News on federal acquisition, recycling, and waste prevention from the White House Task Force on Recycling

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Closing the Circle News

Biobased Products and Bioenergy: The Future is Now

by Ron Buckhalt, Senior Marketing Specialist, U.S. Dept. of Agriculture

In coordination with the Department of Energy and other Federal partners, the U.S. Department of Agriculture (USDA) is speeding the development, commercialization, and adoption of biobased products and feedstocks for use in the U.S. economy.

The importance and timeliness of this initiative comes from the convergence of several important energy efficiency, farm economy, and environmental issues.

First, the call for action is part of President Bush's National Energy Plan. "The U.S. has significant potential for renewable resource development. These non-depletable sources of energy are domestically abundant and often have less impact on the environment than conventional sources. They can provide a reliable source of energy at a stable price, and they can also generate income for farmers, landowners, and others who harness them." *Nature's Power, Increasing America's Use of Renewable and Alternative Energy, National Energy Policy, May 17, 2001.*

Second, large U.S. and world crop production limits the opportunities to increase the prices of agricultural commodities. It also has proven difficult to increase U.S. agricultural exports from the current low $50 billion range back to the $65 billion levels of the first half of the 1990s.

Third, there is a growing recognition that the use of biobased feedstocks can be beneficial for our environment by substituting for petrochemical feedstocks. Using petrochemical feedstocks and products from those feedstocks adds greenhouse gases and escalates climate change pressures.

Fourth, there is the matter of energy security. The energy challenges our Nation faces today offer tremendous opportunities for agriculture to help us solve our energy problems through the production of domestic liquid fuels, such as ethanol and biodiesel. Renewable energy is good for independence, good for farmers, and good for the environment.

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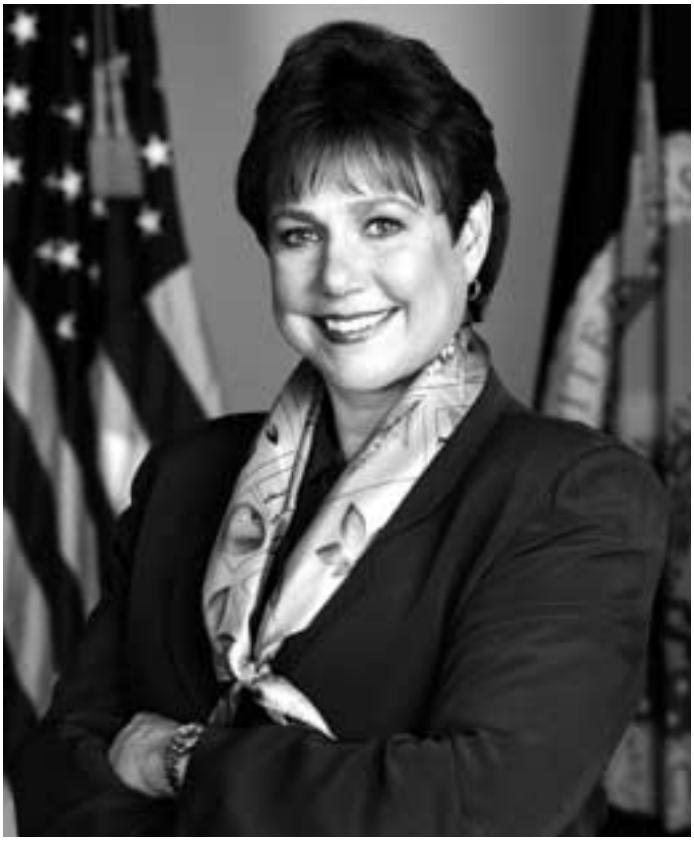

In February 2001, USDA Secretary Ann Veneman said at the Agriculture Outlook Forum, "We will support research and development to find new solutions for issues related to food safety, the environment, biotechnology, energy, and other new uses. In order for the U.S. agricultural economy to remain competitive, we need to accelerate our search for innovative uses for farm products."

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USDA is leading by example. On August 7, 2001, Secretary Ann Veneman announced that USDA agencies will use biodiesel and ethanol fuels in fleet vehicles where practicable and reasonable in cost. This new policy shows USDA's support for the National Energy Plan as well as improving our environmental air quality, the prosperity of the rural economy, and our Nation's energy independence.

To further stimulate the production of ethanol and biodiesel, USDA has made available $150 million in 2001 to companies that increase their purchases of raw commodities to make these liquid fuels.

USDA also established a web site to serve as a source book for those looking for biobased products, http://www.usda-biobasedproducts.net/public. The site currently offers product sources in the categories of Alternative Fuels and Fuel Additives, Lubricants and Functional Fluids, and Solvents/Cleaners and will soon identify product sources in additional categories.

At the same time, USDA is working with the Defense Logistics Agency (DLA) to identify "attributes" of biobased products for inclusion in DLA's product catalogs. This will make it easier for military purchasers and others using DLA's catalogs to identify and purchase biobased products. DLA already is seeking nearly 2 million gallons of biodiesel – a first.

The Greening of Yellowstone

Yellowstone National Park was set aside as the world's first national park in 1872 and is one of our nation's greatest natural treasures, a place to be left unimpaired for future generations. In 1997, when the park celebrated its 125th anniversary, the most important question asked was what can we do to preserve and protect this national treasure for the next 125 years? The result was the creation of a movement dubbed "The Greening of Yellowstone." Using partnerships with state and local governments and private interests, Yellowstone has embarked on a very aggressive greening effort that includes the use of biobased products.

Truck-in-the-Park Project

In partnership with the Montana Department of Environmental Quality, the U.S. Department of Energy, and the University of Idaho, Yellowstone National Park demonstrated the use of rapeseed (canola) ethyl ester, an alternative biodiesel fuel, in a pickup truck. The fuel is produced from rapeseed oil reacted with ethanol made from potato waste generated by the food processing industry. The fuel generates low air emissions and is biodegradable, which are desirable attributes in Yellowstone's sensitive environment. The growing

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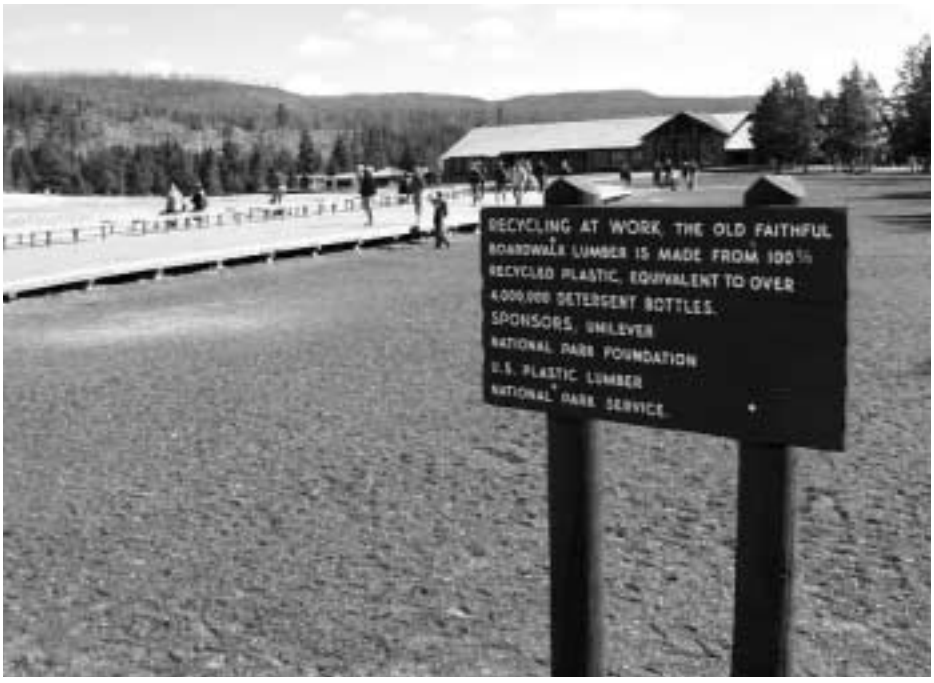

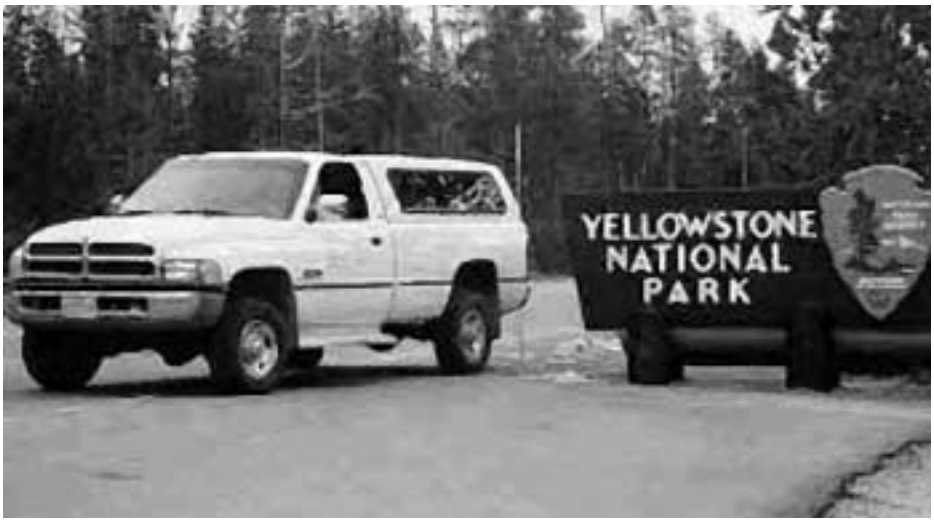

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and harvesting of rapeseed, the oil extraction process, and the fuel demonstration are all accomplished within a tri-state region around Yellowstone.

Using a donated Dodge pickup truck, Yellowstone employees drove more than 130,000 miles on 100 percent biodiesel fuel since 1995. The truck averages about 17 miles per gallon, the same as when it was tested with regular diesel fuel during baseline data development. No modifications were made to the truck's engine or fuel system. Air emissions tests showed that smoke, hydrocarbons, nitrogen oxides, and carbon monoxide were reduced by using the biodiesel. Tests also showed that the sweet odor of biodiesel exhaust does not attract bears, which was a concern to park managers.

In 1998, the truck's engine was completely torn down and analyzed, revealing very little wear and no carbon build-up. The truck is now in Phase II, in which the intent is to accumulate 200,000 miles over the next three years.

The project has now been expanded to include tour buses, garbage trucks, and a variety of heavy equipment. The fleet is currently operating on a 20 percent blend of canola oil and diesel. Beginning the spring of 2002, biodiesel will be used in all of the park's 300 diesel powered vehicles. Additionally, it is envisioned that biodiesel fuel will be made available to the general public at all gas stations within the park.

Alternative Fuels

For the past three years, Yellowstone's administrative fleet of more than 300 unleaded-fuel vehicles has been operating successfully on an ethanol blend (E-10). Since this past spring, E-10 fuel has been available to park visitors at every public gas station within the park. This marks the first time that an alternative fuel is offered to the general public inside of a national park. Based on Yellowstone's success, both Grand Teton National Park and the Town of Jackson Hole, WY now have converted to alternative fuels for their administrative vehicles.

Snowmobile-in-the-Park Project

More than 80,000 snowmobiles enter Yellowstone National Park in the winter, with up to 2,000 in the park on a busy winter day. Snowmobile emissions, which can range up to 1,000 times more than an automobile, are a major concern to park management. Yellowstone and the State of Montana created a partnership to study various combinations of biological fuels and lubricating oils and to measure their effect on emissions and snowmobile engine performance. The project used existing products or those near commercialization. The lubrication oils tested included biodegradable synthetic oils developed from animal and plant fats. These lube oils have been shown to reduce emissions. Because of park use of these oils, most snowmobile rental companies in Yellowstone gateway communities voluntarily use and sell this type of lubricating oil. Demand for the oil has resulted in at least three companies now making this product available to the general public.

Conversion to Environmentally Preferable, Biobased Cleaning Products

Yellowstone is the first park in the country to replace existing cleaning and janitorial products used by park and concessionaire personnel with environmentally preferable cleaning products. After assessing the cleaning products used, the park switched from more than 130 products with certain health or environmental risks, to less then 10 products that are truly "green." This green procuring process has expanded into many other national parks throughout the country.

What Is A Biobased Product?

Simply stated, biobased products include industrial products and fuels, but not food or feed, made from renewable agricultural and forestry feedstocks, including crops and crop byproducts, animal byproducts, and wood and wood residues. Familiar examples include soy-based ink, lubricants, ethanol, biodiesel, and bioplastics.

Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition," directs the U.S. Department of Agriculture to issue a list of biobased products for Federal agencies to consider purchasing. USDA proposed 13 categories of biobased products in an August 13, 1999 Federal Register notice. Following is a brief description of these categories and examples of biobased products. USDA has not yet issued the final list of biobased products.

Examples of Biobased Products

Absorbents/adsorbents

A wide range of agricultural materials are used for absorbents, including wool, cotton and cotton linters, vegetable starch, kenaf, and agricultural wastes such as corn stover, peanut hulls and other crops residues.

Adhesives, Inks and Coatings

Adhesives can be made from plant proteins, plant starches, and plant oils. These adhesives generally have low or no emissions of hazardous air pollutants and volatile organic compounds.

Plywood, finger-jointed lumber, engineered wood building components (laminated beams, trusses, etc.), decorative composites, fiber board panels, and paperboard can contain biobased adhesives.

Plant oils, such as soy, are used to make inks. Under the Vegetable Ink Printing Act of 1994, the ink must contain a minimum of 20 percent by volume of plant oil to be consider plant-based.

Plant-oil based coatings include from starch coatings to protect seeds and assist in germination to boat coatings to reduce bottom fouling by marine organisms. Other biobased coatings are used as concrete sealers and stains, wood sealers and waterproofing, architectural coatings, form release agents, corrosion inhibitors, and polishes.

Alternative fuels and fuels additives

Ethanol, or ethyl alcohol, is usually derived from corn, is blended with petroleum-based gasoline, and is widely available. Research is underway to efficiently produce ethanol from other biomass sources.

Biodiesel is typically produced from vegetable oil or animal fat. It is a clean burning alternative to petroleum diesel and is an excellent lubricity agent, an important characteristic as efforts are underway to reduce the sulfur (also a lubricity agent) in petroleum diesel. Biodiesel can be used at 100% but is typically blended with petroleum at a 20% rate referred to as B-20. Using additives and other methods, USDA researchers have improved the ability of biodiesel to be used in cold weather in temperatures comparable to petroleum diesel.

Agriculture and forestry by-products are also used to make fuel pellets.

Construction materials/composites

This category includes wall systems made from compressed wheat straw or other plant fibers; fiber board made from wheat or other cereal straw, sugarcane bagasse, or other plant fibers; composites made from soybean meal or other plant proteins; molded auto or tractor parts from vegetable fibers; and building or office furnishings made from biobased composites.

Enzymes/intermediate chemicals

Agriculture-based enzymes and chemicals are found in pharmaceuticals, detergents, cleaning agents, cotton textile surface treatments, personal care products, and microbial agents.

Polyols are used in antifreeze, plastics, personal and health care products, and food products. Lactic acid is used to produce renewable plastics. Fatty acids are used in surfactants, plasticizers, lubricants, and other chemicals. Epoxidized soybean oil is used as an intermediate chemical in the manufacture of vinyl plastics and paints. Soybean oil can be used as an intermediate product in the manufacture of polyurethane for hundreds of applications from carpet backing to foam cushions.

Lubricants/functional fluids

These products are made from soybean, canola, rapeseed, corn, or other plant materials. Examples include vehicle lubricants (crankcase oils, transmission fluids, fifth wheel grease, all purpose total loss lubricants); air-cooled engine lubricants (crankcase oils, greases); hydraulic fluids; gearbox oil; metal working fluids and cutting oils; and total loss lubricants including 2-cycle engine oils, rail and flange lubricants, wire rope and cable lubricants, pump

drip oils, bar chain oils, lumber skid lubricants, asphalt release agents, concrete form release oils, and penetrating oils. Vegetable oils also can replace petroleum as the coolant in electric transformers.

Landscaping products

This category includes composts, mulches, potting soil, soil amendments, protein-based mulching films, and dust suppressants.

Biocontrol/bioremediation media

Biocontrol products, such as biocontrol potting soil, reduce or eliminate the need for chemical pesticides because they contain microbes which prevent plant diseases.

When used as absorbents, biobased products can also bioremediate hydrocarbons.They may also be used to simultaneously remove or separate toxic or hazardous substances from soil or surface water while promoting the development of native microbe populations to hasten biodegradation of residual amounts of hazardous substances. The Environmental Protection Agency lists a product made from soybean oil as an oil spill clean-up material. Sprayed on beaches contaminated by petroleum, it allows most of the spilled crude to be safely washed off and collected for burning as fuel. The residual soy product feeds microbes to more quickly break down petroleum residues.

New fibers/filler/yarn/ insulation

This category includes new fibers and older fibers that were once commonly grown in the U.S. and are under development or redevelopment. Examples include kenaf, flax, ramie, low grade wool and cotton, milkweed (yarn, pillow filler, oil), and plant lignin, which is used as an adhesive.

Renewable alternative fiber papers/packaging

Paper can be made from kenaf, chicken feathers, and various agricultural waste fibers such as corn stover.

Solvents/cleaners/ degreasers

This category includes citrus based cleaners, soy-based cleaners and degreasers, solvents, paint strippers and graffiti removers, aircraft cleaners, metal parts cleaners, printing ink removers, adhesive removers, and car washes.

Plant-based plastics/ degradable polymers/films

This broad category includes compostable cutlery, plates, and bowls; films and biodegradable bags; and packing peanuts.

Soybean-oil based polyurethane is used in a variety of products, such as molded cushions and pads for furniture, automotive seats, and dashboards; molded cases and covers for appliances, telephones, computers, and carpet backing; and rigid insulating foams used to insulate refrigerators, freezers, coolers, and appliances.

Other

This category includes personal care products, pharmaceuticals, and nutraceuticals.

Vegetable oils and small molecule plant starches can be used in sun screen, bath bars, skin cleaners, hand and body wash, shower gels, moisturizing lotions and creams, shampoos, hair conditioners, and styling gels. Personal care products also can contain soy, jojoba, lesquerella, meadowfoam, and other plant-derived oils.

Coming Soon

In addition to the biobased products featured in this issue of Closing the Circle News, many other products are undergoing commercial development. Here is a sample.

Non-allergenic latex products: Latex from guayule, can be used in gloves and other medical products. This form of latex has very little protein and is safe to use by the estimated 20 million Americans who have developed life-threatening Type I latex allergies. Guayule is a native shrub which can be farmed in the southwestern states.

Food packaging: Wheat starch, starch-rich streams, modified starches, and agricultural fibers can be used to create new types of biodegradable food packaging materials. In some cases, the food packaging itself is edible! McDonald's Corporation, for example, is using a biobased clamshell burger boxes in several hundred of its stores. These clamshells, as well as meat trays and hot cups, perform similar to petroleum-derived disposables and are made from less expensive starch materials.

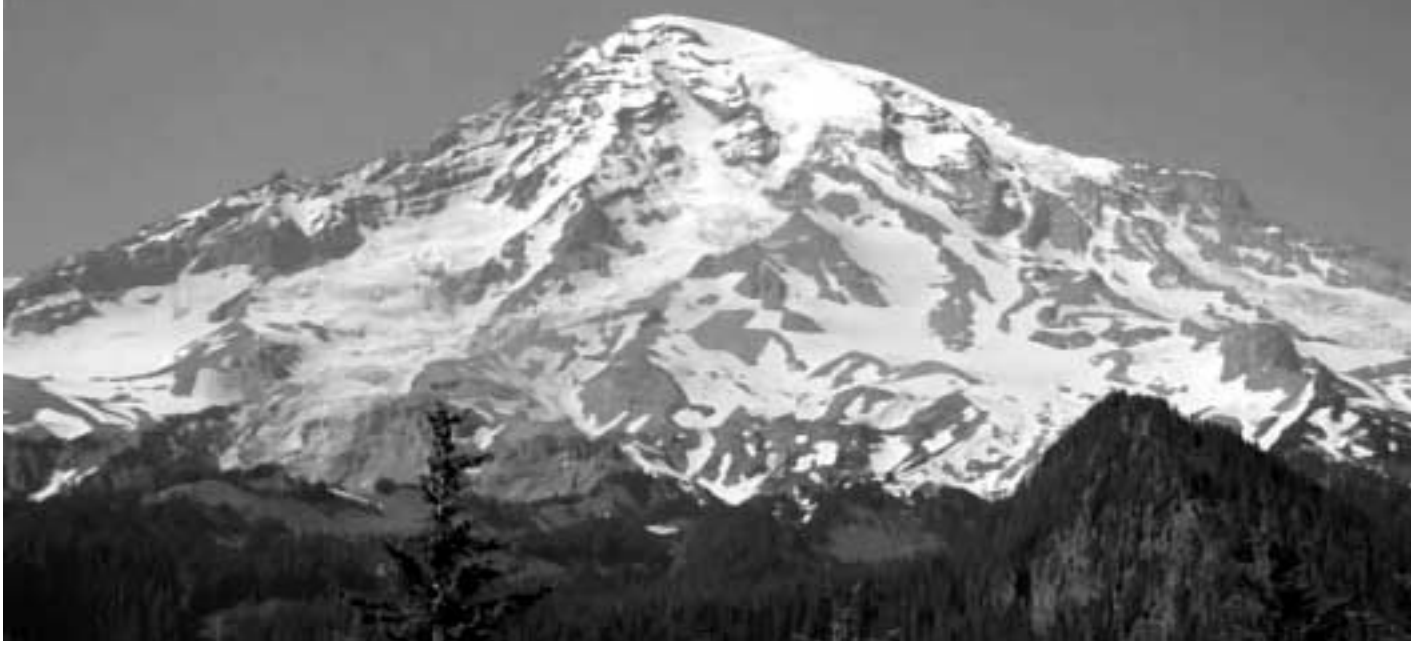
Other packaging: Starch-based foam beads have been developed as drop-in-replacement resins to directly replace polystyrene "peanuts."

Lightweight concrete: To form a lighter concrete, starch aquagels can be added to a concrete mixture during setting. The starch component forms air pockets as it dries, which reduces the density of the concrete.

Industrial enzymes: Biobased enzymes that function at much lower temperatures than commercially available enzymes will allow huge savings in energy costs.

Chemical feedstocks: Research continues into biobased chemicals. In one example, starch and cellulose are being used to synthesize aldaric acids, which are then used to produce an array of nylon-type polymers.

Generating a Biobased Success in Mt. Rainier



Mt. Rainier National Park, in Washington State, is using biobased products as part of its efforts to create a cleaner environment. In 1999, the park set a goal of reducing petroleum fuel consumption by 20 percent by 2005 and chose biodiesel fuel as the best alternative.

In addition to using biodiesel in its vehicles, Mt. Rainier also began using biodiesel fuel in most power generators in the park. The park's generators serve as a backup power system for all areas of the park, including Longmire, Paradise, Ohanapecosh, Sunrise, and Carbon River. These generators prove particularly important during the winter season when power outages occur more frequently. Sunrise, located in the northeast corner of the park, runs entirely on biodiesel fueled generators. Because of Sunrise's remote location, a public power supply is not available and all facilities including the visitor center, seasonal housing, day lodge, water treatment plant, and comfort stations, running from the beginning of June through mid- to late-October, rely on biodiesel fuel. Mt. Rainier's generators run on B-50, a half petroleum, half soy based fuel.

As Mt. Rainier experiments with biodiesel fuel, park staff will be observing whether there are changes in vehicle maintenance, differences in vehicle power, fuel consumption, fuel performance at low temperatures, and emissions. While it is still early to determine whether biodiesel fuel acts as the most effective alternative for fueling vehicles and powering generators, the park has been impressed with its performance thus far. With technology rapidly changing, the park faces an ongoing search for the optimal fueling alternative.

Update: Department of the Interior's Use of Biobased Cafeteria-ware

Having completed a successful pilot project using the biobased EarthShell food service plates and bowls in their employee cafeteria, the Department of the Interior (DOI) became the first government facility to use these products on a regular basis when the cafeteria contractor, GSI, Inc., entered into a purchase agreement with EarthShell. The pilot project demonstrated the outstanding performance of the EarthShell product as well as how effectively food waste and other compostable materials can be turned into a valuable by-product.

DOI plans to learn from this effort and continue to seek out additional opportunities to use biobased products and to keep them out of incinerators and landfills. A recent Closing The Circle Award winner, Tim Hudson from Yellowstone National Park, stated that upon the completion of a solid waste characterization study of the park, Yellowstone learned that approximately 60% of the solid waste generated was compostable, with about 40% of that being food waste. Considering the full cost of solid waste disposal (e.g., tipping fees, transportation, etc.) he stated that his facility can't afford NOT to compost.

Biobased Cleaning at the Pacific Northwest National Laboratory

The Product

The Pacific Northwest National Laboratory now purchases a biobased cleaner to keep workers' health and the environment as clean as the windows and walls. One product almost does it all. Just by changing the dilution, the same product can clean mirrors, sinks, floors, etc. and rid carpets of the toughest stains. Instead of using more than 30 cleaning products, Pacific Northwest now has 7 – one of which is the key product in the suite, the biobased cleaner.

A simplistic definition of "biobased" products is those products produced from readily renewable, biological resources. In the case of Pacific Northwest's biobased cleaner, the readily renewable ingredients are derived from corn, oats, and soy. The product is neither flammable, hazardous, reactive, nor aquatically toxic, and it is child safe.

The Process

To find such a product, Pacific Northwest refined custodial product specifications initially developed by the city of Santa Monica, California. The challenge was to revise the specifications and evaluate the proposed products to adequately address Washington State regulatory requirements as well as capture any other requirements specific to Pacific Northwest.

Pacific Northwest pulled together a team of specialists in the areas of contracts, custodial work, environmentally preferable purchasing, industrial hygiene, liquid effluents, waste management, and environmental releases and reporting. The team developed the specifications, evaluated and tested the proposed products, and selected a suite of products for general cleaning, disinfecting, and floor waxing and stripping.

The Results

Pacific Northwest's custodial staff were skeptical initially about the product's ability to do the job, but after a demonstration of the product in which a carpet stain that had resisted all other cleaning methods was readily removed with the biobased product, staff were impressed. Once staff were trained on how to use the product, what the biobased product would do (for example, prevent calcium deposits) and would not do (for example, remove calcium deposits), the Custodial Manager began hearing from his staff that "it works better than I thought it would."

From the Custodial Manager's viewpoint, the biobased product is exceeding expectations both in its performance and ability to prevent cleaning problems, such as calcium deposits. The benefits of Pacific Northwest's switch to an environmentally preferable biobased cleaning product have been to:

- Provide healthier working conditions for staff,
- Protect the environment,
- Reduce the tracking of inventories of cleaning products, and
- Reduce waste handling, shipping, and disposal costs.

For more information on the Pacific Northwest National Laboratory's Green Custodial Products Program, contact Glenn Thornton, at 509-375-3814. To "green" your cleaning, staff health, and the environment with biobased products, check out the following:

Decision Making Wizard for Environmentally Preferable Cleaning Products

U.S. Environmental Protection Agency
http://www.epa.gov/opptintr/epp/cleaners/select/

Attributes for Environmentally Preferable Cleaning Products

U.S. Environmental Protection Agency
http://yosemite1.epa.gov/oppt/eppstand2.nsf/Pages/PickStore.html?Open
Click on Grocery/Miscellaneous Store

Environmental Cleaning Supplies Contract

State of Minnesota
http://www.moea.state.mn.us/lc/cleaning.cfm

Environmentally Preferable Cleaning Supplies

State of Massachusetts
http://www.comm-pass.com/Comm-PASS/Scripts/xdoc_view.idc?doc_id=003688&cp_xx

Green Cleaning Products

Center for a New American Dream: www.newdream.org/procure/

Green Cleaning Products Contract

State of Washington: http://www.ga.wa.gov/proc.htm

Green Custodial (Cleaning) Products Bid Specifications

City of Santa Monica: santa-monica.org/environment

Green Seal Standard and Environmental Evaluation for General Purpose, Bathroom, and Glass Cleaners Used for Industrial and Institutional Purposes

Green Seal: http://www.greenseal.org/index.asp

How to Select and Use Safe Janitorial/Cleaning Products

California Environmental Protection Agency
http://www.westp2net.org/janitorial/factsheets.htm

The 2001 National Recycling Congress Re-Scheduled!

This year's National Recycling Congress and Exposition was postponed until January 13-16, 2002. It will still be held in Seattle, WA. The White House Task Force on Recycling will once again offer Federal-specific educational sessions. The Task Force and NRC are committed to providing Federal employees with the opportunity to learn and share with Federal and non-Federal recyclers their experiences in waste prevention, recycling, and procurement of recycled content and environmentally preferable products. Here is an overview of the Federal sessions:

Biobased Products – Greener Alternatives: Speakers will discuss USDA's new biobased industrial products web site, biodiesel, and other biobased industrial products available for Federal purchase.

Electronics Recycling Does Compute: This session will explain Federal agencies' options for handling old computers and electronics, by demanufacturing and recycling through Federal Prison Industries, Defense Department demanufacturing contracts, or the Department of Energy's Oak Ridge National Recycle Center.

The Winning Edge: Executive Order 13101 requires more than buying recycled content paper. Representatives of three agencies with aggressive "greening" programs will discuss what gives their programs the Winning Edge.

So How Do I Buy Green Products Anyway?: This hands-on workshop on how to prepare "green" solicitations and contracts will feature examples from actual services and construction contracts and GSA's "green" lease provisions.

Town Hall Meeting: Join us for our annual Federal community Town Hall Meeting to discuss the latest "greening the government" initiatives.

For more information, visit the Task Force's web site at www.ofee.gov or NRC's web site at www.nrc-recycle.org. We have a lot of exciting news and program ideas to share, and we look forward to meeting with you in Seattle!

Last Minute News... Jiffy Lubes Offer Re-Refined Oil!

Drivers of Federal government vehicles in Northern California now can obtain re-refined oil at 71 Jiffy Lube locations in San Francisco, San Jose, Santa Clara, Santa Cruz, Sacramento, and surrounding regions. Through this pilot project, Jiffy Lube will determine whether to offer re-refined oil permanently.

Jiffy Lube technicians will check license plates to confirm GSA or other Federal agency vehicle status and, in most cases, will honor Voyager cards and other government credit cards for payment. The re-refined oil will be part of Jiffy Lube Signature Service® for government vehicles, which provides overall vehicle preventive maintenance.

Visit the "Recycled Content" section of the White House Task Force on Recycling's web site, www.ofee.gov, for the list of Jiffy Lubes participating in the pilot.

White House Task Force on Recycling

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