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MEMORANDUM

TO: Marianne Martin, Assistant Director, CU Environmental Center
Will Toor, Director, CU Environmental Center

FROM: John Bruning, Director, Physical Plant
Ed von Bleichert, Environmental Operations Manager

DATE: April 8, 2003

RE: Blueprint for a Green Campus

This memo serves as an update on environmental programs and initiatives within the Department of Facilities Management over the last year. Although, this outline covers some of the efforts of the overall department, it primarily focuses on the efforts of Physical Plant and its associated Trades, specifically Grounds, and Environmental Services (Custodial, Recycling, Solid Waste, and Integrated Pest Management). Other divisions of F.M. not fully represented in this document include the Powerhouse, Design & Construction, Planning, and I.T.

I. Creating a Climate-Friendly Campus

A. CU Commits to meet emissions reduction targets of the Kyoto Protocol, which would reduce CU's greenhouse gas emissions by seven percent below 1990 levels by 2010.

- See Energy Conservation update submitted by Moe Tabrizi
- 5-year plan for energy conservation includes installation of dedicated high efficiency air-cooled chiller for process cooling in Ekeley Chemistry at a cost of \$75,000. **This has been modified to allow Ekeley to connect to the Central Plant for winter cooling.**

III. Creating a Safe and Healthy Campus

A. Minimizing Hazardous Waste

1. **CU reduces the amount of hazardous waste generated by the campus while maintaining the quality and quantity of research.**
 - **\$1500 funded for removal of Vinyl Asbestos Tile (VAT) in Porter. There was about 800 sq. ft removed in JILA in January of this year. No aware of any other large projects for this fiscal year.**
 - **Aspirator-type (water-wasting) vacuum devices in Cristol are being replaced with vacuum pumps. This eliminates the entrained chemicals in the water being wasted - and eliminates waste of potable water for these applications (which is another environmental benefit).**
2. **CU continues to advance pollution prevention programs to reduce the quantity of hazardous material present on campus and to promote a safer working and learning environment.**
 - Environmental Services currently reviewing and rating all cleaners and disinfectants used by custodians based on toxicity. **To date, 158**

cleaners have been reviewed and ranked. **This is an ongoing project; To date, 206 cleaners have been reviewed and ranked.**

- Storm water drain assessment completed by Physical Plant. Rerouted worst five illicit storm drain connections to sanitary sewer, including drains in Engineering, Duane Physics, and Chemistry.
- **Several cooling tower and outdoor fountain drains have been re-routed to sanitary sewer at a cost of \$15,000.**
- **Fluid labs in Engineering were also re-piped to sanitary sewers at a cost of \$40,000.**
- Continued progress on storm drain stenciling project. **To date 90% of all 'hardscape' drains have been labeled, with Euclid and Regent Autoparks being the exceptions. A plan is currently being devised for storm drains located in turf or other landscape areas. The most current Storm Drainage project completed last summer, has incorporated the use of manhole covers that have the "dispose no waste drains to creek" right in the castings. We also are working on including these covers in our Construction Standards.**
- Currently working on more complete mapping of drain network and emergency contingency plans. **This involves linking catch basins to the next manhole in the system and then to the next outfall to the creek. The primary use of this will be to trace a pollution stream back to the source but can also be used to determine where a pollutant will enter the creek. Work continues on the data bases associated with catch basins, outclass, and manholes.**
- **Funded a manhole audit to determine condition of existing manholes and inlets; \$12,500 for sanitary and \$20,000 for storm. Sanitary audit should be complete by June '02. Work on storm audit will commence shortly thereafter. This project also includes working with the city to create a uniform numbering system that can be used by both entities. Once complete, an additional funding proposal to repair deficiencies will be put forth. We are currently are done with the Sanitary manholes and are planning to be done with the Storm manholes by the end of April. We have also identified certain catch basins that need initial cleaning and are seeking funding to get these cleaned this summer.**
- \$20,000 funded in FY01/02 to implement campus Spill Containment and Control Plan (SCCP) for all above ground gas tanks and diesel generators. Includes purchase of emergency spill containment equipment as well as installation of permanent berms around tanks. Future funding will look to replace certain old tanks/generators with newer double-wall tanks. **Projects complete to date include: 1. Generator at Stadium replaced w/ new double wall tank. 2. Poorly designed fill station at Muenzinger removed completely. Pipe leading from fill station and tank excavated and removed. Construction of spill containment berm for Physical Plant emergency generators and Engineering S. generator currently underway. Additional \$7,000 funded in FY03 (total of \$27,000) for replacement of tank at IBG from single- to double-wall. This is not required by the current SCCP regulations but was deemed appropriate due to the proximity of the IBG tank to the Boulder Creek. All SCCP projects scheduled to be complete by 6/1/03.**
- **Members of the Physical Plant attended annual refresher SCCP refresher course presented by EH&S on 2/11/03.**
- **\$35,000 funded in FY01/02 to install CFC monitors in RL-3 and Education chiller rooms. Previously installed Engineering monitor also repaired with this money. Refrigeration shop has identified 8 other chiller rooms needing monitors. Temporarily postponed due to budget cuts.**

- **Currently working with State on voluntary CFC audit of campus to assure complete compliance with CFC regulations. All of our chillers are now registered with the state and all fees are current.**
- **The refrigeration shop has also created a tracking system for use and releases of CFC's. All contractors have been notified about the requirements we have established for the tracking of their work as well.**

B. Minimizing Exposure to Toxic Chemicals and Pesticides

1. **CU significantly reduces the use of harmful chemicals and volatile pesticides in buildings and grounds management through integrated pest management.**
 - **Physical Plant is currently pursuing an additional FTE to be split between structural IPM and the Integrated Weed Management (IWM) program. Abandoned due to budget cuts.**
 - **Grounds experimenting with use of Cashmere goats to graze noxious weeds on 12 acres at Research Park (4/00, 11/00). Goats were again used on the Research Park in Dec. of '01 for the control of knapweed, and various thistles. Grazing was again used at the Research Park in June of '02, adding a new section to the routine. Goats were also used for the first time on the South Campus in July of '02. We are hopeful to complete a three year cycle of grazing at the Research ark this Spring as well as continuing grazing on the S. campus. This will be dependent on funding.**
 - **Additional releases of seed-head and root-feeding insects were conducted on both the Research Park and South Campus properties in the summer of '01. No further release were conducted by Grounds in '02 but research projects under Professor Tim Seastedt continue at both the research park and South Campus. The Grounds division hopes to release more bugs this season.**
 - **Division took lead in drafting campus IPM Policy currently under review by the Administration. Policy adopted campus wide 3/12/02. "Threshold Action Levels" determined based on Threshold Action Levels, select a treatment that is: Least hazardous to human health; Least damaging to the environment; Effective in controlling the pest; Has minimal negative impacts to non-target organisms; Within available resources All proposed pesticide applications reviewed & approved by coordinator. Only "Qualified Supervisors" have authority to purchase pesticides.**
 - **Environmental Services currently reviewing and rating all cleaners and disinfectants used by custodians based on toxicity. To date, 158 cleaners have been reviewed and ranked.**
 - **Funded roughly \$10,000 in Deferred Maintenance monies for the commencement of parasitic wasp releases in certain research labs in the Ramaley biology building. The release of over 16,000 wasps, Anastatus teupes and Comperia merceti, will occur from March 18th to July 14th with subsequent monitoring through the end of October.**
 - **In Aug. of '02 the Grounds division established 34 different turf test plots. The purpose of the test plots was to test alternatives to synthetic herbicides used for dandelion control. A post emergent herbicide made of sugar beets (Nature's Weed Control©), and Corn Gluten Meal, a pre-emergent herbicide, were applied on the majority of the test plots. Several test plots received only cultural techniques while 2 of the plots received a synthetic herbicide treatment.**

- On 4/4/03 Corn Gluten Meal applications were repeated on the original test plots. Nature's Weed Control will also be applied in early may to all original test plots.
 - The Grounds Turf Manager will be experimenting with the use of organic fertilizers on certain fields across campus over the next year.
- 2. Campus buildings provide higher indoor air quality through improved ventilation and control of indoor air pollution sources.**
- Environmental Services has begun the process of phasing out the use of upright vacuum cleaners in lieu of more ergonomically correct canister and backpack vacuums that do not emit as many particulates into the air. **Of the 266 total vacuums used, 138 are currently either a canister or backpack type, with 112 having been purchased since May of '00. 34 of these were purchased since May of '01. Environmental Services has reduced the total number of vacuums needed by moving toward a "team cleaning" concept. At this point all vacuums used (55-60 total) are backpack vacuums capable of filtering out 99.99% of particles less than or equal to .3 microns.**
 - Performing minor upgrades to campus ventilation systems such as balancing and improving ventilation of fume hoods, removing obstructions, and improving make-up air. **Funded \$12,000 in FY01/02 for fume hood balancing as needed. Completed \$4,000 in work in _ and returned additional \$8,000. Additional \$12,000 funded in 02/03 in order to complete work.**
 - **Funded \$35,000 in FY01/02 for significant improvement to Fine Arts duct work and ventilation system including removal of unused fume hoods, improving fans, lowering of exhaust drops to sit directly over emissions sources, and adding exhaust vents to photo lab hazardous waste SAA. Project will be wrapped –up by 6/1/03.**
 - Performed major upgrades to ventilation systems through deferred and controlled maintenance projects. These have included significant improvements in Chemistry (fume hoods), Imig Music (raising of fresh air intakes from street level), the Grounds Building (emissions exhaust system and HVAC improvements), and Environmental Design (raising of air intakes). **No major projects this year but effort will continue.**
 - \$2.3 million project in Chemical Engineering **currently in Construction Document phase. Project is 75% complete. \$80,000 funded for improvements to Ramaley cadaver room ventilation system. Repairs completed but seem ineffective. Further action necessary.**
 - Environmental Services currently reviewing and rating all cleaners and disinfectants used by custodians based on toxicity. **To date, 158 cleaners have been reviewed and ranked. This is an ongoing project; To date, 206 cleaners have been reviewed and ranked.**
 - Purchase and use of low/no VOC paints, finishes, and adhesives. **Ongoing.**
 - **All outside-air intake louvers have been retrofitted with outside screens which makes them easier to keep clean, thus not reducing the amount of fresh air that can be brought into the buildings.**
 - **Retrofitted of Regent 3rd floor ventilation system complete to correct inadequate airflow in early '03. Replaced 2 air handling units and a chiller.**

IV. Greening Campus Consumption and Disposal Habits

A. Purchasing Environmentally-Responsible Products

1. **CU adopts an environmentally preferable purchasing policy, which will institute standards for environmentally responsible purchasing.**
 - Environmental Services currently reviewing and rating all cleaners and disinfectants used by custodians based on toxicity. **To date, 158 cleaners have been reviewed and ranked. This is an ongoing project; To date, 206 cleaners have been reviewed and ranked.**
 - **Environmental Services continues to research, test, and use least-toxic pesticides for use in the IPM program. All pesticides used have the least possible potential to impact human health, the environment and non-target species.**
 - **Environmental Services switched to 100% recycled content (min. 20% post-consumer) toilet paper in Feb. '03.**

B. As CU grows, we will cap the amount of solid waste going to the landfill using market incentives, new technologies, and purchasing policies to reduce waste generation on campus.

- Partnered with Housing and UCSU to implement automated collections of cardboard from residence halls and family housing courts. **Plans in place to expand program further with additional funding from UCSU and Housing. A six-month temporary position has been created as of this month for the purpose of expanding and formalizing automated cardboard locations in Housing.**
- Grounds partnered with UCSU to establish collection of recyclables from outdoor recycling stations. **Looking at possibility of revising entire grounds trash collection program to maximize efficiency, reduce costs, and include recycling at majority of outdoor trash locations. Project temporarily delayed by budget cuts but on track for partial implementation Summer '03.**
- Environmental Services is also investigating the possibility of using high efficiency hand dryers in campus restrooms. This could save over 5600 cases of paper towels paper year.

WATER CONSERVATION

- The University irrigation system is controlled by a central control computer.(TORO NETWORK 8000)
- The system has its own weather station, which can evaluate wind speed, rain amounts, and calculate evaporative transpiration rate. Evaporative transpiration rate is the amount of water that has been lost in the soil from wind, sun, and strength of radiant sunlight.
- The network also uses the weather station to monitor conditions during a night of irrigation. If there is rainfall above a set amount the station will stop the irrigation cycle for the night and also if the wind speed is greater than a set amount it will cancel irrigation.
- The campus also uses RAW water for irrigation from the ANDERSON DITCH (for the majority of the campus).
- Although the TORO 8000 system is not new, it was recently overhauled and fine-tuned to run more efficiently by correcting data in the computer used in the calculations of irrigation run times. The irrigation officer now also has greater control of the irrigation on campus in the ability to turn off certain areas and not give them more water than needed.
- The Network 8000 has the ability to adjust individual zone runtimes to account for wet areas and microclimates. These adjustments are made over a period of time as the campus turf becomes healthier and drainage issues are corrected.

- Prior to reprogramming the irrigation computer we had run times for an irrigation cycle that would start at 9pm and finish around 8:30am. With the changes we will not start watering until 10pm and will be finished before 7am.
- There are other benefits to the reprogramming. By changing the way the system runs we are able to also conserve on energy used to run the pump stations that deliver the water.
- We have reduced irrigation to many locations around campus by 50% or in some cases turned the irrigation off entirely.
- We have shifted to a deep and infrequent watering method to try to increase plant health and root depth to be able to make better use of the water that is used and not have to water every night.