion	4/ 6.75 lbs.	$64.36 case
16810	Crystal Fusion	2/ 2.5 lbs.	$135.87 case
16870	Silver Fusion	3/ 4 lbs.	$76.58 case
16025	Mag Fusion	3/ 3 lbs.	$95.27 case
17704	Oasis 139G	2.5 gals.	$69.92 case
17700	Oasis 258G	2.5 gals.	$59.00 case
17705	Oasis 305G	2.5 gals.	$58.39 case
17701	Oasis Pro 18G	2-21tr.	$67.40 case
17703	Oasis Pro 43G	2-2ltr.	$52.10 case
17702	Oasis Pro 67G	2-2ltr.	$69.70 case

Findings

We learned what the difference between all of the different Green Seal certifications is. The Green Seal Products that are certified through GS-37 requirements are intended for institutional and industrial cleaning. Products certified through GS-37 are general-purpose, bathroom, glass, and carpet cleaner, made environmentally safe for these purposes. These cleaners are intended for routine cleaning of offices, institutions, warehouses, and industrial facilities. This standard on the use of these cleaners is not specified for households, food preparation operations, or medical facilities.

The Green Seal Products that are certified through GS-08 requirements are intended general purpose household cleaning. They are specifically marketed for cleaning common household surfaces and are environmentally safe for these purposes.

The Green Seal Products that are certified through GS-34 requirements are intended for cleaning/degreasing. They are suitable for cleaning soils in production and maintenance applications and are environmentally safe for these purposes as well.

The following is an updated list with specifications for environmentally friendly cleaning products. CU's first list was compiled by Alison Ruhs, the Environmental Assistant of the University of Colorado's Department of Housing, for the Dining and Housekeeping Services (see Appendix A). We revised the list with what we hope CU takes into consideration when looking for cleaning products. We felt it was important to revise this list because CU's current list of order of importance for specifications differed in some ways from that of the 12 other major institutions and organizations, many of which are currently leaders in sustainability. The revised list is based on what is most important for these 12 major institutions/organizations, including: Green Seal, the US Department of Interior, and the commonwealth of Massachusetts, Canada, Washington, Santa Monica, Vermont, Minnesota, Seattle, WA, Cleaning Pro, San Francisco, and Battelle-DOE (vonBleichert).

We believe it is necessary to make these revisions in order to better the overall health and safety of dining services, based on other research that has been conducted. For example, CU's list has the pH specifics under the category of what they would like to see, but do not require in chemicals. In the revised edition we made, the pH specifications are in the top priority list. We believe that pH is very important in these chemicals for the safety concerns of the kitchen workers. In addition, 10 out of the 12 major institutions have the same pH specification as major priority criteria on their own environmental and health list.

Environmentally Friendly Cleaning Products:
Updated Specifications for University of Colorado at Boulder

It is Mandatory that Chemicals Have These Criteria:

- No VOC levels above 10% by weight of the diluted product
- pH between 2 and 12.5(not above or below) $^{+}$
- Non-toxic to humans and aquatic life
- No ozone depleting chemicals *****
- No Carcinogens, Mutagens, and Teratogens
- Readily biodegradable (OECD definition) $^{+}$
- No dye or perfume (or approved by US Food & Drug Admin.)
- Phosphate-free
- No Phosphoric Acid
- Flash Point above 200 F
- No Aerosols
- Free of Chlorine/Sodium Hypochlorite and Chlorine Bleach
- No APE/NPE surfactants (alkylphenol ethoxylates)
- No SARA Title III 313 chemicals, or acutely toxic chemicals
- A health rating under HMIS no higher than 2 – moderate. Prefer 0-1 rating. Listing of eye and skin irritation. $^{+}$
- No ethylene diamine tetraacetic acid (EDTA) or nitrolotriacetic acid (NTA)
- Not petroleum based
- No extremely corrosive chemicals

SUPERSCRIPT KEY:
$^{+}$ We increased priority of
$^{-}$ We decreased priority of
* We added to list
Priority stayed the same

Chemicals Should Have These Criteria:

- No Cleaning-disinfectant combination products $^{-}$
- No products listed on the EPA Toxics Release Inventory $^{-}$
- No arsenic, cadmium, chromium, lead, mercury, zinc, nickel, and seleniurr $^{-}$
- No Paradichlorobenzene or benzene based products $^{-}$
- Minimization of life-cycle environment impacts $^{+}$

Chemicals Should Try to Have These Criteria:

- Minimized Packaging
- Containers that are made from recycled material
- % of product obtained from renewable resources
- No persistent, bioaccumulative, toxic chemicals *
- Water Based
- Environmental impact analysis conducted and reflected on MSDS (Bleichert).

Action Points

After completing our research on 'green' chemicals, we believe that CU should take into consideration our toxicity assessment spreadsheet (Appendix B), research on Ecolab, and our compiled list of criteria for 'green' cleaning products. Out of the 15 products researched total, 14 products, 9 cleaners and 5 degreasers, have been chosen as considerations for future purchasing. We strongly recommend all the products with a ranking of 0 or 1 on the Toxicity Assessment Spreadsheet, including:

- Concentrated Non-solvent Cleaner Degreaser
- Arsenal Green Select Degreaser Cleaner
- DfE Lectra, Solvent Degreaser
- DfE Bioblast
- Sustainable Earth 60 General Purpose Cleaner
- GO2 Concentrate Oxygenated Multi-Purpose Cleaner
- ECOgent Universal Cleaner Concentrate
- DfE 401, Cleaner/Degreaser
- Skilcraft Envirocare Low Foam All Purpose Cleaner

Rankings of 0 or 1 were accumulated for each product by taking each of the categories in the spreadsheet into consideration. For example, a ranking of 0 means that the pH level, the health/fire/reactivity levels, effects after exposure, and certain other categories were not too extreme and fit the CU criteria for 'green' products that we created.

We believe that CU Dining Services should try to negotiate a contract with Ecolab since most of their products are Green Seal Certified and other departments of the school already have contracts with the company. Four products were chosen from Ecolab that we believe CU should consider, which are also included in the toxicity assessment spreadsheet with rankings of 0 and 1:

- Oasis 139G All Purpose Cleaner
- Oasis Pro 18G All Purpose Cleaner
- Solid Fusion Solid Machine Warewashing Detergent
- Mag Fusion Solid Pot and Pan Detergent

An additional advantage to contracting with Ecolab is the guarantee to provide hands-on training to all staff in both Spanish and English, if necessary. This would allow each staff to recognize the detrimental effects of the chemicals before using them. Providing training in English and Spanish would make more of the staff aware and better understand the effects of the chemicals.

Out of all the alternative chemicals proposed, we have selected the best possible replacement for the current chemicals utilized. For example, to replace the current all-purpose cleaners, we believe that CU should choose the Oasis 139G All Purpose Cleaner from Ecolab to replace the current product used from Chemical Systems Technology. The Mag Fusion Solid Pot and Pan Detergent should replace Dawn. From the alternative degreasers, we believe that the Concentrated Non-solvent Cleaner/Degreaser from ChemBlend International would be the best option. These individual chemicals were chosen based on their MSDS data, which was accumulated in the toxicity spreadsheet.

However, the closest distribution locations for ChemBlend are in Los Angeles, California and Houston, Texas. Thus, we believe it to be an even greater incentive to choose Ecolab products due to its close proximity.

Another major aspect of this project was the newly designed criteria of 'green' cleaning products for CU. We strongly believe that CU should utilize this updated list when considering future products, especially since it covers criteria from not only the Green Seal, but also many of the nation's leaders in sustainability issues. More specifically, this criterion fills gaps of 'green' cleaning products' criteria that may have been left out by Green Seal. We believe that this list is a more comprehensive criterion for 'green' cleaning products.

Appendices

A:

Request for Environmentally Friendly Cleaning Products:
University of Colorado at Boulder

Things we wish to avoid:

- Free of Chlorine/Sodium Hypochlorite and Chlorine Bleach
- Free of Ammonia/Ammonium Hydroxide
- No dye or perfume (or approved by US Food & Drug Admin.)
- Not petroleum based
- Phosphate-free
- No Phosphoric Acid
- No Danger or Poison warnings
- No extremely flammable, corrosive, or extremely reactive chemicals
- Non-toxic to humans and aquatic life
- No Aerosols
- No Cleaning-disinfectant combination products
- No SARA 313 Title III chemicals
- No VOC levels above 10% by weight of the diluted product
- No ozone depleting chemicals
- Flash Point above 200 F is preferred
- No Carcinogens, Mutagens, and Teratogens
- No products listed on the EPA Toxics Release Inventory
- No ethylene diamine tetraacetic acid (EDTA) or nitrolotriacetic acid (NTA)
- No phenolic compounds or glycol ether
- No arsenic, cadmium, chromium, lead, zinc, mercury, nickel, and selenium
- No Acetone
- No APE/NPE surfactants (alkylphenol ethoxylates)
- No 2-Butoxyethanol
- No Diethylene Flycol Monobutyl Ether
- No Hydrochloric Acid
- No Naphthalene
- No Perchloroethylene
- No Polyethylene Monophenyl Ether
- No Paradichlorobenzene or benzene based products

- No Tetrachloroethane
- No Toluene
- No Xylene

Things we would like to see:

- Water Based
- Bio-based instead of petroleum based
- Works optimally in room temperature water
- Readily biodegradable (OECD definition)
- pH between 2 and 12.5 (not above or below)
- Environmental impact analysis conducted and reflected on MSDS
- A health, fire, and reactivity rating under HMIS no higher than 2 – moderate. Prefer 0-1 rating.
- Minimized packaging
- Containers that are made from recycled material
- %age of product obtained from renewable resources
- Minimization of life-cycle environmental impacts
- Unused product not considered a hazardous waste (vonBleichert)

B:

Appendix B

Type of Cleaner	Green Seal Certification (see legend)	Distributor	HMIS/NFPA Rating			Rank
			Health	Fire	React.	
Degreasers						
3M Food Service Degreaser	none	3M	2	1	0	2
Concentrated Non-solvent Cleaner Degreaser	GS-37	Chemblend International	0	0	0	0
Arsenal Green Select Degreaser Cleaner	GS-37	Hillyard Industries				1
DfE Lectra, Solvent Degreaser	none	Rochester Midland Corporation	1	2	0	1
DfE Bioblast	none	Rochester Midland Corporation	2	1	0	1
Cleaner						
Sustainable Earth 60 General Purpose Cleaner	GS-37	Coastwide Laboratories	1	0	0	0
GO2 Concentrate Oxygenated Multi-Purpose Cleaner	GS-37	Chemblend International	0	0	1	0
ECOgent Universal Cleaner Concentrate	GS-37	Cogent Enviornmental Solutions				1
DfE 401, Cleaner/Degreaser	GS-37	Rochester Midland Corporation	0	0	0	0
Skilcraft Envirocare Low Foam All Purpose Cleaner	none	Rochester Midland Corporation	0	0	0	0
Oasis 139G All Purpose Cleaner	GS-37	Ecolab Inc.	1	0	0	1
Oasis Pro 18G All Purpose Cleaner	none	Ecolab Inc.	1	0	0	1
Solid Fusion Solid Machine Warewashing Detergent	none	Ecolab Inc.	1	0	0	1
Mag Fusion Solid Pot and Pan Detergent	none	Ecolab Inc.	0	0	0	0

Legend for GS Certification

- GS-37: Industrial and Institutional Cleaners
- GS-34: Cleaning and Degreasing Agents

Appendix B

Type of Cleaner	pH (Conc.)\	pH (Dilut.)	Flash point	Polyme-rization	Waste Disposal Method (conc.)	Ventilation required
Degreasers						
3M Food Service Degreaser	6.0-7.0		>212F		local	local
Concentrated Non-solvent Cleaner Degreaser	10.5-12.5		none to 212F		local/state/fed regulations	general exhaust
Arsenal Green Select Degreaser Cleaner	7.1		none to 200F	no	local/state/fed regulations	general exhaust
DfE Lectra, Solvent Degreaser	NA		150F	no	local/state/fed regulations	General mechanical and/or local exhaust
DfE Bioblast	12.2		none	no	local/state/fed regulations	general mechanical and/or local exhaust
Cleaner						
Sustainable Earth 60 General Purpose Cleaner	5.0-9.0		none	no	local/state/fed regulations	general exhaust
GO2 Concentrate Oxygenated Multi-Purpose Cleaner	3.0-3.5		>160F	no	local/state/fed regulations	keep away from heat, sparks, open flames
ECOgent Universal Cleaner Concentrate	5		none	no	local/state/fed regulations	General exhaust
DfE 401, Cleaner/Degreaser	6.5-7.5		none		local/state/fed regulations	none required; local exhaust
Skilcraft Envirocare Low Foam All Purpose Cleaner	6.0-8.0		none	no	local/state/fed regulations	none required
Oasis 139G All Purpose Cleaner	10.45		>100C		local/state/fed regulations	local
Oasis Pro 18G All Purpose Cleaner	10.45		>100 C		local/state/fed regulations	general exhaust
Solid Fusion Solid Machine Warewashing Detergent	10.8-11.3				local/state/fed regulations	general mechanical and/or local exhaust
Mag Fusion Solid Pot and Pan Detergent	7.5-9.0				sanitary sewer disposal	general exhaust

Appendix B

Type of Cleaner	APE's	%Volatile by Vol.	SARA Title III	Incompatibility	Hazardous Substance
Degreasers					
3M Food Service Degreaser			313		none
Concentrated Non-solvent Cleaner Degreaser		0%	no	none	none
Arsenal Green Select Degreaser Cleaner		88.97%	no	strong oxidizers, strong acids/bases	none
DfE Lectra, Solvent Degreaser				acids, alkalines, strong oxidents	
DfE Bioblast			no	strong acids and oxidizers	
Cleaner					
Sustainable Earth 60 General Purpose Cleaner			no	none	none
GO2 Concentrate Oxygenated Multi-Purpose Cleaner		95%	no	none	hydrogen peroxide
ECOgent Universal Cleaner Concentrate			no	acids, oxidizers	none
DfE 401, Cleaner/Degreaser				acids; neutralizes active ingredients	none
Skilcraft Envirocare Low Foam All Purpose Cleaner			NA	none	
Oasis 139G All Purpose Cleaner			313	strong metals, acids	none
Oasis Pro 18G All Purpose Cleaner			313	none	2 - (Butoxyethoxy) ethanol
Solid Fusion Solid Machine Warewashing Detergent			313	none	sodium carbonate, nonionic surfactant
Mag Fusion Solid Pot and Pan Detergent			no	only mix with water	none

Appendix B

Type of Cleaner	Effects of Over Exposure
Degreasers	
3M Food Service Degreaser	Eye/Skin Irritation
Concentrated Non-solvent Cleaner Degreaser	Breathing irritation, eye/skin irritation
Arsenal Green Select Degreaser Cleaner	none listed
DfE Lectra, Solvent Degreaser	respiratroy/skin/eye irritation, headache
DfE Bioblast	nausia, diarrhea, eye/skin irritation
Cleaner	
Sustainable Earth 60 General Purpose Cleaner	mild irritation for eyes/skin
GO2 Concentrate Oxygenated Multi-Purpose Cleaner	mild irritation for eyes/skin/inhalation
ECOgent Universal Cleaner Concentrate	mild irritation
DfE 401, Cleaner/Degreaser	mild irritation for eyes/skin/inhalation
Skilcraft Envirocare Low Foam All Purpose Cleaner	mild skin/eye irritation
Oasis 139G All Purpose Cleaner	mild skin/eye irritation
Oasis Pro 18G All Purpose Cleaner	moderate to eyes; slightly to skin
Solid Fusion Solid Machine Warewashing Detergent	minor irritation eyes and skin
Mag Fusion Solid Pot and Pan Detergent	minor irritation eyes and skin

C:

Appendix C:

Environmental Services Cleaning Solutions Toxicity Assessment + Housing

3.28.05

Okay to buy is in GREEN *** information on product is still be researched.**

Type of Cleaner	**Rank**	HMIS/NFPA Rating Health	Fire	React.	**pH (Conc.)**	pH (Dilution)	Flash point	**Waste Disposal Method (conc.)**	**Ventilation required**	**SARA Title III**	Incompatibility	**Effects of Over Exposure**	Hazardous Substance	%volatile by Vol.	**APE's**	Polyme-rization
Disinfectants/Quats																
H2Orange2Concentrate	1	0	0	0	3.6				local	no	redux agents	eye/skin irritant			no	no
Buck. Sani.Quat (pine, mint, lemon)	1	1	0	0	7.4-7.8	6.8-7.2	none	sanitary sewer	local	no	chlorine bleach	eye/skin irritation			no	no
H2Orange2 dilute	0	0	0	0		neutral			local	no	none				no	no
Glass Cleaners																
H2Orange2Concentrate	0	0	0	0	3.6				local	no	redux agents	eye/skin irritant			no	no
H2Orange2 dilute	0	0	0	0		neutral			local	no	none				no	no
Arsenal Green Select Glass Cleaner	0	0	0	0	3.9		200	local author.	bod engineerir	no	oxidizers	drowsiness, headache, and		97.3		no
Green Select Glass Cleaner	0	0	0	0	3.9		200	local author.	bod engineerir	no	oxidizers	headache, drowsiness, unc		97.3		no
Deodorants																
Scavenger	0	0	0	0	7.3-7.7	7.3-7.7		sanitary sewer	local	no	chlorine bleach				no	no
Buckeye Cinnamon	1	0	0	0	7.-8.	7.-8.	none	local author.	local	no	chlorine bleach	eye/skin irritant				no
Floor Cleaners																
H2Orange2 dilute	0	0	0	0		neutral			local	no	none				no	no
H2Orange2Concentrate	1	0	0	0	3.6				local	no	redux agents	eye/skin irritant			no	no
Bathroom Cleaners																
H2Orange2 dilute	0	0	0	0		neutral		local	local	no	none				no	no
H2Orange2Concentrate	1	0	0	0	3.6			local	local	no	redux agents	eye/skin irritant			no	no
Buckey Sanicare Dis & RR	1	0	0	0	11	11	none	dilute w/H2O local	local	no	do not mix	eye/skin irritant				
H2Orange2 Grout Safe	1	0	0	0	3.81		212	local	local	n	none	minor skin/eye irritant				
Green Select Bathroom Cleaner	1	1	0	0	4.33		200	local	d enginnering	no	oxidizers	eye irritant		86.28		no
Toilet Bowl Cleaners																
Non Acid Blow clnr	2	1	0	0	12	10.2	none	loc	local	no	do not mix	eye/skin irritant				
Buckeye Terminator	2	2	0	0	11.7-12.2	10.1-11.1	none	sanitary sewer	local	no	chlorine bleach	eye/skin irritation			no	no
Buckeye Uppercut	2	2	0	0	<1	0.6	212	local	local	no	do not mix	corrosive to eyes/skin irritar	Organic Acid salt			
Shampoos																
H2Orange2 dilute	0	0	0	0		neutral			local	no	none				no	no
H2Orange2Concentrate	1	0	0	0	3.6				local	no	redux agents	eye/skin irritant			no	no
Jet Stream	0	0	0	0	9	8.9	none	local	local	no	chlorine bleach	eye/sking irritant		87		no
Fiber All	1	2	0	0	8.8		200	local	local		strong acids	modderate reddening/eye irratant		85		~~no~~
Bac-Tex (4 use after floods)	**2**	**2**	**0**	**0**	**9.5**	**8.5**	**none**	**local**	**local**	**n**	**do not mix**	**eye/skin irritant**				no

Environmental Services Cleaning Solutions Toxicity Assessment

Type of Cleaner	**Rank**	NFPA Rating			**pH**	pH	Flash	**Waste Disposal**	**Ventilation**	**SARA**	Incompatibility	Effects of	Hazardous	%volatile	**APE's**	Polyme-
		Health	Fire	React.	**(Conc.)**	(Dilution)	point	Method (conc.)	required	**Title III**		Over Exposure	Substance	by Vol.		rization
Spot Removers																
H2Orange2 dilute	0	0	0	0		neutral			local	no	none				no	no
Buckey Touch & Go	0	0	0	0	8.1	7.9	none	local	local	no	chlorine bleach	sever eye irr/slight skin irr				
H2Orange2 Quick Spot	0	0	0	0	4.01		n	l	l	n						
Buckeye Gone	**0**	0	0	0	7.5	7.5	n	l	l	n	bleach	eye/skin irritant				n
Citrus Gel Spotter	2	2	2	0	n/a		122	local	local	n	none	irritation/dryness		90		n
Bio-Enzymatic Spotter	1,2	1	2	2	?	?	n	local	local		none	slight skin irr/eye irritant		95		n
Floor Sealers																
Buckeye Cirene	0	0	0	0	9.3	9.3	none	local	local		strong acids	none	Diethylene Glycol Ethyl Ether			no
Phaser Monostar	1	1	0	0	7.8-8.8		n	l	l		do not mix	eye/skin irr	Diethylene Glycol Ethyl Ether/Dipropylen	?		?
Floor Waxes/Finishes																
Monostar																
Gemstar Laser	0	0	0	0	8.-9.		none	local	local		do not mix	eye/skin irritant	Diproplylen glycol methyl ether			no
Gemstar Gemini	0	0	0	0	6.5-8		none	local	local		do not mix	eye/skin irritant	Diproplylen glycol methyl ether			
Cement Finishes																
Rivet - Airkem	0	0	0	0	7.7	7.7	none	local	local	n	do not mix	eye/skin irritant	Ethylene Glycol			no
Bedrock	0	0	0	0	8.8-9.3		200	local	local	313	do not mix	eye redness	Diethylen glucol methyl ether			no
Stone Floor Finishes																
Taj Mahal	1	1	0	0	8.-9.		none	local	local	n	do not mix	eye/skin irritant	Diethylphene Glycol methyly ether			no
Buckey Castleguard	0	0	0	0	8	8	none	local	local	n	acids/strong alkali	eye/skin irritant	Diethylen Glycol Ethyl Ether			no
Terazzo Floor Finishes																
Rivet - Airkem	0	0	0	0	7.7	7.7	none	local	local	n	do not mix	eye/skin irritant	Ethylene Glycol			no
Buckeye Cirene	0	0	0	0	9.3	9.3	none	local	local		strong acids	none	Diethylene Glycol Ethyl Ether			no
Buckey Castleguard	0	0	0	0	8	8	none	local	local	n	acids/strong alkali	eye/skin irritant	Diethylen Glycol Ethyl Ether			no
Floor Strippers																
Strip-All	X	3	0	0	12.5-13.5		none	corrosive	local	n	oxidizers/acids	severe eye/ skin damage	Ethanolamine/ Benzyl alcohol	92.2		no
Airstrip	X	3	0	0	12.5-13.5		212	req corrosive	local	313	do not mix	severe skin burns/blindness	2-Butoxyethanol			
Spraybuff																
Speedtrack	1	1	0	0	5		200F	local	local	n	oxidizers	eye/skin irritant		93	n	n
Overdrive	2	1	2	0	7.8-8		190F	local	local	n	oxidizers	eye/skin irritant		95	n	n

Environmental Services Cleaning Solutions Toxicity Assessment

Type of Cleaner	Rank	NFPA Rating			pH	pH	Flash	Waste Disposal	Ventilation	SARA	Incompatibility	Effects of	Hazardous	%volatile	APE's	Polyme-
		Health	Fire	React.	(Conc.)	(Dilution)	point	Method (conc.)	required	Title III		Over Exposure	Substance	by Vol.		rization
Rust Remover																
Buckeye UpperCut	**2**	2	0	0	<1		212	local	local	no	chlorine bleach	corrosive to eyes/skin irritar	Organic Acid Salt	57		no
Grafitti Removers																
Swipe It -A	**?(1,2**	1	1	0	**?**		200F	local	local		oxidizers/acids	eye/skin irritation			n	n
Swipe It -A	2	1	1	0	**?**		200	I	I	313	oxidizers/acids	eye/skin irritation	n-Methylpynolidone		n	n
Lift Off #4	1	1	1	0	6.08		none	local	local	no		eye/skin irritation	acetone			
Gum Removers																
Buckeye Gum /Tar/oil	1,2	1	2	0	9.7	9.7	212	local	local	no	chlorine bleach	eye/skin irritant	Limonene/ Tripoplylen Glycol Methyl Ether			
Select Gume Freeze Act	?(3	1	4	0	**?**		130	local	local	no	oxiding agents	eye/skin irritant	Petrolium Gas/ Terafluoroetheane			no
Hand Soap																
Epicare Hand Cleanser	0	0	0	0	9 -9.5		212	local	none	no	do not mix	minor eye irritant				**no**
Epicare Lotion Soap	0	0	0	0	9.5 -10		212	local	none	no	do not mix	minor eye irritant				**no**
Dial Bar soap	1	1	1	0	?		?	local	none	no	strong oxidizers	eye irritant				**no**
All Purpose Cleaners																
H2Orange2 dilute	0	0	0	0		neutral			local	no	none				no	no
H2Orange2Concentrate	1	0	0	0	3.6				local	no	redux agents	eye/skin irritant			no	no
Top Clean -Hillyard	0	0	0	0	7.05		214F	local w/lots of H2O	local	no	none	eye irritant			no	no
Neutral Cleaners																
Sundance Neutral Flr clr	2	2	0	0	7.0-8.3		200F	local	local	no	oxidizers	eye/skin irritant		74	no	no
Buckeye Straight Up	**0**	**0**	**0**	**0**	**7 -7.2**	**7 -7.2**	**none**	**local**	**local**	**no**	**bleach**	**eye/skin irritant**				**no**
Brilliance	**0**	**0**	**0**	**0**	**8**	**8**		**local**	**local**	**no**	**do not mix**	**eye/skin irritant**				**no**
???????????																
Buckeye. Pathfinder	0	0	0	0	7	7	non	local	local	no	chlorine bleach	slight eye irritant				
Buckeye Gone	0	0	0	0	7.5	7.5	none	local	local	no	chlorine bleach	eye/skin irritant		98		no
H2Orange 2 Quick Spot	**0**	**0**	**0**	**0**	**4.01**		**n**	**local**	**local**	**no**	**none**	**minor eye/skin irritant**				**no**
Green Solutions Carpet Cleaner	1	1	0	0	8.0-9.0		212	local	local	no	oxidizers	eye irritant/ may cause skin & respiratory irritation				no
Stainless Steel Cleaner																
EZ Stainless Steel Wipes	1	1	2	0	n/a	I	n	I	I	n	oxidizers					n

Environmental Services Cleaning Solutions Toxicity Assessment

Type of Cleaner	**Rank**	NFPA Rating			**pH**	pH	Flash	**Waste Disposal**	**Ventilation**	**SARA**	Incompatibility	Effects of	Hazardous	%volatile	**APE's**	Polyme-
		Health	Fire	React.	**(Conc.)**	(Dilution)	point	Method (conc.)	required	**Title III**		Over Exposure	Substance	by Vol.		rization
Rinse Additive																
Kai Dri	1	**1**	**0**	**0**	5. -9		n/a	local	local	313	acids & oxidizers	eye/skin irritation	Glycol Ethers	100		no
Carpet Pre-Treatment																
PreTreat Plus	2	2	0	0	8.2		200	I	I		strong acids	moderate reddening/eye irr		85		n

Dining's Chemical Products

8/1/2004

Type of Cleaner	Rank	HMIS/NFPA Rating			pH	pH	Flash	Waste Disposal	Ventilation	SARA	Effects of Over Exposure	Effects of over exposure	Hazardous Substance	% volatile	APE's	Polymeriz	Frequency of use
		Health	Fire	React.	(Conc.)	(Dilution)	point	Method (conc.)	required	Title III	(Accute)	(Chronic)		by Vol.		ation	
Sanitizer																	
Sodium hypochlorite					n/a	n/a	none	local: keep concentrations out of sewers, waterways	adequate ventilation	no	eye & skin irritant, harful fumes and ingestion	not determined	Sodium Chloride,Sodium Hydroxide/Sodium Hypochlorite				*******
System Quat					12	1% =10.5	n/a	Do not contaminate water/food by storage or disposal / rinse container thoroughly discard in trash	general exhaust	no	chemical burns eyes,skin / ingestion harmful	not determined	A.D.B. Ammonium Chloride/N-A. E.B. Ammonium Chloride				******
Oven																	
Easy Off					12.5	n/a	n/a	RCRA Haz Waste, local,state, federal reg.		n/a	eye &skin corrosive	n/a	Sodium Hydroxide / Monoethanolemine / Diethylene Glycol Monobutyl Ether / Butane				*****
Cleaner for Cleanjet					13-14		n/a	neutralize with hydrochloric acid	particle filter	no	highly corrosive	not determined	Potassium hydroxide				
Rinse-aid for Cleanjet					2.3		n/a	local/state/fed reg.		no	not listed	not determined	Citric acid, Propan-2-ol				
General																	
Derma-Pro Antimichrobial					n/a	n/a	none	sewer/trash	general exhaust	no	eye irritant, gastic distress upon ingestion	none	none				*****
System Suds					n/a	1%=8.0	none	local/state/fed reg.	general exhaust	no	eye irritant	not determined	Ethanol/Dodecylbenzene Sulfonic Acid/UREA				**
Dawn/Lemon Dawn					n/a	n/a	116F	local,state,federal reg.	general exhaust	no	mild eye irritant	skin irritation	Ethyl Alcohol	65%			*****
Dishmachine																	
Power Pack I					13.5	1%=13	none	local/state/fed reg.	general exhaust	no	severe burns to eye & skin / ingestion harmful	not determined	Sodium Hydroxide/Sodium Hypochlorite				******
Power Pack II					na	1%=10.5	none	local/state/fed reg.	general exhaust	no	burns irritation to eye & skin / ingestion harmful	not determined	Potassium Silicate/Potassium Hydroxide				******

Silver Shine					n/a	1%=11.5	none	local/state/fed reg.	general exhaust	no	eye & skin irritant	not determined	Sodium Carbonate				******
Spot Free					n/a	1%=6.5	120F	local/state/fed reg.	general exhaust	313	eye irritant	not determined	P.P. Ethylene Block Polymer/*Isopropal Alcohol				******
Plastic / Windows																	
Vinegar					n/a	2.2	none	sewer/trash	general exhaust	no	eye irritant	none	none				****
Wood																	
Murphy Oil Soap Lotion					n/a		n/a	empty containers-trash, contents incineration at licensed facility	general exhaust	no	eye/skin irritant		none				**
Degreaser / Solvent																	
Citrus Degreaser					9.5	1%= 8.5	159F	local/state/fed reg.	avoid vapor/mist	313	eye & skin irritant / nausea		Terpenic Mixture/*Ethylene Glycol Monobutyl Ether				******
Soft Serve Machine																	
Tayor Lube					n/a	n/a	446F	local,state,federal reg.	well ventilated	no	eye &skin irritation	skin irritation (legions)	White Mineral Oils				****
Sani-Kleen					n/a	n/a	n/a	local,state,federal reg.	general exhaust	no	eye &skin irritation	not determined	Sodium Dichloro-S-Triazinetrione Dihydrate/Sodium salts				****
Fuel																	
Gulf Lite Charcoal Starter					n/a	n/a	140F	RCRA Haz Waste, local, state, federal reg.	well ventilated	no	harmful to fatal if swallowed or aspirated into lungs	not determined	Medium Alphatic Sovent (Naphtha) / Hydrotreated Light or heavy (Naphtha)				*****
Sterno Brand					n/a		53F	local,state,federal reg.		no	eye/skin irritant / inhalation coughing		Ethanol/Methanol				*****
Misc.																	
Lime Off					1	2	none	local/state/fed reg.	general exhaust	no	irritant,slightly toxic if inhaled or ingested	slightly toxic with repeated inhalation or ingestion / causes severe irritation to exposed tissue	*Phosphoric Acid				******

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April 1st, 2006 64LCB#15 Green Cleaners

University of Colorado Student Union

Sponsored By: Cayla Chavez-Murphy, Arts & Sciences Senator
Luis Hakim, Graduate Senator

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A Bill

Bill History

Over the years, The University of Colorado, Boulder has demonstrated a strong commitment to protect all members of the University community, as well as serve as an environmentally conscious institution. As a result, the University wishes to reduce any potential health and environmental risks associated with the use of chemical cleaners. The University strives to integrate cleaners with reduced toxicity, reducing any potential harm to one's health or the environment.

Bill Summary

This Bill will preclude the UCSU from purchasing any cleaners which do not successfully demonstrate certification by Green Seal or compliance with the established criterion in the University of Colorado Chemical Cleaner Preferable Purchasing Guidelines (Attachment A).

Whereas Green Seal is a third party, non-profit organization that identifies and promotes products that are less toxic, conserve resources, and minimize overall environmental and health impacts. Green Seal evaluates and promotes these products through a certification process which utilizes internationally recognized methods and procedures to negate any potential bias. The following certification categories are subject to this legislation: Household Cleaners (GS-08), Cleaning/ Degreasing Agents (GS-34), Industrial and Institutional Cleaners (GS-37), Floor Care (GS-40)

Whereas green cleaners are defined as products that have attained Green Seal certification or have proven compliance with the University of Colorado's Manufacturers Product Assessment Tool and are subject to the following categories; general purpose cleaners (GS-37), bathroom cleaners (GS-37), glass cleaners (GS-37), carpet care (GS-37), disinfectants (GS-08/GS-37) , lime & scale removers (GS-37), degreasers (GS-34), solvent spotters (GS-37), and floor care (GS-40).

Whereas risks associated with the use of cleaners include both acute and long term effects. These risks can be difficult to identify as chemical exposures often manifest themselves in the form of cold- or flu-like symptoms which can also make it difficult to identify where/when exposures are occurring.

Whereas risks can include, but are not limited to, acute effects such as: blindness, skin damage (dermatitis) and lung damage (asthma).

Whereas long term effects can include, but are not limited to: damage to the fetus, hormone disruption, cancer, organ damage, effects to the Central Nervous System (CNS), and chemical sensitivities.

Whereas according to a report published by the Office of Environmental Policy and Compliance (U.S Department of Interior) an average of 58.2 lbs of chemical cleaning products are used per custodian per year.

Whereas potential effects are not confined to front line staff such as custodians, housekeepers, or food service staff but rather through the degradation of indoor air quality can affect almost anyone.

Whereas according to the City of Boulder, over 70,000 synthetic chemicals are in commercial use today. Many are suspected to cause cancer or other significant health effects. Despite this, only a little over 600 have been adequately tested.

Whereas according to the Consumer Product Safety Commission, of chemicals commonly found in homes, 150 have been linked to allergies, birth defects, cancer, and psychological abnormalities.

Whereas the University departments, including UCSU cost centers, Facilities Management, and Housing and Dining Services, have participated in the product testing of over 100 cleaners to demonstrate the abundant amount of green cleaners available.

Whereas over ~~*200*~~ *270* products have been certified by Green Seal under the specified categories.

Whereas *green cleaners are required to demonstrate efficacy under the same stipulations as traditional products in the subjected categories, green products are accountable to the same degree as traditional cleaners. Standard test methods have been established by the American Society for Testing and Materials (ASTM) (General Purpose - D4488-95) (Bathroom Cleaners – D5343), and the Chemical Specialties Manufacturers Association (DCC 09 categories include soil removal, smearing, and streaking) and accepted as industry recognized efficacy laboratory test methods. They are nationally established standards used by manufacturers to demonstrate a basic level of efficacy. However, in addition to these laboratory test methods, field testing can also be used to further determine a products overall performance. Green Seal products have proven a basic compliance to these or other nationally established efficacy laboratory test methods as well as field tests. MPAT approved cleaners must also comply with a basic level of efficacy as demonstrated through the said laboratory test methods and/or field tests.*

Whereas *additional products and categories are being evaluated by Green Seal and the Department of Facilities Management with the goal of monitoring a larger scope of cleaning products in conjunction with industry advancements.*

THEREFORE, BE IT ENACTED by the Legislative Council of the University of Colorado Student Union, THAT:

Section 1: All cleaners purchased by a UCSU cost centers are to be considered "green cleaners" as defined in attachment A and able to demonstrate compliance with Green Seal certification or the Manufacturers Product Assessment Tool (MPAT) effective one year from the adoption of the bill.

Section 2: The Manufacturers Product Assessment Tool (MPAT) must be completed in its entirety by the vendor/manufacturer in order for the product to be considered for purchase and reviewed by the University purchasing agent in order to verify standards compliance.

Section 3: Contracts existing between UCSU and chemical cleaning representatives shall be honored beyond implementation of this bill until the contractual termination date. No existing contracts shall be extended without demonstrating compliance with this bill, once implemented.

Section 4: In the time period prior to the termination of existing contracts and implementation of this bill no extra cleaning products shall be purchased for the purpose of stockpiling supplies.

Section 5: No contracts shall be renewed /entered that hinder the UCSU cost centers ability to purchase "green cleaners", products approved by Green Seal or the University's Manufacturers' Product Assessment Tool (MPAT), in all determined categories as specified in the category description of the MPAT (See Attachment A).

Section 6: Previously purchased cleaning products shall be used in completion or properly disposed of by one calendar year after initial implementation of this bill.

Section 7: A comprehensive list of all products approved by means of the Manufacturer Product Assessment Tool (MPAT) shall be circulated to all affected purchasing agents annually by the UCSU Environmental Director.

Section 8: *Due to consistent industry improvement the UCSU shall annually consider increasing the scope of this legislation to include categories of cleaners (such as deodorants, sanitizers, air fresheners, and others) in conjunction with Green Seal standards and industry advancements. The UCSU Environmental Director shall work in conjunction with the Department of Facilities Management (Environmental Operations Manager) to ensure that UCSU has included all potential categories of cleaners under the scope of this legislation. This review shall take place in the beginning of each school year in order to ensure optimal purchasing for consecutive year. Any additional categories added to this legislation must be added as an amendment, passed by UCSU Legislative Council and all applicable Joint Boards.*

Section 9: *Recognizing that there are certain spaces, events, and functions that are critical to the mission of the UCSU and its cost centers, as well as essential for code and regulatory compliance (i.e., Health Inspectors, Health Care Standards, etc.), a process shall be established to hear requests for exemptions to the requirements of this bill. Exemptions will be considered as needed by a 3 member group consisting of the UCSU Environmental Director, a representative from the Wardenburg Environmental Care Committee, and the FM Environmental Operations Manager. All approved exemptions will be reviewed on an annual basis.*

Section 10: *Exemptions will be considered on a case-by-case/product-by-product basis and will not be granted for entire product lines or entire buildings. Exemptions will be granted if one or more of the following criteria are met: 1. Green cleaner requires significantly* more labor/significantly* shorter time between applications (i.e., floor waxes/finishes); 2. Green cleaner is significantly** more expensive on a per unit basis (labor savings from touch-free systems must also be taken into account here); and 3. Green cleaner certification does not exist for the required purpose.*

**Significantly: in the case of labor, shorter application period is defined as a product whose manufacturers recommendation for application increases labor by more than 25% in comparison to traditional products within the same product category. However, the comparison must be made not*

only to the currently used product but the entire product category and must prove a labor increase by 25% in all available green products.

*** significantly – as it relates to cost, must consider 1. a per unit (ex. ounce/ounce) cost comparison, 2. Efficacy (ex. the product requires less or equal concentrate but must be applied multiple times) 3. Dilution (ex. one ounce after dilution makes 23 ounces of a glass cleaner while one ounce of a competing product only dilutes to twelve ounces). An exemption will be awarded if an entire product category fails to compete with the currently used product when looking at the net cost of all three of the above stipulations, and therefore results in an overall price increase **of 15% in the total cleaning supply budget of the cost center requesting an exemption.** However, initial transition costs, including converting dilution systems, and machine application systems, are excluded in the consideration for exemptions due to them not being product specific costs. Equipment costs may be incurred regardless of changes to chemical brands used. Additionally, equipment is often acquired in an attempt to lower labor costs. These transition costs may be considered in extending the implementation period, however not in granting an exemption as the best viable solution.*

Section 11: *If any of the above criterion for an exemption are met the review committee will then take into account overall health and safety benefits when reaching a final decision.*

Section 12: This bill takes effect upon passage by the Legislative Council in two readings, *passage by effected Joint Boards* and upon obtaining the signatures of the Legislative Council President and Tri-Executive.

4/13/06	Referred to Joint Boards	13-0-0
4/17/06	Rec Board: Move to Approve *(with amendments)*	7-0-0
4/18/06	UMC Board: Move to Table	4-0-0
4/25/06	UMC Board: Move to Approve	Acclimation
4/26/06	Health Board: Motion	0-0-0
4/27/06	Motion	0-0-0

_____ _____

Ashley Moore, Legislative Council President Jeremy Jimenez, Tri-executive

_____ _____

Brad Long, Tri-executive Mebraht Gebre-Michael, Tri-executive

From:	Carrie Gibadlo
To:	Harrisac@colorado.edu;
CC:	
Subject:	Green Cleaners
Date:	Monday, April 09, 2007 2:33:36 PM
Attachments:	Cost Center Chemical Inventory_4.9.07.xls UCSU_Category Explanation.doc

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Hi Amy,

I have attached two documents. THe first is the Cost Center inventory which includes an attributes category that can be used to input custodial feedback, like we disucussed in the meeting last week. The second, is a one-page explanation of the categories regulated by the UCSU policy. Feel free to review these and send them back if you have suggestions or concerns before they are sent to the vendors. Otherwise, can you please forward them to the vendors and then I will add any input they may have before we solicit feedback from the custodians. I will send you a list of more specific questions you can ask the custodians this week.

Also, just wondering are you planning to be the UCSU envrionmental director next semester as well? .....I hope!

Thanks, Amy.

Carrie Gibadlo

Chemical Cleaners Program Analyst

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University of Colorado, Boulder
Chemical Cleaner Preferable Purchasing Program

Researched and compiled by:
Carrie Gibadlo
Department of Facilities Management
The University of Colorado

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303.735.3627

University of Colorado, Boulder
Chemical Cleaner Preferable Purchasing Guidelines
The Manufacturers Product Assessment Tool

Table of Contents:

Category Descriptions:

Categories 1-9:

1. General Purpose Cleaners - include all products that are intended to clean glass, surfaces such as counter tops, sinks, basins and other refined areas that do not require specified cleaners, and windows. General purpose cleaners can also be used to remove soil from floors such as tile or linoleum but is not intended to remove wax or polishing, in addition it is not intended to polish or wax a floor. This category does not include biocides and is not required to be registered under FIFRA.
2. Bathroom Cleaners – include all products that are intended to clean fixed surfaces in a bathroom such as counter tops, sinks, basins, tubs, walls, floors, and toilet bowls. However, it does not include shower curtains, drapes, and other bathroom accessories. This category may include products that are biocides and are required to be registered under FIFRA.
3. Glass Cleaners – include all products specifically intended to clean glass and windows. These products may not be biocides and do not require registration under FIFRA.
4. Carpet Cleaners – include all products intended to clean carpets and rugs by means of mechanical extraction, shampooing, dry foam, bonnets or absorbent compounds such as shampoos and carpet cleaners. It does not include products primarily for stain removal. These products are not required to be registered under FIFRA.
5. Disinfectants – include products that intend to destroy, neutralize, or inhibit the growth of disease-carrying microorganisms. These products are considered biocides and are required to be registered under FIFRA.
6. Lime and Scale removers – include products intended to remove any flaky oxidized film that has been heated to high temperatures, such as those that can be found in showers or bathroom walls, and calcium oxide.
7. Degreasers – are intended to remove grease from any situation, most commonly ovens, and are not registered under FIFRA.
8. Solvent Spotters (carpet extraction cleaners) - include those that remove stains including tar, grease, varnish, lipstick, etc. from carpets and upholstery.
9. Floor Care – includes floor finishes and strippers. It does not include cleaners that can be used for all surfaces including floors, or carpet care.

*CAS numbers are provided for the chemicals referenced, however, not chemical categories.

University of Colorado
Chemical Cleaner Preferable Purchasing
Executive Summary

Program Background:

It is the intention of the University of Colorado, Boulder to be reviewing and analyzing the procedures used to care for the University property. In late 2002, it came to the attention of the Department of Facilities Management that the chemical cleaners used by University employees where not in conjunction with the improvements the cleaning industry has made to offer "green cleaning" products. Green cleaning products utilize advancements to reduce health risks as well as lessen the impacts of chemical cleaners on the environment. Many different federal regulations as well as institutional standards have highlighted and implemented alternatives to chemical cleaners with adverse health affects. The desired attributes listed in the following pages summarize the research and advancements made by the cleaning industry that can be implemented to produce a safer and healthier work environment.

Program Goals:

The Chemical Cleaner Preferable Purchasing Program aims to require that the cleaning products used on University properties not have adverse health affects when used in the proper manner. We aim to protect University employees from any of the long or short-term health affects that may be associated with cleaning products. In addition, it is our aim to reduce impacts on the environment as well as utilize advancements made by the cleaning industry. It is our intention to review these attributes periodically to update them with any industry advancements, as well as adjust them as seen fit. The categories of products subjected under the criterion include: 1. General Purpose Cleaners 2. Bathroom Cleaners 3. Glass Cleaners 4. Carpet Cleaners 5. Disinfectants 6. Lime and Scale removers 7. Degreasers 8. Solvent Spotter 9. Floor Care Products. The following standards have been modeled after Green Seal's GS-37 standard, the State of Vermont's Environmentally Preferable Purchasing program, and the Commonwealth of Massachusetts Environmentally Preferable Cleaning Products.

How to Use this Document:

The mandatory attributes listed in the Product Standards briefly describe required aspects of each chemical cleaner that will be considered in University purchasing. Any product that fails to meet all of these criteria will immediately be dismissed as undesirable. The secondary attributes will be used to gage a product's appeal as well as compare it with a competitor's product. A product that matches all of the secondary criteria as well as offers a price competitive bid and product effectiveness will be considered most desirable. Appendix A lists a detailed description of each of these attributes, appendix B describes commonly used hazardous ingredients, appendix C lists useful definitions of terms, and appendix D lists websites used to establish the criterion or refereed to in the criterion.

The Selection Process:

A vendor whose product is certified by Green Seal and can provide documentation to prove so, will be automatically considered acceptable for bidding. All other vendors will be required to submit a University of Colorado Manufacturers Product Assessment Tool (MPAT), which has been modeled after the State of Vermont's and the Commonwealth of Massachusetts MPAT. Failure to provide any of the mandatory documentation to prove compliance with any mandatory attributions will deem a vendor un-responsive and therefore unacceptable for purchasing. A failure to provide the required documentation for the secondary attributes will result in no points awarded in that specific area. This evaluation addresses human health and environmental impacts, packaging requirements and content, and reactions and irritations caused by synthetic dyes and fragrances.

Duration of Contracts and Approval:

Each department has the ability to review the cleaners used for their department continuously, however vendors will not be required to reapply for product approval as long as they have not changed the composition or packaging of the product. If the composition of the product has changed, the health and environmental criteria must be reevaluated by filling out the health and environmental assessment sections of the MPAT in the appropriate category. If the packaging has changed then the vendor will be required to fill out section IV of the MPAT. If during the duration of a year the product's composition has changed, but the product has also become Green Seal certified then the MPAT does not need to be filled out. If approval has been deemed by a University of Colorado department it is withheld for the entire University system. The human health and environmental impact scores (from the MPATs) as well as the product costs and efficiency determined through product testing or other peer reviewed tests will all be considered when purchasing products for the University.

University of Colorado
Chemical Cleaner Preferable Purchasing
Product Standards

Mandatory Product Attributes for categories 1-8:
The following criteria are mandatory for environmentally responsible general purpose cleaners, bathroom cleaners, glass cleaners, disinfectants, lime and scale removers, degreasers, solvent spotter, and carpet cleaners at the University of Colorado. Failure to comply will result in immediate rejection of a bid.
Green Seal certification for General-Purpose, Bathroom, Glass, and Carpet Cleaners used for Industrial and Institutional Purposes (GS-37) will be considered automatic compliance with criterion of all mandatory attributes.

Intent:
It is our goal through these criteria to create a safe, nontoxic, and environmentally responsible working condition for the employees and students at the University. We wish to recognize the technological advances within the cleaning industry and utilize these advances to reduce health risks and lower environmental impacts. The following standards apply to all cleaners used on University property being used by University employees.

PLEASE REFER TO APPENDIX A FOR FURTHER EXPLANATION OF EACH CRITERION.

Product Specific Health Requirements:

1. **It is non-toxic to humans and/ or aquatic life** – The product may not be injurious when used under its normal, intended use within the appropriate concentrations. The undiluted product may not be toxic to humans. A product is considered toxic if any of the following criteria apply:
   Oral lethal dose (LD50) <2000mg/kg
   Inhalation lethal concentration (LC50) < 20mg/L
   If the vapor phase concentration of the product at room temperature is less than 20mg/L, it should be tested at its saturation concentration. If it is non toxic at this concentration, it passes the inhalation criteria. Toxicity data must include whole product testing. The testing procedures should meet the criteria put forward by the Organization for Economic Cooperation and Development (OECD) Guidelines for Testing of Chemicals. These protocols include Acute Oral Toxicity test (TG401), Acute Inhalation and Toxicity test (TG403), and Acute Dermal and Toxicity Test (TG402).
   All chemicals listed under the Emergency Planning and Community Right to Know Act Section 313 are considered toxic. The product as used must pass the criterion for aquatic toxicity. A compound is considered non-toxic if it meets one or more of the following: Acute LC50 for algae, daphnia, or fish = 100mg/L. Testing is not required if sufficient aquatic toxicity data exists for each of the product's ingredients to demonstrate the product mixture complies. In addition, alternative substantiated tests will be considered adequate with the discretion of the University of Colorado.
2. **No confirmed or suspected carcinogens, mutagens, or teratogens** – Carcinogens describe any agent that can cause cancer. For the purpose of this document carcinogens are defined as those chemicals listed as known, probable, or possible human carcinogens by: 1) the International Agency for Research on Cancer (IARC) Group 1, 2A, or 2B; 2) the National Toxicology Program (NTP); 3) the U.S. Environmental Protection Agency Group A, B, or C; or 4) the National Institute for Occupational Safety and Health. Mutagens are any agent that can induce or increase a mutation within an organism. Teratogens include any agent that cause damage during reproductive development without harm to the mother or a lethal affect on the fetus. Teratogens, for the purpose of this document, are defined by the State of California under the Safe Drinking and Toxic Enforcement Act of 1986. For a list of websites pertaining complete chemical lists refer to appendix D.
3. **No Danger or Poison Warnings** – Danger warnings indicate that a taste to a teaspoon is fatal if swallowed, inhaled or absorbed through the skin of a 180lb man. Poison Warnings indicate high toxicity.
4. **Less irritating to skin and eyes** – The undiluted product must not be a skin sensitizer as tested by the OECD Guidelines for testing chemicals, Section 406. No product shall be considered corrosive to the skin or eyes in its undiluted form. Dispensing system concentrates must be tested as used.
   Standards must be met when tested as an undiluted product using the Human Skin Construct systems and the bovine opacity and permeability test after a ten-minute exposure. Other peer -reviewed or in

vitro test methods may also be acceptable. Dispensing system concentrates must be tested as used.

5. **Neutral pH and high flash point** – pH measures the relative acidity or alkalinity of a substance, ranging from 0 –14, 7 being neutral. A low or high pH may be more irritating to the eyes and skin. Preference will be given to pHs between 4-9. However, any pH not between 2-12.5 will not be acceptable. Flashpoints measure how easily a product will ignite. Over 200F (93.3334C) will be considered acceptable.
6. **No product cleaners shall contain disinfectants** – disinfection of a surface requires the surface be cleaned prior. By eliminating disinfectants from the general purpose cleaners', toxicity levels will be reduced. Therefore, any products considered to disinfectant must be labeled and evaluated as a disinfectant.

Product Specific Environmental Requirements:

1. **It is readily biodegradable** – Substances that rapidly degrade can be quickly removed from the environment. A substance must degrade by >70% in 28 days to be considered acceptable.
2. **Low phosphate content** – Phosphates can lead to oxygen depletion and eutrophication in bodies of water and ultimately the death of aquatic life. 0.5% by weight or less will be considered environmentally sound.
3. **No more than 10% Volatile Organic Compounds concentration by weight of the product** – VOCs are substances which contribute to the formation of smog and to poor indoor air quality, as well as have adverse health affects.
4. **Product is contained in recyclable/ refillable containers** – The primary packaging (packaging that directly contains the product excluding only the cap or lid) must be recyclable within campus recycling operations. However, the primary packaging may be refillable in lieu of recyclability only if the vendor/ manufacturer has implemented a program that encourages refilling already used containers.

Product Specific Ingredient Requirements:

1. **No SARA Title III Chemicals** – The ingredients under this act represent some of the most acutely toxic chemicals used in cleaning products.
2. **No Ethylene diamine tetraacetic acid, ethylene dinitrilotetraacetic acid (EDTA) or nitrilotriacetic acid (NTA)** – EDTA and NTA are not readily biodegradable. They are suspected carcinogens and can mobilize heavy metals in sewage treatment plant sludge and in stream and lake sediments.
3. **No Alkylphenol Ethoxylates** – APEs do not degrade completely and are suspected endocrine disrupters.
4. **No Chlorine Bleach** – wastewater chlorine- containing bleaching agents can react with other chemicals to form chlorinated organic compounds, which can be toxic and carcinogenic.
5. **No phenolic compounds** – Phenolic compounds are highly volatile, toxic, and suspected carcinogens.
6. **No petroleum or petrochemical compounds including glycol ethers and petroleum derived surfactants** – Petroleum based solvents are made from non-renewable resources, are extremely flammable, and are toxic upon inhalation. Glycol ethers are manufactured through petrochemical processes and many are toxic. Petroleum derived surfactants are linked with more serious environmental impacts than those made from vegetable oils.
7. **No ozone depleting chemicals** – Ozone depletion leads to higher amounts of UVB rays reaching the Earth's surface. UVB has adverse health affects. Any agent monitored by the Montreal Protocol (MP) will be considered unacceptable. See Appendix D for a list of chemicals monitored by the MP.
8. **No product may contain any of the following eleven designated chemicals based on assessments which conclude them to be health hazards in anything more than trace amounts**– Acetone, Alkoxylated linear alcohol, 2-Butoxyethanol, Ethanolamine, Limonene, Perchloroethylene, Phosphoric acid, Polyethylene Monophenyl Ether, Sodium Hydroxide, Sodium Hypochlorite, and phthalates. See Appendix B
9. **No heavy metals**- including zinc, arsenic, lead, cadmium, cobalt, chromium, mercury, nickel, and selenium.

University of Colorado
Chemical Cleaner Preferable Purchasing
Product Standards

Mandatory Product Attributes for category 9:

The following criteria are mandatory for environmentally responsible floor care products at the University of Colorado, Boulder. Floor care products include A. Floor finishes, and B. Floor Strippers. This standard does not address floor sealers, spray buffing products, or systems designed to remove wax solely through abrasion. The product user should follow manufacturers' instructions addressing the compatibility of floor care systems in order to ensure effectiveness. Failure to comply will result in immediate rejection of a bid. **Green Seal Certification for Floor-Care Products: Finishes and Compatible Strippers used for Industrial and Institutional Purposes (GS-40), will be considered automatic compliance with criterion of all mandatory attributes.**

Floor finish – as defined by Green Seal (GS-40) is any product that is designed to polish, protect, and enhance floor surfaces by leaving a protective wax, polymer, or resin coating that designed to be periodically removed and reapplied.

Floor stripper- as defined by Green Seal (GS-40) a product designed to remove a floor finish through the breakdown of polymers, or by dissolving or emulsifying the finish, polish, or wax.

PLEASE REFER TO APPENDIX A FOR FURTHER DETAILED EXPLANATION OF EACH CRITERION.

Product Specific Health Requirements:

1. **All of the Product Specific Health Requirements mandatory for categories 1-8 also apply for floor care products. To view these criteria refer to page three.**

Product Specific Environmental Requirements:

1. **It is readily biodegradable** – Substances that rapidly degrade can be quickly removed from the environment. A substance must degrade by >70% in 28 days to be considered acceptable with exception to the polymer, wax, and or resin portion of the floor finish.
2. **Low phosphate content** – Phosphates can lead to oxygen depletion and eutrophication in bodies of water and ultimately the death of aquatic life. 0.5% by weight or less will be considered environmentally sound.
3. **No more than 7% Volatile Organic Compounds concentration by weight of the product** – VOCs are substances which contribute to the formation of smog and to poor indoor air quality, as well as have adverse health affects.
4. **Product is contained in recyclable/ refillable containers**– Using recyclable and/ or refilling containers reduces waste in landfills and conserves natural resources.

Product Specific Ingredient Requirements:

1. **No Alkylphenol Ethoxylates** – APEs do not degrade completely and are suspected endocrine disrupters.
2. **No phthalates** – phthalates are suspected endocrine disrupters
3. **No heavy metals** – including zinc, arsenic, lead, cadmium, cobalt, chromium, mercury, nickel, and selenium.

University of Colorado
Chemical Cleaner Product Standards

Secondary Product Attributes:
The following criteria will be used to measure a product's desirability after meeting the mandatory criterion for environmentally responsible cleaning products at the University of Colorado, Boulder. Each category is worth one point that will be awarded when the proof required for compliance is provided. No partial points will be awarded.

Intent:
It is the goal of this secondary criterion to create the ability to measure a product's environmentally responsible attributes and the manufacturer commitment to offering a product with reduced health risks and lower environmental impacts. A product that fully complies with this criterion will be deemed most desirable.

Product Specific Secondary Requirements:

1. **No required disposal as hazardous waste** – Hazardous waste is defined by the United States Environmental Protection Agency as "by-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Posses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists." These characteristics promote adverse health affects, have potential to create expensive disposal, and are overall undesirable.
2. **Concentrated and works efficiently when diluted in unheated water** – concentrated products reduce packaging as well as energy needed to ship the product. Using cold water for the dilutions also conserves energy. A product that has less than 20% water by weight and instructs mixing with unheated water will be considered acting in accordance with this standard.
3. **Fragrances** – Fragrances can encourage reactions regarding chemical sensitivity. Reactions can include but are not limited to dizziness, headaches, rashes, respiratory problems, vomiting, skin irritation, and multiple other chemical sensitivities. To minimize these potential hazards all ingredients identified on the MSDS as a fragrance must follow the Code of Practice of the International Fragrance Association.
4. **Product dispensed through automatic systems** – Dispensing systems reduce direct contact with the product and encourage proper dilution. Both of these facets help protect the employees.
5. **No aerosol cans** – Aerosol cans require special handling at times for both disposal and recycling. For example, if punctured they can produce an uncontrolled spray, and can lead to dangerous chemical releases putting sanitation workers at risk. The aerosols in the can (such as propane and butane) are flammable and often contribute to the amount of VOC's in the atmosphere. Products are favored that are available in non-aerosol formulation such as ready to use pump action spray bottles, air charged refillable containers, or concentrations that can be dispensed into spray bottles for use.
6. **No animal testing** – The University of Colorado's Facilities Management department wishes to discourage animal testing and will accept the results of past peer-reviewed or standard tests demonstrating compliance with the criterion. Products whose manufacturer does not perform any animal testing on any product will be given preference. Each year millions of animals are murdered in order to test ingredients for consumer products. However, with current technologies, many viable alternatives are readily available. For example, acute toxicity can be studied using in vitro systems since toxicity in chemicals is often focused on a cellular level. Studies indicate that using a serious of four cell cultural tests is approximately 85% accurate in calculating human toxicity. Repeated dose toxicity can also be studied using in vitro methods, which demonstrate the effect of chemicals on different organ systems in conjunction with the use of computer and mathematical modeling. Overall, stable human cell cultures have been developed for kidney, nervous, immune, reproductive, and other essential organ systems. Using these systems in conjunction with computer based modeling approaches allows many alternatives to animal testing. In addition, using past peer reviewed tests or conducting research may eliminate the need to continue any type of testing. (18) The EPA has also created a high production volume (HPV) chemical-testing program that will test 2,800 widely used industrial chemicals which will eliminate the need for individual industry/ corporate testing. The University of Colorado criteria prefers any product that has directly contributed to animal testing. Therefore, preferred vendors/ manufacturers shall not partake in animal testing nor shall they hire a company to conduct animal testing in relation to the direct creation of product up for bid.
7. **Low company environmental impact** – Manufacturers that focus solely on distributing environmentally sound products will be given preference over companies that only have specific "environmental/ green lines".

University of Colorado
Chemical Cleaner Preferable Purchasing

Manufacturers Product Assessment Tool:
Vendor Name:_____
Manufacturer Name:_____
Complete Product Name:_____
Order Number:_____
Product Description:_____

The provided attachments must be filled out by the bidder/ manufacturer for each product being considered under the Chemical Cleaner Preferable Purchasing program by the University of Colorado. Both bidder and manufacturer must sign this certification if they are different entities.

I/ we do declare that all specifications contained in this request for information and all ingredients in each of the proposed products were properly reviewed and that all products meet mandatory regulations in the applicable category and that all information is accurate and true.

I/ we also understand that, should a determination be made that knowingly false information has been submitted and/ or omitted as part of this response, it will result in immediate disqualification of purchasing. Additionally, any knowingly false information submitted may result in other penalties associated with doing business with the University of Colorado, including, but not limited to, disqualification from bidding on future contracts of a similar nature or any contract, and/or appropriate legal action.

For the Bidder:	For the Manufacturer:
_____	_____
Signature	Signature
_____	_____
Print Name/ Title	Print Name / Title
_____	_____
Date	Date

In order to speed up any necessary clarifications of response, please list the name and phone number of the designated contacts below:
Sales Representative: Name_____ Phone:_____
Chemist(s): Name:_____ Phone:_____

Please return a copy of the completed document to the following address:

UCSU Environmental Director
Box 206
Room 125
University Memorial Center (UMC)
University of Colorado, Boulder
Boulder, Colorado 80309

University of Colorado
Chemical Cleaner Preferable Purchasing

Manufacturer Product Assessment Tool Section I:

Mandatory Product Attributes for categories 1-8:

The following will assess the mandatory product attributes for categories 1-8. Each manufacturer/ vendor will be required to answer a series of questions on the MPAT as well as submit all the required documentation in each attribute category. All products will be required to submit a material safety data sheet (MSDS). Failure to meet these attributes and/ or submit the required documentation will be considered automatic failure and the product will not be considered eligible for purchase.

Intent:

It is the intent of this document to evaluate the potential health affects of the direct user as part of the formulation, mixing, product handling, transfer and exposure associated with the product use and application. It is also our intent to consider the environmental impacts associated with the product manufacturing and application. Our goal is to protect the product user, lessen the environmental impact and exclude any products that pose a hazard to building occupants.

Required documentation for each subcategory may include:

1. Green Seal certification
2. Massachusetts state contract approval
3. Company or 3rd party lab tests
4. Evaluation of toxicity by using t he equation provided in Appendix E
5. Full disclosure of all the product ingredients (active and inert)
6. Manufacturer/ bidder affidavit
7. Vermont State contract approval

Product Specific Health Requirements:

1. Toxicity

Is the product toxic to humans? Y or N

- Is the Oral lethal dose (LD50) <2000mg/kg ? Y or N
- Is the Inhalation lethal concentration (LC50) < 20mg/L ? Y or N
- Is the product listed under the Emergency Planning and Community Right to Know Act Section 313 Y or N

Is it toxic to aquatic life?

- Does the product fail to meet the standards for Acute LC50 for algae?, daphnia?, or fish? < 100mg/L or otherwise not have sufficient aquatic toxicity data existing for each of the product's ingredients to demonstrate the product mixture complies? Y or N

Required documentation includes one of the following:

1. Green Seal certification
2. Massachusetts approval or award of a state contract
3. Company or 3rd party lab tests
4. Evaluation of toxicity by using t he equation provided in Appendix E

If all of the above question are answered "No" and required documentation is submitted then the product meets mandatory health attribute number 1.

Does the product meet mandatory health attribute number 1? Yes or No

2. Carcinogens, mutagens, or teratogens To obtain a list of subjected chemicals refer to appendix D. Carcinogens are defined as those chemicals listed as known, probable, or possible human carcinogens by: 1) the International Agency for Research on Cancer (IARC) Group 1, 2A, or 2B; 2) the National Toxicology Program (NTP); 3) the U.S. Environmental Protection Agency Group A, B, or C; or 4) the National Institute for Occupational Safety and Health.

Does the product contain any ingredients that are known, probable, or possible human carcinogens? Y or N

Mutagens are any agent that can induce or increase a mutation within an organism as defined by the Harmonized System for the Classification of Chemicals which Cause Mutations in Germ Cells (UN 2003) Class 1A, 1B, and 2.
Does this product contain any known, probable, or possible human mutagens? Y or N
As defined by the State of California under the Safe Drinking and Toxic Enforcement Act of 1986 (See Appendix D), does this product contain any teratogens (reproductive toxins)? Y or N
Required documentation includes one of the following
1. Green Seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Vermont State contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory health attribute number 2.

Does the product meet mandatory health attribute number 2? Yes or No

3. Danger or Poison Warning Signs

Does your product label include the words Danger or Poison to warn that a product may be considered corrosive, highly toxic, or fatal if swallowed by a 180lb man? Y or N
Required documentation includes one of the following:
1. Green Seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Company or 3rd party lab tests
4. Vermont State contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory health attribute number 3.

Does the product meet mandatory health attribute number 3? Yes or No

4. Less irritating to skin and eyes

Dispensing system concentrates must be tested as used. Can the manufacturer provide testing information that proves 1) the undiluted product is not a skin sensitizer as defined in Section 406 of the OECD Guidelines for testing chemicals (See Appendix D) or 2) another peer -reviewed in vitro/ in vivo test method that proves the product is not corrosive to the skin or eyes in its undiluted form? Y or N
Required documentation includes one of the following:
1. Green Seal certification
2. Company or 3rd party lab tests

If the above question is answered "Yes" and required documentation is submitted then the product meets mandatory health product attribute number 4.

Does the product meet mandatory health attribute number 4? Yes or No

5. pH and Flashpoint

Is the product pH between 2-12.5? Y or N
Product pH:_____
Is the product flashpoint above 200F (93.3C)? Y or N
Required documentation includes one of the following:
1. Green Seal certification
2. Company or 3rd party lab tests
3. Vermont State contract approval

If the above questions are answered "Yes" and required documentation is submitted then the product meets mandatory health attribute number 5.

Does the product meet mandatory health attribute number 5? Yes or No

6. Disinfectants

Is the product a combination of cleaner-disinfectant (general purpose cleaner, glass cleaner, carpet cleaner, solvent spotter, or degreaser) containing a biocide requiring EPA registration as a pesticide? Y or N

Required documentation includes one of the following:

1. Green seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Vermont State contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory health attribute number 6.

Does the product meet mandatory health attribute number 6? Yes or No

Product Specific Environmental Requirements:

1. Rapid Biodegradability

Does the product meet OECD's definition of rapid biodegradability, meaning the product complies with the OECD biodegradability Test Guideline 301, A – F (See Appendix D) and can submit company or 3rd party testing data that shows the substance did actually degrade biotically or abiotically in the aquatic environment by >70% in 28 days? Y or N

Required documentation includes one of the following:

1. Green Seal Certification
2. Company or 3rd party lab tests
3. Massachusetts state contract approval

If the above question is answered "Yes" and required documentation is submitted then the product meets mandatory environmental attribute number 1.

Does the product meet the environmental mandatory attribute number 1? Yes or No

2. Phosphate content

Is the phosphate or phosphonate content 0.5% by weight or less? Y or N

Required documentation includes one of the following:

1. Green Seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval
4. Vermont state contract approval

If the above question is answered "Yes" and required documentation is submitted then the product meets mandatory environmental attribute number 2.

Does the product meet the environmental mandatory attribute number 2? Yes or No

3. 10% Volatile Organic Compounds concentration by weight of the product

Does the product contain less than 10% Volatile Organic Compounds concentration by weight of the product? Y or N

Required documentation includes one of the following:

1. Green Seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval
4. Vermont state contract approval

If the above question is answered "Yes" and required documentation is submitted then the product meets mandatory environmental attribute number 3.

Does the product meet the environmental mandatory attribute number 3? Yes or No

4. Recyclable/ refillable containers

Is the primary packaging recyclable or does the manufacturer provide a service for the returning and refilling of their packages? Y or N

If the product's primary packaging is only refillable do you offer a service to refill the containers with the product? Y or N or NA

Required documentation includes the following:

1. Section IV – Packaging Content form

If the above questions are answered "Yes" or NA and required documentation is submitted then the product meets mandatory environmental attribute number 4

Does the product meet the environmental mandatory attribute number 4? Yes or No

Product Specific Ingredient Requirements:

1. SARA Title III Chemicals

Are any ingredients past trace amounts listed on SARA Title III sections 302 and 313? Y or N

Required documentation includes one of the following:

1. Green Seal Certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval
4. Vermont state contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory ingredient attribute number 1.

Does the product meet the ingredient mandatory attribute number 1? Yes or No

2. Ethylene diamine tetraacetic acid or ethylene dinitrilotetraacetic acid (EDTA) (CAS# 60-00-4) or nitrilotriacetic acid (NTA) (CAS# 139-13-9).

Are either of the above two chemicals an ingredient past trace amounts in the product? Y or N

Required documentation includes one of the following:

1. Green Seal Certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory ingredient attribute number 2.

Does the product meet the ingredient mandatory attribute number 2? Yes or No

3. Alkylphenol Ethoxylates (No specific CAS number applicable for chemical categories)

Does the product contain APEs (alkylphenol mono- and di-ethoxylates, alkylphenoxy acetic, and alkylphenoxypolyethoxy acetic acids, and alkylphenols) past trace amounts? Y or N

Required documentation includes one of the following:

1. Green Seal Certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory ingredient attribute number 3.

Does the product meet the ingredient mandatory attribute number 3? Yes or No

4. Chlorine Bleach (CAS#7681-52-9).

Does the product contain chlorine bleach past trace amounts? Y or N

Required documentation:

1. Green Seal Certification
2. Full disclosure of all the product ingredients (active and inert)

If the above question is answered "No" and required documentation is submitted then the product meets mandatory ingredient attribute number 4.

Does the product meet the ingredient mandatory attribute number 4? Yes or No

5. Phenolic compounds

Does the product contain any phenolic compounds (phenol, CAS# 108-95-2) past trace amounts, such as Ortho-benzyl parachlorophenol (CAS#120-32-1), ortho-phenylphenol, potassium salt (CAS# 90-43-7), or para-tertiary-amylphenol (CAS#80-46-6)? Y or N

Required documentation includes one of the following:

1. Green Seal Certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval

If the above question is answered no and required documentation is submitted then the product meets mandatory ingredient attribute number 4.

Does the product meet the ingredient mandatory attribute number 5? Yes or No

6. Petroleum or petrochemical compounds including glycol ethers and petroleum derived surfactants

Does the product contain any petroleum or petrochemical compounds including glycol ethers and petroleum derived surfactants?

Required documentation includes one of the following:

1. Green Seal Certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory ingredient attribute number 3.

Does the product meet the ingredient mandatory attribute number 6? Yes or No

7. Ozone depleting chemicals To obtain a list of chemicals refer to appendix D.

Does the product contain any chemical ingredient past trace amounts that are regulated by the Montreal Protocol? Y or N

Required documentation includes one of the following:

1. Green Seal Certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval
4. Vermont State contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory ingredient attribute number 7.

Does the product meet the ingredient mandatory attribute number 7? Yes or No

8. Acetone (CAS#67-64-1), Alkoxylated linear alcohol (CAS#s 68987-81-5 or 37251-67-5), Benzyl Alcohol (100-51-6), 2-Butoxyethanol (CAS# 111-76-2), Ethanolamine (CAS# 141-43-5), Limonene (CAS# 138-86-3), Perchloroethylene (CAS#127-18-4), Phosphoric acid (CAS#7664-38-2), Polyethylene Monophenyl Ether (26027-38-3), Sodium Hydroxide or caustic soda (CAS#1310-73-2), Sodium Hypochlorite(7681-52-9), and phthalates

Does the product contain any of the above 11 ingredients or phthalates? Y or N

Required documentation includes one of the following:

1. Green Seal Certification
2. Full disclosure of all the product ingredients (active and inert)

If the above question is answered "No" and required documentation is submitted then the product meets mandatory ingredient attribute number 8.

Does the product meet the ingredient mandatory attribute number 8? Yes or No

9. Arsenic (CAS#7440-38-2), lead (CAS#7439-92-1), cadmium (CAS#7440-43-9), cobalt (CAS#7440-48-4), chromium (CAS#7440-47-3), mercury (CAS#7439-97-6), nickel (CAS#7440-02-0), selenium (CAS#7782-49-2), and zinc (CAS#7440-66-6)

Does the product contain any of the above heavy metals? Y or N
Required documentation includes one of the following:
1. Green Seal Certification
2. Formulation data or information related to this specific data

If the above question is answered "No" and required documentation is submitted then the product meets mandatory ingredient attribute number 9.

Does the product meet the ingredient mandatory attribute number 9? Yes or No

7. Fragrances

Are all fragrances identified in the Material safety data sheet? Y or N
If all are identified do they all comply with the Code of Practice of the International Fragrance Association? Y or N
Required Documentation includes one of the following:
1. Green Seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval

If the above questions are answered "Yes" and required documentation is submitted then the product meets mandatory attribute number 10.

Does the product meet mandatory attribute number 10? Yes or No

If the manufacturer/ vendor can answer yes to all of the questions in bold as well as submit all the required documentation than they have met all of the required mandatory attributes and will be considered eligible for purchasing.

COMPLIANCE IS DEMONSTRATED ONLY BY ANSWERING ALL OF THE QUESTIONS IN BOLD "YES" AND SUBMITTING ALL REQUIRED DOCUMENTATION FOR REVIEW. DOES THIS PRODUCT COMPLY WITH ALL OF THE MANDATORY ATTRIBUTES? Yes or No

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Manufacturer Product Assessment Tool Section II:

Manufacturer Product Attributes for Category 9:

The following will assess the mandatory product attributes for category 9. Each manufacturer/ vendor will be required to answer a serious of questions on the MPAT as well as submit all the required documentation in each attribute category. All products will be required to submit a material safety data sheet (MSDS). Failure to meet these attributes and/ or submit the required documentation will be considered automatic failure and the product will not be considered purchasable.

Intent:

It is the intent of this document to evaluate the potential health affects of the direct user as part of the formulation, mixing product handling, transfer and exposure associated with the product use and application. It is also our intent to consider the environmental impacts associated with the product manufacturing and application. Our goal is to protect the product user and exclude any products that pose a hazard.

Required documentation for each subcategory may include:

1. Green Seal certification
2. Massachusetts state contract approval
3. Company or 3rd party lab tests
4. Evaluation of toxicity by using t he equation provided in Appendix E
5. Full disclosure of all the product ingredients (active and inert)
6. Manufacturer/ bidder affidavit
7. Vermont State contract approval

Product Specific Health Requirements:

All of the questions and mandatory documentation applied to the product specific health requirements for categories 1-8 also apply to category 9.

In order to answer yes to the following question, and therefore show compliance to mandatory health requirements the manufacturer/ vendor is required to answer all of the question under the Product specific health requirements for categories 1-8 as well as submit the required documentation.

Product Specific Health Requirements:

1. Toxicity

Is the product toxic to humans? Y or N

- Is the Oral lethal dose (LD50) <2000mg/kg ? Y or N
- Is the Inhalation lethal concentration (LC50) < 20mg/L ? Y or N
- Is the product listed under the Emergency Planning and Community Right to Know Act Section 313? Y or N

Is it toxic to aquatic life?

- Doe the product fail to meet the standards for Acute LC50 for algae?, daphnia?, or fish? < 100mg/L or otherwise not have sufficient aquatic toxicity data existing for each of the product's ingredients to demonstrate the product mixture complies? Y or N

Required documentation includes one of the following:

1. Green Seal certification
2. Massachusetts approval or award of a state contract
3. Company or 3rd party lab tests
4. Evaluation of toxicity by using t he equation provided in Appendix E

If ALL of the above question are answered "No" and required documentation is submitted then the product meets mandatory health attribute number 1.

Does the product meet mandatory health attribute number 1? Yes or No

2. Carcinogens, mutagens, or teratogens To obtain a list of subjected chemicals refer to appendix D. Carcinogens are defined as those chemicals listed as known, probable, or possible human carcinogens by: 1) the International Agency for Research on Cancer (IARC) Group 1, 2A, or 2B; 2) the National Toxicology Program (NTP); 3) the U.S. Environmental Protection Agency Group A, B, or C; or 4) the National Institute for Occupational Safety and Health. Does the product contain any ingredients that are known, probable, or possible human carcinogens? Y or N

Mutagens are any agent that can induce or increase a mutation within an organism as defined by the Harmonized System for the Classification of Chemicals which Cause Mutations in Germ Cells (UN 2003) Class 1A, 1B, and 2.

Does this product contain any known, probable, or possible human mutagens? Y or N

As defined by the State of California under the Safe Drinking and Toxic Enforcement Act of 1986 (See Appendix D), does this product contain any teratogens (reproductive toxins)? Y or N

Required documentation includes one of the following

1. Green Seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Vermont State contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory health attribute number 2.

Does the product meet mandatory health attribute number 2? Yes or No

3. Danger or Poison Warning Signs

Does your product label include the words Danger or Poison to warn that a product may be considered corrosive, highly toxic, or fatal if swallowed by a 180lb man? Y or N

Required documentation includes one of the following:

1. Green Seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Company or 3rd party lab tests
4. Vermont State contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory health attribute number 3.

Does the product meet mandatory health attribute number 3? Yes or No

4. Less irritating to skin and eyes

Can the manufacturer provide testing information that proves 1) the undiluted product is not a skin sensitizer as defined in Section 406 of the OECD Guidelines for testing chemicals (See Appendix D) or 2) another peer -reviewed in vitro/ in vivo test method that proves the product is not corrosive to the skin or eyes in its undiluted form? Y or N

Required documentation includes one of the following:

1. Green Seal certification
2. Company or 3rd party lab tests

If the above question is answered "Yes" and required documentation is submitted then the product meets mandatory health product attribute number 4.

Does the product meet mandatory health attribute number 4? Yes or No

5. pH and Flashpoint

Is the product pH between 2-12.5? Y or N

Product pH:_____

Is the product flashpoint above 200F (93.334C)? Y or N

Required documentation includes one of the following:

1. Green Seal certification
2. Company or 3rd party lab tests
3. Vermont State contract approval

If the above questions are answered "Yes" and required documentation is submitted then the product meets mandatory health attribute number 5.

Does the product meet mandatory health attribute number 5? Yes or No

6. Disinfectants

Is the product a combination of cleaner-disinfectant (general purpose cleaner, glass cleaner, carpet cleaner, solvent spotter, or degreaser) containing a biocide requiring EPA registration as a pesticide? Y or N

Required documentation includes one of the following:

1. Green seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Vermont State contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory health attribute number 6.

Does the product meet mandatory health attribute number 6? Yes or No

Product Specific Environmental Requirements:

1. Rapid Biodegradability

Does the product meet OECD's definition of rapid biodegradability meaning the product complies with the OECD biodegradability Test Guideline 301 (A - F) or can provide data that shows the substance did actually degrade biotically or abiotically in the aquatic environment by >70% in 28 days? Y or N

Required documentation includes one of the following:

1. Green Seal Certification
2. Company or 3rd party lab tests
3. Evaluation of toxicity by using t he equation provided in Appendix E
4. Massachusetts state contract approval

If the above question is answered "Yes" and required documentation is submitted then the product meets mandatory environmental attribute number 1.

Does the product meet the environmental mandatory attribute number 1? Yes or No

2. Phosphate Content

Is the phosphate or phosphonate content 0.5% by weight or less? Y or N

Required documentation includes one of the following:

1. Green Seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval
4. Vermont state contract approval

If the above question is answered "Yes" and required documentation is submitted then the product meets mandatory environmental attribute number 2.

Does the product meet the environmental mandatory attribute number 2? Yes or No

3. 7% Volatile Organic Compound Concentration

Does the product contain less than 7% Volatile Organic Compounds concentration by weight of the product? Y or N

Required documentation includes one of the following:

1. Green Seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval
4. Vermont state contract approval

If the above question is answered "Yes" and required documentation is submitted then the product meets mandatory environmental attribute number 3.

Does the product meet the environmental mandatory attribute number 3? Yes or N

4. Recyclable/ refillable containers

Is the primary packaging recyclable or does the manufacturer provide a service for the returning and refilling of their packages? Y or N

If the products are only refillable do you offer a service to refill the product containers with the product? Y or N or NA

Required documentation includes the following:

1. Section IV – Packaging Content Form

If the above questions are answered "Yes" or NA and required documentation is submitted then the product meets mandatory environmental attribute number 4.

Does the product meet the environmental mandatory attribute number 4? Yes or No

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Product Specific Ingredient Requirements:

1. Alkylphenol Ethoxylates

Does the product contain APEs (alkylphenol mono- and di-ethoxylates, alkylphenoxy acetic, and alkylphenoxypolyethoxy acetic acids, and alkylphenols) past trace amounts? Y or N

Required documentation includes one of the following:

1. Green Seal Certification
2. Full disclosure of all the product ingredients (active and inert)
3. Massachusetts state contract approval

If the above question is answered "No" and required documentation is submitted then the product meets mandatory ingredient attribute number 1.

Does the product meet the ingredient mandatory attribute number 1? Yes or No

2. Phthlates

Does the product contain phthalates past trace amounts? Y or N

Required documentation includes one of the following:

1. Green Seal Certification
2. Full disclosure of all the product ingredients (active and inert)

If the above question is answered "No" and the required documentation is submitted then the product meets mandatory ingredient attribute number 2.

Does the product meet the ingredient mandatory attribute number 2? Yes or No

3. Arsenic (CAS#7440-38-2), lead (CAS#7439-92-1), cadmium (CAS#7440-43-9), cobalt (CAS#7440-48-4), chromium (CAS#7440-47-3), mercury (CAS#7439-97-6), nickel (CAS#7440-02-0), selenium (CAS#7782-49-2), and zinc (CAS#7440-66-6)

Does the product contain any of the above heavy metals? Y or N

Required documentation includes one of the following:

1. Green Seal Certification
2. Full disclosure of all the product ingredients (active and inert)

If the above question is answered no and the required documentation is submitted then the product meets mandatory ingredient attribute number 3.

Does the product meet the ingredient mandatory attribute number 3? Yes or No

If the manufacturer/ vendor can answer yes to all the questions in bold as well as submit all the required documentation than they have met all of the required mandatory attributes for category 10 and will be considered eligible for purchasing.

University of Colorado
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Manufacturer Product Assessment Tool Section III:

Manufacturer Secondary Product Attributes:
The following will assess the secondary product attributes for all categories of chemical cleaners after meeting the mandatory criterion. For each attribute met the product will be awarded one point out of a possible five points. There will be no partial points awarded. The higher the points the more desirable a product will be considered. Each manufacturer/ vendor will be required to answer a serious of questions as well as submit the required documentation in each attribute to receive a point.

Intent:
It is the goal of this secondary criterion assessment to gage a product's desirability based on its potential health hazards as well as environmental impacts. A product that scores six points out of the possible six points as well as offers a competitive price and performance effectiveness will be deemed most desirable.

Required documentation for each subcategory may include:
1. Green Seal Certification
2. Company or 3rd party lab tests
3. Information from a literature search that shows compliance with the specification of each ingredient than use the equation for the evaluation of toxicity provided in appendix F.
4. Full disclosure of all the product ingredients (active and inert)
5. Manufacturer/ vendor affidavit
6. Vermont State contract approval
7. Massachusetts Sate contract approval

Product Specific Requirements:
1. Hazardous Waste

Is the product considered hazardous waste as defined by the United States Environmental Protection Agency? Y or N

Required documentation includes one of the following:
1. Green Seal certification
2. Full disclosure of all the product ingredients (active and inert)
3. Vermont State contract approval

If the above question is answered "No" and required documentation is submitted then the product meets secondary attribute number 1.

Does the product meet secondary attribute number 1? Yes or No
If yes please award one point on the designated line. _____

2. Concentrated and works efficiently in unheated water

Is the product recommended diluted in cold/ unheated water? Y or N
Is the product less than 20% water by weight? Y or N

Required documentation includes one of the following:
1. Green Seal certification
2. Full disclosure of all the product ingredients (active and inert)

If the above questions are answered "Yes" and required documentation is submitted then the product meets secondary attribute number 2.

Does the product meet secondary attribute number 2? Yes or No
If yes please award one point on the designated line. _____

3. Automatic Dispensing Systems

1. Does the manufacturer/ vendor offer automatic dispensing systems that reduce worker exposure and promotes proper dilutions? Y or N

Required documentation:

1. Manufacturers/ vendors must provide a description of the equipment offered and information on the features that reduce worker exposure and promote proper dilution.

If the above question is answered "Yes" and required documentation is submitted then the product meets secondary attribute number 3.

Does the product meet secondary attribute number 3? **Yes or No**
If yes please award one point on the designated line. _____

4. Aerosol Cans

1. Is the product offered in a non-aerosol container? Y or N

Required documentation:

1. Attachment A – include details of refillable/ rechargeable pump spray bottle if applicable

If the above question is answered "Yes" and required documentation is submitted then the product meets secondary attribute number 3.

Does the product meet secondary attribute number 4? **Yes or No**
If yes please award one point on the designated line. _____

5. Animal testing

Can the manufacturer of this product provide a statement on corporate non-animal testing policy? Y or N

Required documentation includes the following:

1. A company affidavit on corporate non-animal testing policies.

If the above question is answered "Yes" and required documentation is submitted then the product meets mandatory environmental attribute number 5.

Does the product meet the environmental secondary attribute number 5? **Yes or No**

6. Company Environmental Impact

1. Does the manufacturer of the product focus only on producing green cleaning products? Y or N
2. Is this product green seal certified? Y or N
3. Has the vendor/ manufacturer instituted a company policy to become more environmentally preferable such as using recycled content paper in things like brochures, pamphlets, etc. Or Energy Star (energy efficient) equipment? Y or N

Required documentation:

A description of the information described above on a separate piece of paper.

If at least two of the above questions are answered "Yes" and required documentation is submitted then the product meets secondary attribute number 5.

Does the product meet secondary attribute number 6? **Yes or No**
If yes please award one point on the designated line. _____

TOTAL AWARDED POINTS FROM SECONDARY ATTRIBUTES. _____

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Manufacturer Product Assessment Tool Section IV:

Packaging Content Form:

The primary packaging (packaging that directly contains the product excluding only the cap or lid) must be recyclable within campus recycling operations. However, the primary packaging may be refillable in lieu of recyclability only if the vendor/ manufacturer has implemented a program that encourages refilling already used containers.

1. Packaging contents:

Packaging Material	Total Recycled Content (%)	Post-Consumer recycled content (%)	Primary package Recyclable Y/N
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

1. Refillable Containers:

Describe all programs currently being implemented to encourage the reuse of product packaging/ containers. List any additional costs, expenses, or benefits that may be associated with the program. In addition, list all packaging associated with the product being bid that would be subject to this program. If necessary one may attach an additional one piece of post consumer recycled content paper to this sheet to describe the program in full.

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Manufacturer Product Assessment Tool Section V:

Overall Assessment Form:

Intent:

It is the intention of this document to provide the University employees responsible or associated with the purchasing and use of the product being bid with a synopsis of the product attributes. This document should directly reflect the answers associated in sections I-IV of the MPAT. Any discrepencies may prolong or terminate the purchasing process.

All vendors/ manufacturers must check off all applicable boxes as part of completing the bidding response.

In addition, sections I-IV of the Manufacturers Product Assessment Tool must be filled out in its entirety. All required documentation must be submitted simultaneously with the overall assessment form attached on top.

Vendor Name: _____
Contact Name:_____
Vendor Address:_____
City:_____ State: _____ Zip Code:_____
Phone: _____ Fax: _____ Email:_____

Manufacturer Name: _____
Contact Name:_____
Manufacturer Address:_____
City: _____State:_____ Zip Code:_____
Phone:_____ Fax:_____ Email:_____

Category of Product: (Please check all applicable)

__1. General Purpose Cleaner
__2. Bathroom Cleaner
__3. Glass Cleaner
__4. Carpet Cleaner
__5. Disinfectants
__6. Lime and Scale Remover
__7. Degreaser
__8. Solvent Spotter
__9. Floor Care

All of the following questions must be answered. Please print neatly.
Does this product meet all the applicable mandatory attributes? _____
How many points have been awarded based on secondary criteria (1-5)? _____
What is the product's pH? _____
Is this product associated with any other contract approval/ criteria approval that has been referenced in this document? For example, Green Seal 37, Massachusetts State contract approval, or Vermont State contract approval?

_____
_____

How many years has the vendor been in business? _____
How many years has the manufacturer been in business? _____

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Appendix A:

Mandatory Attributes Definitions and Explanations

Intent:

The following explanations are intended to further define the mandatory product attributes. It is the goal of appendix A to explain why these attributes are both essential and specifically defined.

Product Specific Health Requirements:

1. It is non-toxic to humans and aquatic life –it is not injurious to humans or aquatic life when used for its normal, intended use, and under normal conditions. Toxic chemicals are often associated with human health effects and ecological impacts, including death, cancer, damage to major organs, and interference with normal reproduction and development. All chemicals listed under the Emergency Planning and Community Right to Know Act Section 302 are considered extremely hazardous substances while chemicals listed under section 313 are considered highly toxic. Under this act chemicals can be added and deleted accordingly by the EPA. Chemicals can be confirmed as subjected or not to this act by calling 1-800-424-9346. Some chemicals have qualifiers meaning that if they are used, manufactured, or processed in specific forms they too are considered toxic. No chemical shall be used if under these conditions it is considered extremely hazardous or toxic. Often criteria used to classify chemical toxicity is based on previous animals testing such as follows:
    A. A chemical that has a median lethal dose (LD50) of more than 50 milligrams per kilogram but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
    B. A chemical that has a median lethal dose (LD50) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
    C. A chemical that has a median lethal concentration (LC50) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than two milligrams per liter but not more than 20 milligrams per liter of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

    However, the University of Colorado, Boulder wishes to discourage animal testing. In addition we wish to recognize the alternatives to animal testing for toxicity. See Appendix E, Toxicity Calculation, which supplements final product animal testing.

    Toxicity can also be determined by reviewing the product label and MSDS sheets. Hazardous chemicals that make up 1 percent or more of the product must be identified on the MSDS sheets. To reference lists of subjected chemicals see appendix C.

2. No known, probable, or suspected carcinogens, mutagens, or teratogens - The EPA, through a weight-of evidence approach, defines them as any agent that can cause cancer. Carcinogens that make up at least 1% are required to be listed on the MSDS sheets under SARA Title III. A mutagen is any agent such as ultraviolet light, a radioactive element, or chemical ingredient, which can induce or increase the frequency of mutation in an organism. The effect is hereditary and becomes part of the genetic pool passed on to future generations. Adverse effects can occur to the developing organism that result from exposure prior to conception, during prenatal development, or postnatally, to the time of sexual maturation. A teratogen is an agent that interferes with normal embryonic development without damage to the mother or lethal effect on the fetus. Effects are not hereditary. It includes any agent such as a virus, a drug, or radiation that adversely affects and causes malformations of a developing embryo or fetus. This information can be determined by reviewing the MSDS sheets.
   To reference lists of subjected chemicals see appendix C.
3. No Danger or Poison Warnings - Danger and poison warnings indicate a grave potential for human

health hazards and can easily be sought out on the product container. Danger warnings mean that a taste to a teaspoon is fatal if swallowed, inhaled, or absorbed through the skin of a one hundred and eight-pound man. Poisons indicate high toxicity and potential to harm humans and the environment.

4. Less irritating to skin and eyes - Skin and eye irritants can vary from temporary irritation to burns and blindness. The undiluted product must be tested, except when being distributed in an automatic dispensing system directly from the manufacturer/ vendor in which case the dispensing concentration may be tested, using OECD Guidelines for testing chemicals Section 4 using Human Skin Construct systems and the bovine opacity and permeability test after a ten minute exposure. No product that has the potential to be corrosive to the eyes, skin or mucous membranes, can cause serious eye or mucous membrane damage, or can burn the skin will be considered acceptable. Regular clothing must have the full ability to protect the employees using the product. Any product listed as a "severe irritants" shall be immediately rejected.
5. Neutral pH and high flash point – pH is used to measure a products acidity or alkalinity. By setting standards for a neutral pH potential risk for skin, eye, and lung irritants is lowered. In addition the potential for a hazardous waste characterization is lowered. Flash point regulations help to eliminate products that would be considered flammable or combustible. Any product that would be classified as flammable or combustible pose grave potential dangers to workers and are best avoided.
6. No product cleaners shall contain disinfectants – The University of Colorado, Boulder believes that disinfectants and cleaning products should remain two separate entities in order to ensure highest efficiency in disinfecting surfaces as well as avoiding unnecessary risks to the workers. For example, surfaces should be fairly cleaned before disinfecting in order to ensure effectiveness. In addition workers must carefully follow instructions when disinfecting an area such as allowing adequate contact time and using unsoiled rags in order to ensure proper disinfection. If either entity is ignored than toxic disinfectants can be unnecessarily overused. Additionally workers can be exposed to harmful vapors.

Product Specific Environmental Requirements:

1. It is readily Biodegradable – measures the amount of time it takes for large organic materials to break down into smaller organic materials. Readily biodegradable materials begin their breakdown immediately, harmlessly, and eventually breakdown into water, minerals, salts, carbon dioxide, and other oxides. Many products can be classified as biodegradable and may over a long period of time. However, time is imperative when considering the environmental impacts of these products. Our definition for readily biodegradable is excerpted from OECD's Harmonized Integrated Hazard Classification System For Human Health and Environmental Effects of Chemical Substance. The OECD, Organisation for Economic Co-Operation and Development, groups together 30 membering countries and has active relations with 70 other countries who share a commitment to democratic government and the market economy. They play an active role in fostering good governance in the public service and in corporate activity. Therefore, they produce internationally agreed instruments, decisions, and recommendations to promote rules of the game where multilateral agreement is necessary for individual countries to make progress in a globalized economy. The United States has been a member since April 12, 1961. Readily biodegradable can be determined by the following criteria. Substances that rapidly degrade can be quickly removed from the environment. A pass level in these tests can be considered as indicative of rapid degradation in most environments. Ready biodegradation can most easily be defined using the OECD biodegradability tests OECD Test Guideline 301 (A - F). However, a fail in this test does not mean it is not rapidly biodegradable. Thus a further criterion was added which would allow the use of data to show that the substance did actually degrade biotically or abiotically in the aquatic environment by >70% in 28 days. Thus, if degradation could be demonstrated under environmentally realistic conditions, then the definition of `rapid degradability' would have been met. Many degradation data are available in the form of degradation half-lives and these can also be used in defining rapid degradation. Where such data are not available, a BOD(5 days)(biological oxygen demand)/COD ratio (chemical oxygen demand) >0.5 is considered as indicative of rapid degradation according to the International Labour Organization. Primary biodegradation would not normally qualify in the assessment of rapid degradability unless it can be demonstrated that the degradation products do not fulfill the criteria for classification as hazardous to the aquatic environment. (15) Biodegradability can be determined most easily by a label on the container.

2. Low Phosphate Content – Increased phosphate concentrations can lead to algae bloom and plant growth. Phosphorous is a plant nutrient and by adding excess to natural water ecosystems a disproportionate plant growth causes oxygen to be depleted and aquatic life to die. Phosphate concentrations as low as 0.050 mg P/L (ppm) or 50.0 micrograms P/L (ppb) will produce exponential growth of green algae in 96 hours Freshwater green algae are clearly the most sensitive group of aquatic organisms to phosphate additions to water. A phosphate concentration of 0.5% by weight or less is environmentally sound. 0.5% allows for some natural residue phosphates but eliminates added phosphates in products. (14)
3. No more than 10% Volatile Organic Compounds – which are emitted as gases from certain solids or liquids. Concentrations of VOC's are consistently higher indoors (up to ten times) than outdoors and the EPA's Total Exposure Assessment Methodology studies found that while people used VOC's they can expose themselves and others to very high pollutant levels, and elevated concentrations can persist in the air long after activity is completed. They have adverse health effects including irritation of the eyes, nose, and throat; headaches, loss of coordination, and nausea; damage to liver, kidney, and central nervous system. Some VOC's are suspected or known to cause cancer in humans. (13) Any concentration of the product measured over 10% by weight of the product will be considered too high, and lower percents are most desirable. Based on a review of available products, 80% of products are able to meet a 10% standard. (14)
4. Product is contained in recyclable/ refillable containers – by using post consumer recycled material in packaging or by reusing containers material waste sent to landfills is reduced lessening environmental impacts. The manufacturing of different plastics also has a wide scope of environmental concerns that were considered. Green Seal research indicated the most common packaging for industrial and institutional cleaners was plastic, more specifically, HDPE followed by PET. High-density polyethylene (HDPE) and polyethylene terephthlate (PET) are the most commonly recycled plastics and will be considered most desirable. Polyvinyl chloride (PVC) has the most detrimental impacts during its manufacturer because it depends on a vinyl chloride monomer, which is a known human carcinogen. In addition, vinyl chloride and ethylene dichloride which are suspected carcinogens are released during manufacturing. In addition, PVC is not readily recyclable. Therefore, PVC is the least desirable plastic.

Product Specific Ingredient Requirements:

1. No SARA Title III Chemicals – are considered hazardous to human health and have detrimental environmental affects. Each chemical is subjected to an analysis of their acute affects, chronic (non-cancer) affects, developmental, reproductive, liver, kidney, gastrointestinal, neurological, hematological, cardiological, immunological, respiratory, miscellaneous (like thyroid and spleen), carcinogenecity, and environmental impact. Chemicals subjected to Section 302 are considered hazardous chemicals. Hazardous chemicals as defined by the EPA "are capable of producing fires and explosions or adverse health effects like cancer and dermatitis." Chemicals subjected to Section 313 are considered toxic chemicals. A toxic substance defined by the EPA is "a chemical or mixture that may present an unreasonable risk of injury to health or the environment." For a list of chemicals subjected to SARA Title III reporting and the toxicity data reference http://www.epa.gov/tri/chemical/hazard_categories.pdf or for additional information see appendix C.
2. No EDTA and NTA – are builders that are used to soften water and increase the cleaning power of surfactants. The surfactants are the active ingredients in the cleaner that perform the main cleaning function. However, these ingredients pose serious environmental and health hazards. They are not biodegradable and are suspected carcinogens. As an alternative, sodium carbonate, sodium bicarbonate, sodium citrate, and sodium cilicate are used as builders. These ingredients are less hazardous to both humans and the environment. NTA (CAS # 139-13-9) is a recognized carcinogen under California's Safe Drinking Water and Toxic Enforcement Act.
3. No Alkylphenol Ethoxylates – APE's are not readily biodegradable. In addition, data continues to increase that depict APE's as known and probable endocrine disrupters. Their effects have been demonstrated in aquatic life.
4. No chlorine bleach - Chlorine containing bleach can be toxic and carcinogenic when reacting with other chemicals. For example, studies indicate that chlorine reacts with phenol at trace concentrations levels in aqueous environmental matrices and this reaction can readily occur without any catalysts. Phenol is a major class of pollutants often found in wastewater. Chlorophenols are highly toxic to

humans and most aquatic species. (11) In addition, chlorine gas can include acute inflammation of the conjunctivae, nose, pharynx, larynx, trachea, and bronchi. (12)

5. No Phenolic compounds – (16) Phenol compounds are considered highly toxic. Phenol is regulated under eight different federal laws due to its toxicity. The programs include: The Occupational and Safety Health Act, Extremely Hazardous substances under the Superfund Act, Clean Air Act, Resource Conservation and Recovery Act, Clean Water Act, Federal Insecticide, Fungicide, and Rodenticide Act, and Toxic Release Inventory. (17)
6. No petroleum or petrochemical compounds including glycol ethers and petroleum derived surfactants – Both petroleum and petrochemical compounds are derived from non-renewable resources and their extraction and manufacturing contribute to severe environmental impacts. The manufacturing of both chemical compounds leads to VOC levels rising in the lower atmosphere causing photochemical smog. In addition, the manufacturing of both products is extremely energy intensive. Petroleum derived chemicals more significantly result in hydrocarbon air emissions, oil and dissolved-solids wastewater discharges and solid and hazardous waste. Petroleum derived ingredients most significantly impact the environment by releasing hydrocarbon air emissions and water emissions that include oil, grease, and dissolved solids.
7. No Ozone Depleting Chemicals as defined the Montreal Protocol – Reduction in ozone layers will lead to higher levels of UVB (a type of ultraviolet light) reaching the Earth's surface. UVB has several harmful effects and is particularly effective at damaging DNA. Studies show that UVB causes nonmelanoma skin cancer, dramatically contributes to malignant melanoma development, and is linked to cataracts. (10) On September 16th, 1987 at the Headquarters of the International Civil Aviation Organization in Montreal the agreement was adopted to create strong measures to reduce the production and consumption of a number of CFCs and several Halons (recognized ozone depleting chemicals). There are currently 96 chemicals controlled by the Montreal Protocol. See appendix C to reference the most current list.
8. No product may contain any of the following eleven designated ingredients – The University of Colorado's Green Cleaners Purchasing Program has designated these eleven ingredients based on their acute and chronic health effects, environmental impacts, applicable federal regulations, and an overall assessment of the potential dangers linked to this chemical. The following eleven chemicals have been labeled unacceptable because of the hazards they pose. For detailed information on each chemical please see appendix B.
9. No heavy metals – Exposure to heavy metals has adverse health affects such as a link to developmental retardation, various cancers, kidney damage, and even death in some instances of exposure to very high concentrations. Exposure to high levels of mercury, gold, and lead has also been associated with the development of autoimmunity, in which the immune system starts to attack its own cells, mistaking them for foreign invaders, this can lead to diseases developing within joints, kidneys, circulatory system, and central nervous system. Heavy metals do not readily biodegrade and can last in the environment for hundreds of years. Certain heavy metals, like lead, are highly toxic even at very low levels. Lead in particular is toxic to the brain, kidneys, reproductive system and cardiovascular system.

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Appendix B:
Commonly Found Hazardous Ingredients:
Intent: It is the intention of this document to provide the preliminary information used when accessing potential ingredients. After reviewing numerous chemicals these ingredients have been deemed too potentially hazardous to be considered acceptable in anything beyond a trace amount. In addition, the Department has chosen to display only the adverse health affects of the chemicals as substantiated by government organized websites, specifically New Jersey's Department of Health and Senior Citizens at http://www.state.nj.us/health/eoh/rtkweb/, National Institute for Occupational Safety and Health at http://www.cdc.gov/niosh/homepage.html, and the Department of Interior at http://www.doi.gov/greening/sustain/trad.html. Although, the recommendations and standards may not be the same the adverse health affects and chemical characteristics are verified.

Chemical Name/ CAS#	Eye Irritant	Skin Irritant	Nose/ Respiratory Irritant	Carcinogen	Highly Flammable	Additional Effects
Acetone 67-64-1	X	X	X		X	May cause dizziness
Alkoxylated Linear Alcohol 68987-81-5	X	X	X			May cause birth defects
Benzyl Alcohol 100-51-6	X	X	X	X		Poisonous by ingestion
2-Butoxyethanol 111-76-2	X	X	X			Causes central nervous depression
Ethanolamine 141-43-5	X	X	X			Can cause burning and asphyxiation
Limonene 138-86-3	X	X	X			May cause kidney damage
Perchloroethylene 127-18-4	X	X	X	X		Liver and kidney damage
Phosphoric Acid 7664-38-2	X	X	X			Causes nausea & vomiting
Polyethylene Monophenyl Ether 26027-38-3	X	X				Endocrine disruptor
Sodium Hydroxide 1310-73-2	X	X	X			May permanently harm digestive tract
Sodium Hypochlorite 7681-52-9	X	X	X			Ingestion can cause fall in blood pressure, delirium, and coma

For more detailed information see following information specific to each chemical.

Acetone:
CAS #: 67-64-1
A.K.A: 2-Propanone

Acute Health Effects:
- Contact can irritate the skin characterized by redness, dryness, and inflammation
- Exposure can irritate eyes characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury
- Can cause nose and throat irritation
- Exposure to high concentration can cause dizziness, lightheadedness, and passing out

Chronic Health Effects:
- Not tested for cancer
- Potential Reproductive affects
- Repeated skin exposure can cause dryness and cracking of the skin, and/or dermatitis
- Ingestion may cause irritation of the digestive tract, central nervous system depression, kidney damage, and liver damage
- This chemical has not been adequately evaluated to determine whether or not brain or nerve damage could occur with repeated exposure. However many solvents and other petroleum based chemicals have been shown to cause such damage. Effects may include reduced memory and concentration, personality changes (withdraw, irritability), fatigue, sleep disturbances, reduced coordination, and/or effects on nerves supplying internal organs (autonomic nerves), and/or nerves to the arms and legs (weakness, "pins and needles")

Regulated Under:
- Occupational and Safety Health Act (OSHA)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), (Superfund)
- Federal Insecticide, and Rodenticide Act (FIFRA)
- California Occupational and Safety Health Act
- California Assembly bill 2588 California Air Toxics "Hot Spots" Chemicals

Environmental Impacts:
- Acetone is a solvent that emits volatile organic compounds.
- High levels of VOC's which help create smog and poor indoor air quality
- Flash point of -18 C (-0.4F)
- Highly flammable
- The vapor is heavier then air and may travel along the ground; distant ignition is possible
- Can form explosive peroxides on contact with strong oxidants such as acetic acid, nitric acid, and hydrogen peroxide. Reacts with chloroform and bromoform under basic conditions, causing explosion and fire.

Alkoxylated linear alcohol:
CAS #: 68987-81-5
37251-67-5
A.K.A: Ethoxylated alcohol
Acute Exposure:
- Can cause eye irritation, severe burns, severe destruction and blindness. Liquid, fumes, mists, or vapors may cause irritation, including stinging, tearing, and redness
- May cause severe skin burns or irritation
- May cause severe burns or irritation to mouth, throat, and stomach. Nausea, pain, and vomiting may occur. Depending on amount swallowed, holes in the intestinal tract, kidney inflammation, shock, and death can occur.
- May cause irritation of throat, lungs, and respiratory system with burning, choking, coughing headaches, and rapid heartbeat.

Chronic Exposure:
- Irritation of skin and dermatitis
- Carcinogen
- May cause birth defects or other reproductive harm

Regulated Under:
- Occupational and Safety Health Act (OSHA)

Benzyl Alcohol
CAS # 100-51-6
A.K.A: Benzenemethanol
Acute Exposure:
- Vapors cause irritation of the respiratory system.
- Causes skin irritation**,** severe eye irritation including redness and pain.

Chronic Exposure:
- Suspected neurotoxicant, and liver toxicant
- Prolonged and/or repeated contact may cause defatting of the skin, dermatitis, redness and pain. May be harmful if absorbed through the skin. Contact with the skin may cause a local anesthetic effect.
- May cause severe gastrointestinal tract irritation with nausea, vomiting and possible burns. May be harmful if swallowed.

Regulated Under:
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

Environmental Impacts: (23)
- This substance is toxic to aquatic organisms.
    - It is combustible
    - Flashpoint of 93 C (199.4F)
- Reacts with strong oxidants.
- Attacks some forms of plastics.
- On combustion, it forms toxic gases including carbon monoxide

2-Butoxyethanol
CAS #: 111-76-2
A.K.A: Ehtylene Glycol Monobutyl ether
Acute Exposure:
- Mouth, nose, throat, and eye irritant
- May cause blood in urine
- Can cause headache, dizziness, lightheadedness, confusion, and passing out

Chronic Exposure:
- Not tested for cancer hazard
- May damage developing fetus, liver, and kidney
- May cause testicular atrophy
- May affect the lungs. It is unknown whether it causes lung damage

Regulated Under:
- Occupational and Safety Health Act (OSHA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
- California Occupational and Safety Health Act
- California Assembly Bill 2588: California Air Toxics “Hot Spots” Chemicals

Environmental Impacts:
- This chemical can form explosive peroxides.
- Reacts with strong oxidants causing fire and explosion hazard.
- Flash point of 60 C (140F)
- Combustible

Ethanolamine
CAS #: 141-43-5
A.K.A: 2-Aminoethanol
Acute Exposure:
- Severe irritation and burn to the skin and eyes with possible permanent eye damage
- Considered a severe eye irritant; corrosive

- Inhalation can irritate nose, throat and lungs causing coughing, wheezing, and or shortness of breath

Chronic Exposure:
- Not tested for cancer hazard
- Limited evidence that it is a tetragon in animals, and should be treated as such until more tests are done.
- May cause skin allergy
- Can irritate the lungs
- Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath
- May damage the liver and kidneys
- High exposure may affect the nervous system characterized by headache, dizziness, unconsciousness and coma
- Ingestion may cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns.
- Aspiration may lead to pulmonary edema
- May cause central nervous system depression and asphyxiation

Regulated Under:
- Occupational and Safety Health Act (OSHA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
- California Occupational and Safety Health Act

Environmental Impacts:
- It is considered minimally toxic to upland game birds, bobwhite quail, as well as fish and aquatic invertebrates. (26)
- Combustible liquid
- Flash point of 85 C (185 F)
- The substance decomposes on heating and on burning producing toxic and corrosive gases including nitrogen oxides.
- Reacts with cellulose nitrate causing fire and explosion hazard.
- Reacts violently with strong acids and strong oxidants.
- Attacks copper, aluminum and their alloys, and rubber.

Limonene

CAS #: 138-86-3

A.KA: Dipentene

Acute Exposure:
- Skin and eye irritant
- May affect the amount and activity of different liver enzymes, liver weight, cholesterol levels, and bile flow

Chronic Exposure:
- Damage to kidneys and renal tumors
- Causes skin allergy

Regulated Under:
- Federal Insecticide, Fungicide, and Rodenticide Act

Environmental Impact:
- In the atmosphere, limonene and other terpenes react rapidly with photo chemically produced hydroxyl and nitrate radicals and ozone. The oxidation of terpenes such as limonene contributes to aerosol and photochemical smog formation.
- In soil, limonene is expected to have low mobility; in the aquatic environment, it is expected to bind strongly to sediment. Limonene is resistant to hydrolysis. Biodegradation occurs under aerobic, but not anaerobic, conditions.
- It is insoluble in water
- It is considered slightly toxic to freshwater invertebrates. (27)
- Flash point of 45 C (113 F)
- It is combustible liquid
- Poisonous gases are produced in fire. (28)
- Is insoluble in water.

Perchloroethylene

CAS #: 127-18-4

A.K.A: Tetrachloroethylene
Acute Exposure:
- May affect human nervous system including dizziness, fatigue, headaches, sweating, uncoordination, and unconsciousness
- May irritate skin, eyes, nose, and throat

Chronic Exposure:
- Liver and kidney damage
- Memory loss and confusion
- Recognized carcinogen
- Considered a poison

Regulated Under:
- Occupational and Safety Health Act (OSHA)
- Clean Air Act (CAA)
- Resource Conservation and Recovery Act (RICRA)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Superfund)
- Clean Water Act (CWA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
- Toxic Release Inventory Chemicals
- California Occupational and Safety Health Act
- California Assembly Bill 1807: Toxic Air Contaminants
- California Assembly Bill 2588: California Air Toxics "Hot Spots" Chemicals
- California Proposition 65: Known Carcinogen and Reproductive Toxicants
- California Safe Drinking Water Act

Environmental Impact:
- Perchloroethylene can contribute to the formation of photochemical smog when it reacts with other VOC's in the air.
- This substance is toxic to aquatic organisms and may cause long term effects in the aquatic environment. (23)

Phosphoric Acid
CAS #: 7664-38-2
Acute Exposure:
- Contact can severely irritate and burn the skin and eyes leading to permanent damage; corrosive
- Inhalation can irritate the nose, lungs, and throat causing coughing and wheezing

Chronic Exposure
- Not tested for cancer and reproductive hazard
- Repeated exposure can cause bronchitis to develop with cough, phlegm and shortness of breath
- May cause dryness and cracking of the skin

Regulated Under:
- Occupational and Safety Health Act (OSHA)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Superfund)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
- California Occupational and Safety Health Act
- California Assembly Bill 2588: California Air Toxics "Hot Spots" Chemicals

Environmental Impacts:
- Generally disassociate and release hydrogen ions in the environment, thus increasing the pH of soil or water.
- Diluted or undiluted if this comes into contact with birds, it causes severe dermal toxicity to areas not covered with feathers.
- Causes a potential hazard to the entire aquatic environment, due to its ability to alter pH levels, which can cause serious adverse effects on fish. (29)
- Not combustible
- Attacks many metals forming a flammable/ explosive hydrogen gas.
- Reacts violently with basis. (28)

Polyethylene Monophenyl Ether
CAS #: 26027-38-3
A.K.A: Nonoxynol
Nonoxynol –1, -2, -3, 4, -5,-6,-7, and –8 are Alkyphenol Ethoxylates. (30)
Acute Exposure:
- Skin and Eye Irritant

Chronic Exposure:
- Suspected endocrine disrupter mostly suspected for nonoxynol 9 & 30

Regulated Under:
- Toxic Substances Control Act (TSCA)

Environmental Impacts:
- Can exert an estrogenic affect

Sodium Hydroxide
CAS #:1310-73-2
A.K.A: Caustic soda
Acute Exposure:
- Ingestion causes severe pain, nausea, vomiting, diarrhea, and shock
- Inhalation Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma.
- Causes chemical burns to the respiratory tract.
- Causes skin burns. May cause deep, penetrating ulcers of the skin May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color.
- Causes eye burns. May cause chemical conjunctivitis and corneal damage.

Chronic Exposure:
- Prolonged or repeated skin contact may cause dermatitis. Effects may be delayed.
- Causes gastrointestinal tract burns. May cause perforation of the digestive tract.
- May cause severe and permanent damage to the digestive tract
- May cause corrosion and permanent tissue destruction of the esophagus and digestive tract. May cause systemic effects. Irritation may lead to chemical pneumonitis and pulmonary edema.

Regulated Under:
- Occupational and Safety Health Act (OSHA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
- Comprehensive Environmental Response, Componsation, and Liability Act(CERCLA) (Superfund)
- California Occupational and Safety Health Act
- California Air Toxics “Hot Spots” Chemical s (Assembly Bill 2588)

Environmental Impacts:
- May be hazardous to the environment, special attention should be given to water organisms.
- This substance is a strong base, it reacts violently with acid and is corrosive in moist air to metals l like zinc, aluminum, tin, and lead forming a combustible/ explosive gas.
- Reacts with ammonium salts to produce ammonia, causing fire hazard.
- Absorbs carbon dioxide and water from the air. (23)

Sodium Hypochlorite
CAS #: 7681-52-9
Acute Exposure:
- Can severely irritate and burn the skin and eyes with possible eye damage; corrosive
- Inhalation can irritate nose, throat, and lungs causing coughing and/or shortness of breath.

Chronic Exposure:
- Higher exposures can cause pulmonary edema
- No testing for cancer or reproductive hazard
- May cause bronchitis to develop with cough phlegm and/or shortness of breath

Regulated under:
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Superfund)
- California Occupational Safety and Health Act

Environmental Impacts:

- Toxic to aquatic organisms
- The substance decomposes upon heating, on contact with acids, and under influences of light producing toxic and corrosive gases including chlorine.
- It is a strong oxidant and reacts violently with combustible and reducing materials causing fire and explosion hazards.
- In water it is a string base and reacts violently with acid and is corrosive.

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Appendix C:

Comprehensive List of Applied Definitions:

Intent: It is the intention of this document to clearly define any terms or phrases applied within the above documentation. This is not intended to be an all encompassing list. However, it is meant to help facilitate a clearer understanding of the criteria depicted for the University of Colorado's Chemical Cleaner Preferable Purchasing Program.

Definitions: (In alphabetical order)

1. Attribute - A quality or characteristic inherent in or ascribed to someone or something. In this case attributes are applied to the different types of chemical cleaners.
2. Biochemical Oxygen Demand (BOD) - the weight of oxygen taken up mainly as a result of the oxidation of the constituents of a sample of water by biological action; expressed as the number of parts per million of oxygen taken up by the sample from water originally saturated with air, usually over a period of five days at 20 degrees centigrade. A standard means of estimating the degree of contamination of water.
3. Bovine opacity and permeability test – was developed as an alternative to the Draize rabbit eye irritation test to serve as an in vitro test experience assessing the attraction of certain chemical compounds or microorganisms to the eye area. (34)
4. Bathroom cleaner – this category includes products used to clean hard surfaces in a bathroom such as counters., walls, floors, fixtures, basins, tubs, and tile. It includes products that are required to be registered under the federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), such as disinfectant and sanitizes, but does not include products specifically intended to clean toilet bowls. (38)
5. Carcinogen – any agent that can cause cancer. Carcinogens are defined as those chemicals listed as known, probable, or possible human carcinogens by: 1) the International Agency for Research on Cancer (IARC) Group 1, 2A, or 2B; 2) the National Toxicology Program (NTP); 3) the U.S. Environmental Protection Agency Group A, B, or C; or 4) the National Institute for Occupational Safety and Health. To obtain a list of chemicals refer to appendix D.
6. Carpet Cleaner – products used for routine cleaning of carpets and other textile floor coverings. They should specify the appropriate maintenance method, such as extraction cleaning, shampooing, absorbent powder etc. (38)
7. Concentrate – a product that contains less than 20% water by weight.
8. Disinfectant – EPA registered agents used to disrupt or irreversibly inactivate infectious fungi, virus, and bacteria, but not necessarily their spores. (38)
9. Endocrine disrupters - An endocrine disrupter is a synthetic chemical that when absorbed into the body either mimics or blocks hormones and disrupts the body's normal functions. This disruption can happen through altering normal hormone levels, halting or stimulating the production of hormones, or changing the way hormones travel through the body, thus affecting the functions that these hormones control. Chemicals that are known human endocrine disrupters include diethylstilbestrol (the drug DES), dioxin, PCBs, DDT, and some other pesticides. Many chemicals, particularly pesticides and plasticizers, are suspected endocrine disrupters based on limited animal studies.
10. Environmentally Preferable – Environmentally preferable are those products or services, which demonstrate a lesser impact on human health and the natural environment in comparison to market competitors. These products may contain less harmful ingredients, be less energy intensive, and minimize waste.
11. Eutrophication - Having waters rich in mineral and organic nutrients that promote a proliferation of plant life, especially algae, which reduces the dissolved oxygen content and often causes the extinction of other organisms. Used of a lake or pond. (32)
12. Flash point - is the lowest temperature at which a liquid can form an ignitable mixture in air near the surface of the liquid. The lower the flash point, the easier it is to ignite the material.
13. General Purpose Cleaner – This category includes products used to clean windows, glass, and polished surfaces including impervious flooring such as concrete or tile. It does not include cleaners intended primarily for the removal of rust, mineral deposits, or odors. It does not include products intended primarily to strip, polish, or wax floors and it does not include cleaners intended primarily for cleaning toilet bowls, dishes, laundry, glass, carpets, upholstery, wood, or polished surfaces. This category does

not include any products required to be registered under FIFRA, such as those making claims as sterilizers, disinfectants, or sanitizers. (38)

14. Glass cleaners – This category includes products used to clean windows, glass, and polished surfaces. This category does not include any products required to be registered under FIFRA, such as those making claims as sterilizers, disinfectants, or sanitizers. (38)
15. Green Seal - Green Seal is an independent, non-profit organization that strives to achieve a healthier and cleaner environment by identifying and promoting products and services that cause less toxic pollution and waste, conserve resources and habitats, and minimize global warming and ozone depletion. Green Seal has no financial interest in the products that it certifies or recommends nor in any manufacturer or company. Green Seal's evaluations are based on state-of-the-art science and information using internationally recognized methods and procedures. Thus, Green Seal provides credible, objective, and unbiased information whose only purpose is to direct the purchaser to environmentally responsible products and services.
16. Green Cleaners – For the purpose of this document, green cleaners are products that utilize advancements to reduce health risks and environmental impacts and have established product standards by acquiring Green Seal certification or certification through the University's MPAT.
17. Human Skin Construct systems – use an in vitro three-dimensional human skin model to test the corrosion abilities of different chemicals. The skin construct must be able to demonstrate appropriate barrier properties, for example maintaining a barrier to non-corrosive materials, and also able to respond appropriately to corrosive materials and can be purchased commercially or can be developed in a testing laboratory. (35)
18. In vitro - outside the living body and in an artificial environment (31)
19. In vivo - in the living body of a plant or animal, in a real-life situation (31)
20. Ingredient – Any constituent of a product that is known to be added or a part of a product by at least 0.01% by weight. (38)
21. Mandatory Attributes – A mandatory attribute must be met in full in order to be considered eligible for contract. Any incomplete response, i.e. failure to submit required documentation or failure to answer questions in full, will result in non-compliance with the regulation a rejection of the product.
22. Mutagens - are any agent that can induce or increase a mutation within an organism.
23. MSDS – Material Safety Data Sheets provide information concerning a hazardous chemical as prescribed by law. The information describes precautionary measures a user should take during the manufacturing, use, and disposal of the chemical in order to ensure the healthiest and safest conditions.
24. Ozone Depleting Compound – any compound that has the potential to deplete the ozone greater than 0.01 (CFC 11 = 1) (38)
25. Post consumer materials – as defined by the EPA refers to a material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. "Post-consumer material" is part of the broader category of "recovered material."
26. Primary Packaging – the packaging that directly contains the desired product with exception only to the lid and/ or cap.
27. Sanitizers – EPA registered products agents used to reduce, but not necessarily eliminate microorganisms to levels considered safe to public health codes and regulations. (38)
28. Secondary Criteria – Secondary criteria are not mandatory regulations, however compliance with these regulations will be used to gage a product's desirability. In addition, points will be awarded to the products that demonstrate compliance within each subcategory.
29. Surfactants - a substance capable of reducing the surface tension of a liquid in which it is dissolved (33)
30. Teratogens - include any agent that cause damage during reproductive development without harm to the mother or a lethal affect on the fetus as listed by the State of California under the Safe Drinking and Toxic Enforcement Act of 1986. Often they are referred to as reproductive toxins.
31. Trace Amount - A constituent, such as a chemical compound or element, present in quantities less than a standard limit. In this case the standard limit is 1.0% and then must be listed on the MSDS.

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Appendix D:

Vendor/ Manufacturer References

Intent: It is the intention of this document to provide an additional list of references that may aid the manufacturer/ vendor when responding to the mandatory and secondary attributes. However, these references are not considered by University of Colorado to be completely comprehensive. It is the responsibility of the manufacturer/ vendor to do any additional research that may be necessary to best complete the criteria. For example, to seek the most updated versions of EPA listings, etc.

Required Documentation:

1. Green Seal:
   A. General information - www.greenseal.org
   B. List of Certified Products - http://www.greenseal.org/certproducts.htm
   C. GS-37 outline - http://www.greenseal.org/standards/industrialcleaners.htm
   D. List of All Standards - http://www.greenseal.org/standards.htm#environmental
2. Massachusetts State Contract for Environmentally preferable cleaning products –
   General Information - http://www.mass.gov/epp/products/cleaning.htm
   Entire Policy - http://www.newdream.org/procure/products/MassRFP.pdf
3. Vermont State Contract for Environmentally Preferable Purchasing -
   http://www.bgs.state.vt.us/pca/enviro.htm

Product Specific Health Requirements Related Sites:

1. Organisation for Economic Co-operation and Development: http://www.oecd.org Search – Chemical guidelines to obtain a copy of the regulations. Section three addresses biodegradability. Section four will provide the health requirements, specifically skin/ eye irritation.
2. The following links access lists of known, probable, or possible carcinogens, mutagens, and teratogens.
   A. International Agency for Research on Cancer (IARC) -
   Go to - http://monographs.iarc.fr/
   Select classifications tab on left section of screen. Classification groups 1, 2A, and 2B are considered carcinogens according to this document.
   B. National Toxicology Program: Annual report on Carcinogens - http://ntp-server.niehs.nih.gov/
   Reference Public Health section seclect the Report of Carcinogens and view most recent report.
   C. Environmental Protection Agency : Office of Pesticide Programs List of Chemicals Evaluated for Carcinogenic Potential
   To obtain a paper copy (no electronic copies are currently available) of the above document visit the website listed below or send an email to lormand.mary-jean@epa.gov or williams.julia@epa.gov
   http://www.epa.gov/pesticides/carlist/
   D. National Institute for Occupational Safety and Health - http://www.cdc.gov/niosh/npotocca.html
   E. State of California, Environmental Protection Agency, Office of Environmental Health Hazard Assessment, The Safe Drinking Water and Toxic Enforcement Act of 1986
   http://www.oehha.ca.gov/prop65/prop65_list/files/P65single070904.pdf
   F. Organization for Economic Cooperation and Development (OECD) Harmonized Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures: Chapter 2.5 Harmonized System for the Classification of Chemicals which Cause Mutations in Germ Cells. ENVJ/JM/MONO (2001)6
   Website: http://www.oecd.org/dataoecd/48/51/37182285.pdf
3. Human Skin Construct Systems: The Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM) http://iccvam.niehs.nih.gov/methods/ps/ps044510/pssect3.pdf
4. Biocides requiring EPA registration as a pesticide -
   A. http://www.epa.gov/pesticides/biopesticides/ingredients/index.htm
   B. http://www4.law.cornell.edu/uscode/7/ch6.html (FIFRA)

Product Specific Environmental Requirements Related Sites:

1. Organisation for Economic Co-operation and Development: http://www.oecd.org Search – Chemical guidelines to obtain a copy of the regulations. Section three addresses biodegradability.

Product Specific Ingredient Requirements Related Sites:

1. SARA Title III Sections 302 (extremely hazardous substances) and 313(toxic chemicals) –
   A. All encompassing list - http://www.epa.gov/tri/chemical/hazard_categories.pdf
   B Section 313 - http://www.epa.gov/tri/chemical/RY2003ChemicalList.pdf
   C. Toxicity Data - http://www.epa.gov/tri/chemical/hazard_categories.pdf
2. Montreal Protocol –
   A. Contains a complete list of chemical subject to restriction - http://www.unep.org/ozone/pdfs/Montreal-Protocol2000.pdf
   B. Overall information - http://www.unep.org/ozone/Treaties_and_Ratification/2B_montreal%20protocol.asp
3. Code of Practice of the International Fragrances – http://www.ifraorg.org/GuideLines.asp

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Appendix E:

Toxicity Calculation:

The University of Colorado will evaluate the toxicity of a product if toxicity data for each of the product ingredients exists.

The toxicity values are adjusted by the weight of the ingredient in the product and summed using the following formula:

$$TP = \left[\sum_{I=1}^{n} wti/Tv_i \right]^{-1}$$

Where,

TP = toxicity of the product
wti = the weight fraction of the ingredient
TV = the toxicity value for each ingredient (LD50, LC50)
n = number of ingredients

For example, a product containing 5% alkylpolyglycoside, 10% sodium silicate, and 85% water would be compared to the oral toxicity cutoff criterion using:

$$TP = \{\underline{0.05} + \underline{0.1}\}_{-1}$$
$$\{5{,}000 \quad 1{,}280\}$$

Chemical	LD50 (oral)[1] Mg/kg	wt %	LD50 (oral) mg/kg
alkylpolyglycoside	>5,000	5	100,000[2]
sodium silicate	1,280	10	12,800
TP			11,300

Assumed an LD50 of 5,000 for purposes of the example.

The cutoff criterion is 2,000 mg/kg, and the toxicity of the product is 11,300 mg/kg. Therefore, the example product complies with the oral toxicity criterion.

Exemptions from toxicity testing:

Inhalation toxicity will not be required for any compound with a vapor pressure of 1 mmHg or less.

If inhalation test data are not available, an inhalation LC50 may be estimated using the following formula.

$$LC_{50} = \frac{LD_{50,oral} \text{ X } ABS \text{ X } BW}{ABS_{inh} \text{ X } R \text{ X } ET \text{ X } CF}$$

Where,

LD50,oral = the single dose LD50 for the oral pathway (mg/kg)
ABSGI = the gastrointestinal absorption rate, (unitless)
ABSinh = the inhalation absorption rate, (unitless)
R = the respiration rate for the experimental animal (L/min)
ET = the exposure time (hours)
CF = the conversion factor (60 min/hr)
BW = the body weight of animal (kg)

If data are not available, The University of Colorado will use the EPA Region IV recommended gastrointestinal absorption factor of 0.8 for VOCs and 0.5 for semivolatile organic compounds. The University of Colorado will use an inhalation absorption rate of 1.0 for all organic compounds. The average weight of a rat is 0.35 kg and its respiration rate is 0.14 L/min. The exposure period is 4 hours.

In order to perform this estimate, the LD50 value **must** be based on a single dose.

This formula is taken from the Massachusetts' Request for Response GRO16 Appendix II.

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Appendix F:

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   Website for list of subjected chemicals - http://yosemite.epa.gov/oswer/ceppoweb.nsf/vwResourcesByFilename/title3.pdf/$File/title3.pdf
   Web access: www.epa.gov Search – EPCRA, Select – 'Chemical Information" → "Title III Consolidated List of Lists - October 2001 Version"
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Environmental Services Cleaning Solutions Toxicity Assessment

Acronyms: NA: Not applicable, NE: Not established, N/I: MSDS says no information available, n/i: No information (either not addressed on MSDS, or in the case of the hzrds. Ingredients toxicity information the database has no health information)

			HMIS/ NFPA Rating										Hazardous Substances:	Environmental Regulations			
Type of Cleaner	**Rank**	**GS Cert.**	**Health**	**Fire**	**Reactivity**	**pH Conc.**	**pH Diluted**	**Flash Point**	**Ventilation Required**	**SARA Title III**	**Incompatibility**	**Effects of Acute Over Exposure**	**Gastrointestinal/ liver toxin = G, Neurotoxin = N, Respiratory= R, Cardiovascular/ Blood= B, Endocrine= E, Skin/ Sense Organ=S, Teratogen = T, Developmental= D, Kidney=K, Musculoskeletal (M)**	**% volatile by Vol.**	**Waste Disposal Method (conc.)**	**Concentrated**	**MSDS Date**
Categories Applicable to Green Seal Standards (37&34) :													**Effects of Chronic Over Exposure**				
General Purpose Cleaners		**37**															
Spartan Green Solutions All Purpose Cleaner		yes	2	0	0	7.0-8.0	n/i	> 212F	general to local		strong oxidizers	causes eye irritation: redness, swelling, and tearing.					6.30.05
Spartan Clean On The Go hdqC2 [2]		yes	3	0	0	6.0-7.0	n/i	> 212F			strong oxidizers	Corrosive. Irreversible eye damage skin burns. May be FATAL if absorbed through the skin.	Combustion products are toxic.				12.14.05
Spartan Tribase Multi-Purpose Cleaner		yes	2	0	0	8.0-9.0	n/i	> 212F			none known	causes eye irritation: redness, swelling, and tearing.	Combustion products are toxic.		local author.		11.30.05
Spartan Clean by Peroxy		no	2	0	1	2.0-3.0		210-212F	general to local		ions; organic materials; hypochlorites and oxidizable materials	causes eye irritation: redness, swelling, and tissue damage	(1-5%); Hydrogen Peroxide CAS#7722-84-1 (1-5%); Alcohol ethoxylate CAS#68439-46-3 (1-5%); Ethoxylated akyl quaternary CAS#61791-10-4 (1-5%); Fragrance (<1%)		Compliance with federal, state, and local laws		1.16.07
Glass Cleaners		**37**															
Disinfectants		**37**															
Spartan Green Solutions High Dilution Disinfectant 256			3	0	0	6.5-7.5		> 212F	general to local		strong oxidizers	Corrosive. Irreversible eye damage skin burns. May be FATAL if absorbed through the skin.					4.5.06
Spartan Green Solutions Neutral Disinfectant Cleaner		no	3	0	0	6.0-7.0		> 212F	local		strong oxidizers	Corrosive. Irreversible eye damage skin burns. May be FATAL if absorbed through the skin.					9.23.05

	Bathroom Cleaners/ Degreasers		**37,34**															
	Spartan Green Solutions Industrial Cleaner			2	0	0	9.0-10.0		> 212F	general to local		strong oxidizers	causes eye irritation: redness, swelling, and tearing.	Combustion products are toxic.				5.3.06
	Spartan Biorenewables RestRoom Cleaner			1	0	0	1.5-2.5		> 212F	general to local		strong oxidizers; hypochlorites	causes eye irritation: redness, swelling, and tearing.	Citric Acid CAS#77-92-9 (5-10%), Alcohol ethoxylate CAS#68439-46-3 (1-5%). Combustion products are toxic.				9.8.06

	Shampoos / Detergents		**37**																
	Spartan Contempo H202 Spotting Solution		**no**	2	0	1	5.0-6.0		212F	general to local	Subject to Section 313	Metals; metal ions; organic materials and oxidizable materials	causes eye irritation: redness, swelling, and tissue damage	2-Butoxylethanol CAS#111-76-2 (1-5%), Hydrogen Peroxide CAS#7722-84-1 (1-5%)		Compliance with federal, state, and local laws		6.1.07
	Floor Care Applicable to Green Seal Standard (40):																		
	Floor Strippers																		
	Floor Waxes & Finishes																		
	Cleaner & Sealer																		
	Spartan Sunswept		no	1	0	0	7.8-8.2		212F	General to local		none known	Causes mild eye irritation: swelling, pain, redness, and tearing	Ester alcohol CAS#25265-77-4 (1-5%); Tributoxyyethyl phosphate CAS#78-51-3 (1-5%); Ethylene copolymer CAS#67892-91-5 (1-5%); Propylene glycol CAS#57-55-6 (1-5%)		Compliance with federal, state, and local laws		6.30.05
	Tile Finish																		
	Cement Finishes																		
	Terazzo Floor Finishes																		
	Hand Cleaners Applicable to Green Seal Standard (41):																		
	Hand Soaps																		
	Specialty Cleaners Not Applicable to Green Seal Standards:																		
	Toilet Bowl Cleaners																		
SU	**Spraybuff - Occassional Use**																		
	Spartan Spraybuff																		
	Bounce Back																		
SU	**Deodorants - Speciality Use Only**																		
	Graffiti Removers																		
	Spartan SoyStrong			2	2	0	NA		179F				limonene and tall oil which may cause skin sensitization with repeated contact..mild to severe pulmonary injury caused by small						
	Spartan Graffiti Remover SAC			2	2	0	NA	NA	147F			strong acids and oxidizing agents	aspirated into resp. system during ingestion or vomiting may cause mild to severe pulmonary injury. May cause nasal discomfort and	spontaneous combustion of rags, towels, etc. Combustible liquid and vapors.				2.20.06

SU	**Metal / Ceramic Cleaners - Speciality Use Only**																	
	Drain Treatments																	

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7/28/08

Approved Cleaning Products by category: (alphabetical order by manufacturer)

General Purpose Cleaner

Spartan Clean on the Go by Peroxy

Glass Cleaners

Spartan Green Solutions Glass Cleaner

Disinfectants

Spartan Clean on the Go by Peroxy

Bathroom Cleaners/ Degreasers

Spartan Green Solution Restroom Cleaners

Carpet Cleaners (Shampoo / detergents)

~~American Formulating and Manufacturing SafeChoice Carpet Shampoo~~
Spartan Green Solutions Carpet Cleaner

Floor Cleaners

Spot Removers

Spartan Green Solutions Carpet Cleaner (2-Liter is same)

Floor Strippers

Spartan Green Solutions Floor Finish remover

Floor Waxes/ Finishes

Tile Finish

Spartan Green Solutions Floor Seal and Finish

Cement Finish

Spartan Green Solutions Floor Seal and Finish

Stone Floor Finish

Spartan Green Solutions Floor Seal and Finish

Terrazzo Floor Finishes

Spartan Green Solutions Floor Seal and Finish

Hand Soaps

GOJO Green Certified Foam Hand Cleanser

Hand Sanitizers

Toilet Bowl Cleaners

Spraybuff (change name)

Floor Sealers

Spartan Green Solutions Floor Sealer and finish

Carpet Pre-treatment

Spartan Green Solutions Carpet Cleaner

Deodorants

Buckeye Scavenger
Buckeye Ten-4
Hillyard Take Down

Graffiti Removers

Motsenbockers' Lift Off #4

Gum Removers

EnvirOx H2Orange2 Concentrate #117

Rust Remover

Buckeye Uppercut

Metal / Ceramic Cleaners

CRC Ceramic Restoration Creme

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Green Cleaning

Intoduction

The purpose of this presentation is to cover the basics of Green Cleaning and how it may differ from “traditional cleaning”

This presentation will also take a brief look at the tools, chemicals & procedures for Green Cleaning within a facility.

Green Cleaning and Sustainability

Green Cleaning is defined as:

"Cleaning to protect health without harming the environment"

Sustainability is defined as:

"… using resources to meet the needs of the present, while at the same time ensuring that adequate resources are available for future generations…"

Where "Green Cleaning" is Different

Cleaning has evolved over the last 30 years..
…from using aggressive, toxic chemicals for routine and restorative tasks alike, To an understanding that we don't need to use such harsh chemicals for our daily, routine cleaning tasks…

- Green Cleaning" products are formulated using Green Chemistry to handle the "daily dirt" that is found in the routine cleaning of facilities..
- Dyes and Fragrances have been minimized (or eliminated) to reduce their impact on IAQ and those persons sensitive to inhalation irritants.
- To compensate for difficult soils or textured surfaces - instead of using aggressive, corrosive chemicals, we can "adjust the cleaning tool" –. Use scrub pads, brushes or microfiber cloth to help clean really tough soils or "buildups"
- Moving to Green Cleaning Chemicals can allow facilities to dramatically reduce the environmental impact of up over 90% of their consumable chemicals !!

The "Green Cleaning" Journey

- Implementing a Green Cleaning program is not a simple "flip of the switch" to a couple of non-toxic chemicals and a different vacuum...
- It is a journey that begins with an assessment of what the current state of the facility's cleaning and sanitation program is, a "working definition" of what management desires the end state of the facility's program to be, and then establish the road map or (implementation plan) of how we plan to achieve the goals and objectives of management.
- Green Cleaning is as much, or more an evaluation and improvement in process as it is in the chemicals and tools involved in that cleaning…
- The Green Cleaning journey starts with the basic issues that are achievable in a manageable time frame, and then continues with Green improvements and enhancements as the program develops

The Movement to "Greener Cleaning"

- Each month, millions of tons of harmful chemicals are washed down the drains and sprayed into the air. With green chemical brand products they "screen out" harmful ingredients to help keep toxic chemicals out of the environment.
- Harmful toxins, residues and fumes come from most traditional cleaning chemicals. These can be damaging to human health and our planet - but by using green cleaning chemicals, workers are no longer exposed to those harmful toxins.
- Studies have shown that building occupants, visitors and janitorial staff experience fewer incidents of skin, eye and respiratory irritation, fewer chemical sensitivities, less severe allergic reactions and a decrease in headaches and nausea when buildings are cleaned with green cleaning products.

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"Green Cleaning" is here to stay

Conventional Cleaning Hazards

- The average cleaning professional uses conventional cleaning chemicals that contain more than 50 pounds of hazardous ingredients annually
- 6% of cleaning professionals will be injured by commercial cleaning products
- 20% of these injuries are serious chemical burns to the eyes and skin

No Bad Chemicals-Break the Chain

Bleach
Hydrochloric Acid
"Butyl" Cleaners / Degrease
Petroleum Distillates
Methylene Chloride
Ammonia
Paint Thinners
Para dichlorobenzene

Standards and Certification

Standards

What is Green Seal?

- Green Seal is an independent non-profit organization dedicated to safeguarding the environment and transforming the marketplace by promoting the manufacture, purchase, and use of environmentally responsible products and services.

What is EPA DfE?

- When you see the DfE logo on a product it means that the DfE scientific review team has screened each ingredient for potential human health and environmental effects and that—based on currently available information, EPA predictive models, and expert judgment—the product contains only those ingredients that pose the least concern among chemicals in their class

Green Chemicals

- Performance
  - Products perform as well or better than leading national brands
  - Lower Total Cost Solution
- People
  - Contains ingredients that are naturally derived and no chemicals that are harmful to custodial workers
- Planet
  - Leader in creating solutions that have a reduced impact on environment
  - Mix effectively with cold water
  - Greenseal, DfE, and SEGC114 certified
- Price
  - Priced competitively to be the lowest total cost compared to leading national brands of conventional products.

Comparing Typical and Green Closets

The Typical Janitorial Closet

- Many different tools
- Large Mop Buckets and Wringers
- Multiple Handles and Mops
- Many different Cleaning Chemicals
- Many "special use" products
- Maybe some dilution control
- Some chemicals "glug-glug"
- Bleach and/or Ammonia
- Strong, caustic strippers
- Zinc Crosslinked Finishes
- No real Cleaning Standards
- Minimal Attn. to Cleaning Processes
- Standard Single Motor Vacuum

The Green Janitorial Closet

- Simple – multi purpose tools
- Microfiber Mopping Equipment
- Multi use MF Handles and tools
- Minimal Chemicals – Green Certified
- Multi Use Chemicals
- All Products in Dilution Control
- No – "Glug Glug" Chemicals
- No Bleach or Ammonia
- Green Seal, No Odor Strippers
- Zinc Free Floor Finishes
- Established Cleaning Standards
- Use of Green Cleaning Processes
- Back Pack, HEPA Filter Vacuums

Types of Cleaning

Cleaning can be divided into two general categories:

–"Catch-Up" or restorative cleaning

–"Keep-Up" or routine / daily cleaning

•"Catch-Up" cleaning refers to deep, restorative cleaning of a neglected or extremely soiled surface or fixture. Standard chemicals and or procedures / tools are not effective (at least in a timely fashion)

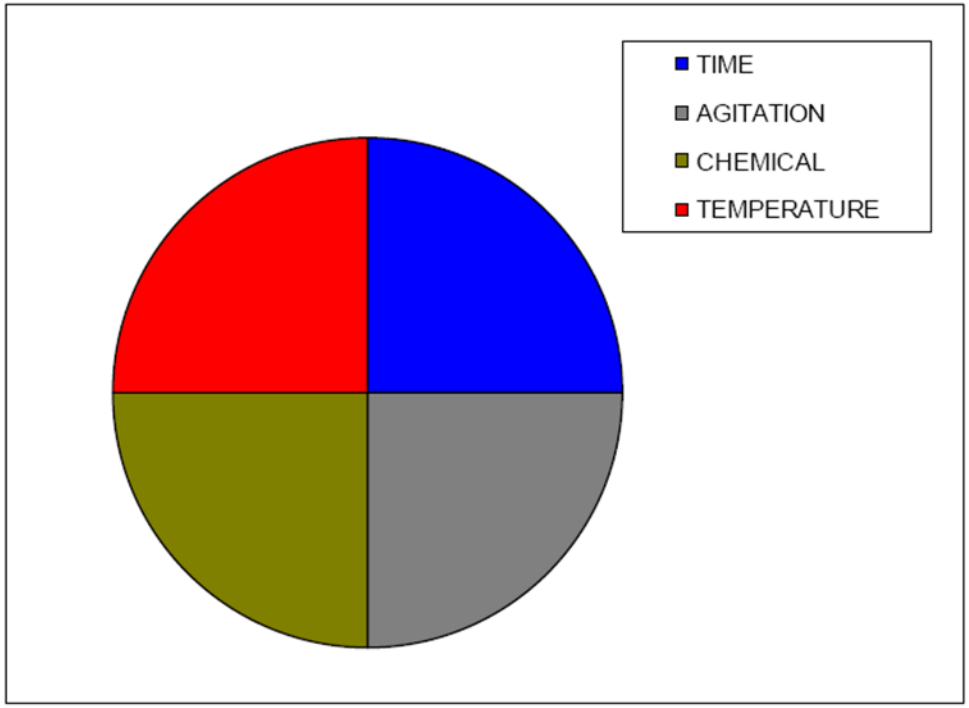
•"Keep-Up" cleaning refers to the daily or routine cleaning of the soil that accumulates on a daily basis and is performed on a regular basis

-When properly conducted, Keep-Up cleaning will prevent or at least minimize -"Catch-Up" cleaning

Elements of Cleaning

All cleaning tasks involve four elements – in a variable balance that will achieve the goal of removing the soil from the surface…

- Time
  - How long in contact with the soil
  - Time Restrictions
- Agitation
  - Type
  - Quantity
- Chemical
  - Type (Safety?)
  - Concentration
- Temperature
  - Cleaning Solution
  - Surface being Cleaned

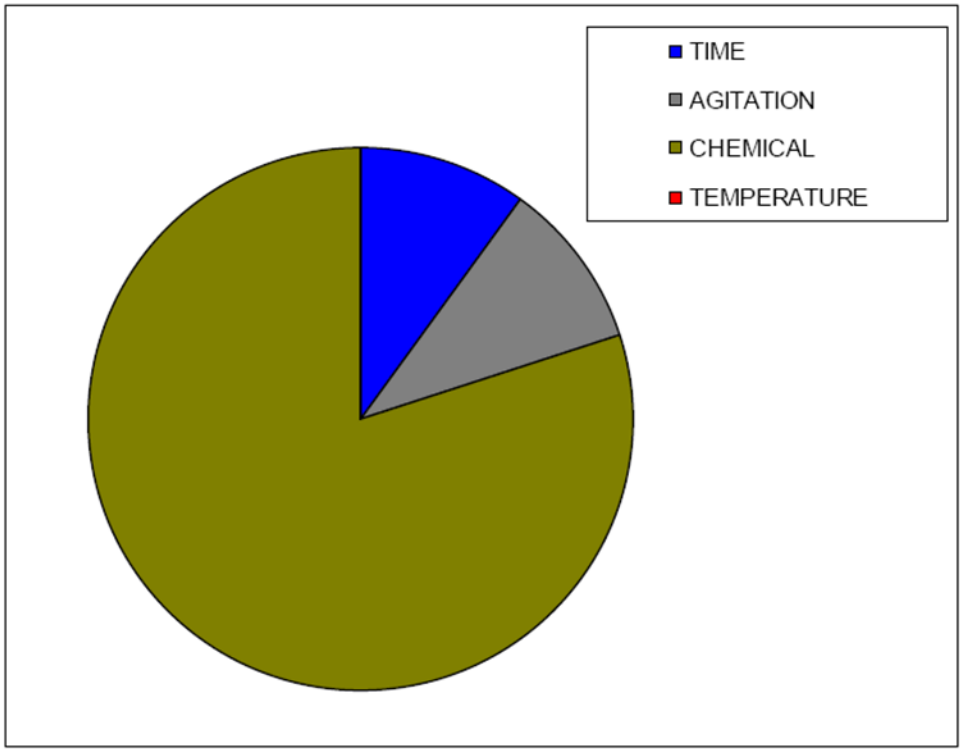


Elements of Cleaning

As you increase or reduce on element, another element (or two) may to be adjusted to compensate for the change…

When using a very strong chemical, the task won't require as much agitation or dwell time to remove the soil…

With an aggressive "spray & wipe" temperature plays almost no part in the cleaning task

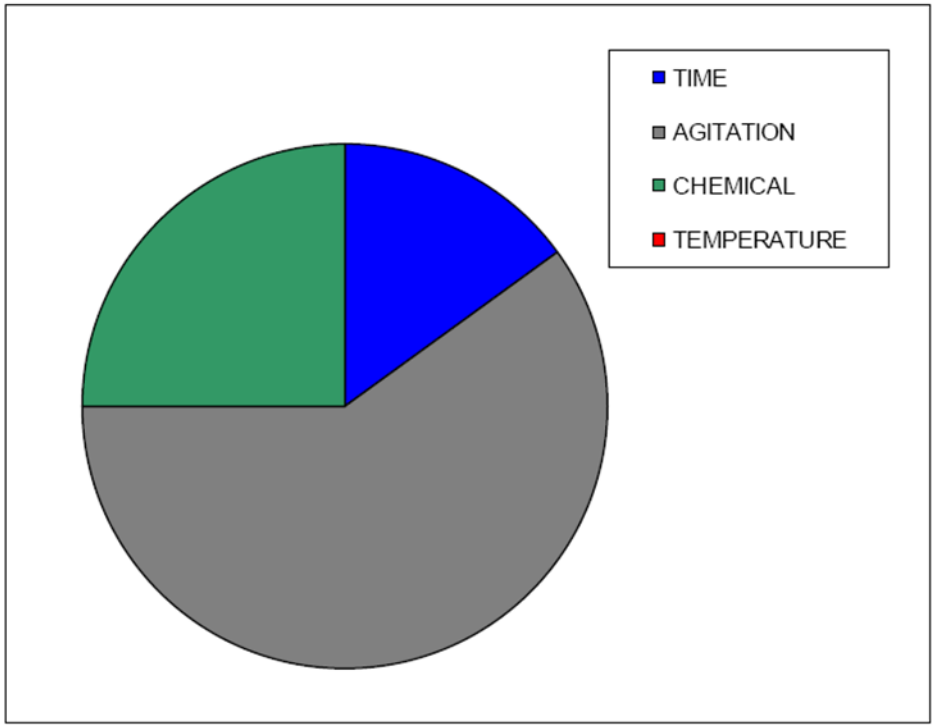


Elements of Cleaning

As you increase or reduce on element, another element (or two) may to be adjusted to compensate for the change…

When we move to a "greener", safer product, we may need to make an adjustment to keep the task efficient and productive…

With an Green "spray & wipe" we would increase the agitation and dwell time to accomplish the cleaning task



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Green Cleaning Tools & Equipment

A "Green Cleaned" Building are Healthier

- Proper green cleaning is an ongoing process and needs to be done daily to prevent buildups of dust and soils and odors!
- A well cleaned facility has less place for germs, mold, mildew, etc. to hide and grow!
- A green cleaned building still utilizes disinfectants – Even though at this time there is not a "green" classification for disinfectants – Helping to control illness through proper cleaning and disinfection of contact points is VERY important in a Green Cleaning program
- Proper disinfection of contact ("touch") points will reduce cross contamination of germs and illness within the facility

Green Cleaning Summary

- Remember – ***A Cleaner Facility is a Healthier Facility!***
  (For everyone including you and your family)
- Green Cleaning and Sustainability work together for a stronger program
- Gov't. Legislation helped "Green Cleaning" be more known and accepted!
- Green Cleaning incorporates Eco Friendly Chemicals, Tools ***and*** Green Processes to develop a true Green Cleaning Program
- The first steps are to determine the customer's goals & do the assessment
- A Green Cleaning program will eliminate toxic and hazardous products and incorporate Eco Friendly procedures to accomplish tough cleaning tasks
- There are many, many items that can become a part of the program
- To minimize the spread of germs, Disinfect switches, dispensers, door handles- any contact or touch points etc. with the appropriate disinfectant

Green Cleaning

Thank You!

Questions?

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Green Cleaning Policy for Facilities Management – Campus Building Services

Effective date: July 1, 2018

i. Scope

This policy applies to all cleaning procedures, cleaning material purchases, cleaning equipment purchases, and cleaning services that occur inside and on the building site and grounds for Facilities Management – Campus Building Services (CBS). Specifically, this policy covers the following:

Cleaning strategies for:
- Hard floor and carpet cleaning and maintenance
- Protection of vulnerable occupants during cleaning
- Disinfectant and sanitizer selection and use
- Safe storage and handlings of cleaning chemicals, including spill management

Performance metrics and strategy development:
- Reductions in water use, energy use, and chemical toxicity
- Green cleaning product purchasing
- Green cleaning equipment purchasing

Staffing and training plans:
- Staffing requirements and contingency for staffing shortages
- Timing and frequency of staff training

ii. Goals

This policy will be fully implemented starting on the effective date.

Category	Goal	Performance measurement unit
Cleaning products and materials purchases	85% meet sustainability criteria	Cost
Cleaning equipment purchases	100% meet sustainability criteria	Number of equipment items
Cleaning equipment inventory	40% of equipment in the project inventory will meet the applicable sustainability criteria	Number of equipment items in the overall inventory for the project
Toxic chemical usage (e.g. all cleaning chemicals not on the "approved" list, including those not addressed by EQc Green Cleaning – Products and Materials)	Toxic chemicals will only be used in situations where products meeting the requirements of EQ Credit Green Cleaning – Products and Materials are unable to sufficiently clean the area, the area cannot be replaced (such as a floor tile), and represents a hazard to human health	Number of uses

iii. Roles and Responsibilities

The Custodial Manager for this policy is the Custodial Operations Manager. Is responsible for ensuring that this policy is executed and that any contracted cleaning vendors under management's control are aware of and fully trained on the procedures outlined in this policy. Further, the Manager is responsible for sharing this policy with the building tenant representatives (building proctors) and encouraging policy adoption accordingly. Manager is responsible for reviewing this policy for any significant changes on the interval specified in the quality assurance section. If at any time updates are required to this policy, will ensure that the appropriate individuals are informed of the updates.

iv. Procedures and strategies for implementation

Hard floor and carpet cleaning and maintenance

Provided by the Campus Team Cleaning Crews (TCC)/ Floor Crew (FC)

- Hard floors, including tile, concrete, and wood surfaces, will be cleaned once a week with only sustainable cleaning products. (TCC)
- Carpets will be vacuumed bi-weekly in offices and daily in public areas with vacuum cleaners that meet the sustainability criteria listed later in this policy. (TCC)
- One per month, the carpets will be inspected for stains and other damages. If feasible, the necessary areas will be spot cleaned with sustainable carpet cleaning materials. If damaged, the carpet tiles can be replaced. (TCC)
- When carpet extraction equipment must be used, methods to reduce chemical usage will be implemented and extraction chemicals will be Green Seal certified. (FC)

Protection of occupants during scheduled floor care cleaning

Areas Serviced by Floor Crew

- Advanced notice of scheduled floor work will be shared with building proctors to share with building occupants.
- Advanced notice of scheduled floor work will be physically posted in facilities via notices on doors where work is to occur.
- Occupants including women who are pregnant, children, elderly occupants, and individuals with asthma, allergies, or other sensitivities should notify FM as soon as floor work notices are posted, if work needs to be rescheduled or if alternative products are necessary to accomplish scheduled work.
- As much as possible, only sustainable cleaning products will be used. Please refer to the goals and tracking sections of this policy for additional information.
- Any cleaning that involves the use of carpet cleaners, or if at any point; the use of a non-sustainable cleaning product is required, this cleaning will be performed after regular business hours.

Disinfectant and sanitizer selection and use

Per state contract / agreement with Campus Distribution Center and Departmental Sustainability Standards

- Only Green Seal Certified hand soaps and hand sanitizers that meet the at least one of the sustainability criteria listed under the purchasing guidelines will be considered to meet the requirements of this policy.

- Hand sanitizers will be placed at select building entrances for the use of occupants and only Green Seal Certified disinfectant soap will be available in the restrooms.
- Only disinfectants meeting the purchasing sustainability criteria listed below will be considered to meet the requirements of this policy. Disinfectants will be kept locked in the custodial closets and may only be used by the cleaning staff.
- Cleaning staff will be required to follow all dilution strategies for disinfectants.

Safe storage and handlings of cleaning chemicals, including spill management

Via Core Safety & Custodial Basic Training

- Cleaning chemicals will be stored in the custodial closets to prevent access for other occupants.
- Cleaning staff will receive training on the various hazards of different toxic chemicals and how to address spills.
- Spills will be cleaned and handled according to the safety data sheets provided by the manufacturer.
- All spills will be handled carefully. As soon as a spill of a non-sustainable product occurs, the Custodial manager must be notified. If the spill occurs in an area to which typical building occupants have access, the area will be roped off and building occupants will be informed to stay clear of the area.
  Safety data sheets for all of the cleaning chemicals used in the building will be retained and hazard information will be highlighted. This information will be kept in SDS binders in main supply rooms and supervisors' offices.

Strategies for reducing the toxicity of the chemicals used for laundry, ware washing, and other cleaning activities

Via the use of chemical mixing stations in custodial closets

- Cleaning staff will be supplied with safe cleaning chemicals that meet the sustainability criteria described in the purchasing guidelines listed below.
- Laundry detergent meeting the EPA Design for the Environment will be supplied for washable custodial supplies.
- For surface cleaning, ionized water cleaning devices (using only water) will be considered when feasible, especially for new auto-scrubber purchases.

Strategies for conserving energy, water, and chemicals used for cleaning

Information provided via Custodial training on proper operation of equipment | chemical usage monitored via closet mounted mixing stations

- Manual-powered equipment and cleaning strategies will be used whenever possible to reduce the energy and water used by powered equipment and typical cleaning strategies (with exception of no-touch restroom cleaning equipment as scheduled).
- Cold water will be used for any necessary disposal to reduce energy used to heat hot water (hot water may be used in extraction equipment as needed.)
- The filters in vacuums and other applicable equipment will be changed frequently to enable air flow and reduce the energy consumption of the equipment.
- When cleaning chemicals are necessary, the operating procedures for chemical dilution will be followed to ensure that the minimum amount of cleaning chemicals necessary is used.

Strategies for promoting hand hygiene

- Each restroom will have wall mounted Green Sealed certified soap dispensers.

Tracking plan for staffing and overall performance

Handled via a central scheduling process based on APPA standards for cleanliness, with all training and Monitoring of processes being stored and identified in the FM target Solutions Training Portal

- Regular APPA-like audits will be conducted to evaluate cleanliness. As a part of the audits, the auditors will interview cleaning staff to ensure that the cleaning and hard floor and carpet maintenance system is being consistently used and custodial closets are stocked with only approved products.
- The audits will be conducted bi-monthly and will be delegated by the Custodial Manager for this policy to frontline supervisors. The Custodial Manager is responsible for checking records of the results of the audits in the management records on a quarterly basis, following up with any cleaning staff to provide additional training and/or guidance and recording these actions. Frontline supervisors will follow up with training as needed immediately after conducting inspections.
- All cleaning staff is required to check in and out daily. Team supervisors will retain these records via timecards in FAMIS to ensure that the building is sufficiently staffed with trained professionals.
- The training manager will log all training that is provided to the cleaning staff and will ensure that the training plans described above are met.
- When new staff comes on board, the training manager will record the initial training and orientation provided to the staff.

Tracking plan for water, energy, and toxic chemical usage

Via Supervisory monthly inspections, insuring compliance with Campus Sustainability & Safety Standards

- Toxic Chemicals will be defined as those items listed on the preapproved “Exception List.”
- Every time a toxic chemical is used (e.g. bleach for blood borne pathogen cleanup), it must be reported to the Custodial Manager. Usage of toxic chemicals will be tracked through procurement records of “Exception List” chemicals.
- All vacuum filters will be replaced on a regular basis to maximize performance and energy efficiency. The CBS equipment repair technician will perform regular maintenance on all cleaning equipment. Custodians are responsible for cleaning filters daily/weekly as needed replacement as needed (no less than twice per month) and will conduct daily cleanings.
-

Tracking plan for cleaning product and cleaning equipment purchases

Via an ongoing product and needs assessment by the Operations Team

- All cleaning product and cleaning equipment purchases, made by the building management, will be recorded in FAMIS via purchasing module. On a quarterly basis, the Custodial Manager will review all purchases and compare against the policy goals. If the policy goals are not being met, the Custodial Manager will take appropriate steps to correct, typically in the form of providing education to the individuals in charge of procurement on the goals and sustainability criteria outlined in this policy.

Staffing and training plans

- Staffing will be monitored via APPA guidelines for level of service standards in conjunction with requirements for coordinated departmental trainings in the areas of chemical and workplace safety, as well as quarterly assessments for ongoing employee equipment and Team Cleaning training.
- All cleaning staff, including backup personnel, receives training when hired, core safety training, and ongoing safety training as defined below.

- Safety trainings are held twice a month at the beginning of each team meeting. Topics vary each month, and cover standard operating procedures for cleaning different surfaces, proper toxic chemical usage and spill management, hazards of toxic chemicals, cleaning to protect vulnerable occupants, cleaning equipment maintenance, and conservation of energy and water usage during cleaning.
- Training Manager – training supervisor - coordinates and hosts all of the trainings.

v. Purchasing guidelines

Sustainability Criteria for Cleaning Products and Materials

Evaluated annually by the Operations Team as well as via spot inspections to determine new and innovative goods and methodologies that fit into the Campus Sustainability Model for products and Services to be used by the Environmental Services Division

Cleaning products must meet one or more of the following standards

- Green Seal GS-37, for general-purpose, bathroom, glass and carpet cleaners used for industrial and institutional purposes;
- UL 2792 (formerly CCD 110), for cleaning and degreasing compounds;
- UL 2759 (formerly CCD 146), for hard-surface cleaners;
- UL 2795 (formerly CCD 148), for carpet and upholstery care;
- Green Seal GS-40, for industrial and institutional floor care products;
- UL 2777 (formerly CCD 147) , for hard-floor care;
- EPA Design for the Environment Program's Standard for Safer Cleaning Products; and/or
- Cleaning devices that use only ionized water or electrolyzed water and have third-party-verified performance data equivalent to the other standards mentioned above (if the device is marketed for antimicrobial cleaning, performance data must demonstrate antimicrobial performance comparable to EPA Office of Pollution Prevention and Toxics and Design for the Environment requirements, as appropriate for use patterns and marketing claims).

Disinfectants, metal polish, or other products not addressed by the above standards must meet one or more of the following standards

- UL 2798 (formerly CCD 112), for digestion additives for cleaning and odor control;
- UL 2791 (formerly CCD 113), for drain or grease trap additives;
- UL 2796 (formerly CCD 115/107), for odor control additives;
- Green Seal GS-52/53, for specialty cleaning products;
- California Code of Regulations maximum allowable VOC levels for the specific product category;
- EPA Design for the Environment Program's standard for safer cleaning products; and/or
- Cleaning devices that use only ionized water or electrolyzed water and have third-party-verified performance data equivalent to the other standards mentioned above (if the device is marketed for antimicrobial cleaning, performance data must demonstrate antimicrobial performance comparable to EPA Office of Pollution Prevention and Toxics and Design for the Environment requirements, as appropriate for use patterns and marketing claims).

Disposable custodial paper products and trash bags must meet the minimum requirements of one or more of the following programs

- EPA comprehensive procurement guidelines, for custodial paper;
- Green Seal GS-01, for tissue paper, paper towels and napkins;
- UL 175 Sanitary Paper Products, for toilet tissue and hand towels
- Custodial paper products derived from rapidly renewable resources or made from tree-free fibers;
- FSC certification, for fiber procurement;
- EPA comprehensive procurement guidelines, for plastic trash can liners; and/or

- California integrated waste management requirements, for plastic trash can liners (California Code of Regulations Title 14, Chapter 4, Article 5, or SABRC 42290-42297 Recycled Content Plastic Trash Bag Program).

Hand soaps and hand sanitizers must meet one or more of the following standards:

- antimicrobial agents (other than as a preservative) except where required by health codes and other regulations (e.g., food service and health care requirements);
- Green Seal GS-41, for industrial and institutional hand cleaners;
- UL 2784 (formerly CCD 104), for hand cleaners and hand soaps;
- UL 2783 (formerly CCD 170), for hand sanitizers;
- EPA Design for the Environment Program's standard for safer cleaning products.

Sustainability Criteria for Cleaning Equipment

Evaluated annually by the CBS management team as well as spot inspections to determine new and innovative products and methodologies that fit into the Campus Sustainability Model for products and Services utilized by the Custodial Services division.

All powered equipment must have the following features:

- safeguards, such as rollers or rubber bumpers, to avoid damage to building surfaces;
- ergonomic design to minimize vibration, noise, and user fatigue, as reported in the user manual in accordance with ISO 5349-1 for arm vibrations, ISO 2631–1 for vibration to the whole body, and ISO 11201 for sound pressure at operator's ear
- as applicable, environmentally preferable batteries (e.g., gel, absorbent glass mat, lithium-ion) except in applications requiring deep discharge and heavy loads where performance or battery life is reduced by the use of sealed batteries.

Vacuum cleaners must be certified by the Carpet and Rug Institute Seal of Approval/Green Label Vacuum Program and operate with a maximum sound level of 70 dBA or less in accordance with ISO 11201.

Carpet extraction equipment, for restorative deep cleaning, must be certified by the Carpet and Rug Institute's Seal of Approval Deep Cleaning Extractors and Seal of Approval Deep Cleaning Systems program.

Powered floor maintenance equipment must be equipped with such as vacuums, guards, or other devices for capturing fine particulates and must operate with a maximum sound level of 70 dBA, in accordance with ISO 11201.

Automated scrubbing machines must be equipped with variable-speed feed pumps and either (1) on-board chemical metering to optimize the use of cleaning fluids or (2) dilution control systems for chemical refilling. Alternatively, scrubbing machines may use tap water only, with no added cleaning products.

vi. Quality Assurance/Quality Control Processes

The Custodial Manager will evaluate the green cleaning policy on a quarterly basis to evaluate progress towards the implementation goals. If any cleaning product or equipment purchases are not being recorded properly, the Custodial Manager will inform the appropriate individuals to ensure that activities are recorded moving forward. The Custodial Manager will evaluate the results of the cleaning audits to determine whether the building is being sufficiently cleaned and whether the standard cleaning procedures are being properly executed. As necessary, the Custodial Manager will revise the green cleaning policy to include additional cleaning strategies or modify existing cleaning strategies.

In addition, if any implementation goals are not being met, the Custodial Manager will investigate the situation and will work with the individuals purchasing the materials and equipment or using the equipment. The Custodial Manager will evaluate whether updates are necessary to the in order to

achieve the implementation goals.

Any revisions that are made to the policy will be incorporated into the next training cycle for the cleaning staff.