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Supercritical carbon dioxide/water emulsion found effective for remediating metal contaminants in waste

by Bill Dupuy

Modifying a technique already used to remove caffeine from coffee and undesirable agents from semiconductor wafers, a research team at the Laboratory is developing the promise of an environmentally friendly method for using supercritical carbon dioxide and water to remove radioactive particles and hazardous metals from mixtures of waste.

In early tests, the technique removed virtually all of the contaminants from exposed materials. The researchers believe the technique ultimately could be used to extract contaminants from containers and other types of refuse generated by workers in laboratories and industrial plants. That would result in the need to dispose of only small volumes of

contaminants rather than using water in bulk for cleaning or putting the vast volumes of contaminated work materials into the waste stream.

An advance over previous research in the field, the Los Alamos team worked with a microemulsion that comprises supercritical carbon dioxide and water, which was modified with the addition of a polyether. Research results were presented recently at the 2002 meeting of the American Chemical Society in Orlando, Fla.

By itself, supercritical carbon dioxide, which is CO₂ under pressure

and at a certain temperature, is an effective solvent for a number of materials except metal ions, said Los Alamos research team leader Mark McCleskey of Actinide, Catalysis, and Separations Chemistry (C-SIC). Carbon dioxide is abundant and low in cost. It is also environmentally benign because it is inert, nontoxic and nonflammable. But the only way previously known to employ it in metal ion extraction was by combining it with a special kind of molecule known to combine with



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Integrated Management: a work in progress

by John R. Gustafson

The Lab is engaged in a number of actions that continue progress toward Integrated Management.

Integrated Management is the path Director John Browne has defined for the Lab for becoming the National Nuclear Security Administration's "laboratory of choice" by being a unified and customer-focused lab with outstanding performance in all areas.

Following the successful track grooved by the Lab's Integrated Safety Management program and extended

through Integrated Safeguards and Security Management, Integrated Management aims to unify the activities of the work force in fulfillment of our programmatic responsibilities. It intends to integrate the Lab's science, programs and business operations with our mission and vision.

The effort includes changing a number of Lab processes so that we have an institutional approach to issues rather than many separate approaches.

Here are a few areas in which activity toward integrated management is currently under way:

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Integrated Management ...

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Facility Management

Associate Director for Operations Jim Holt is leading an effort to revamp the way the Lab manages facilities. It currently costs the Lab about \$400 million a year to keep facilities operational. Holt is looking into ways to reduce costs while improving the results of facility maintenance efforts.

Holt has been meeting with leaders from technical divisions to get their input on how best to reduce the Laboratory's total "footprint," centralize facility maintenance activities where it makes sense to do so and standardize facility management processes. The Operations Directorate also is developing a ten-year comprehensive site plan to guide investment in facility maintenance and infrastructure renewal.

Budgeting

When Director Browne announced his realignment last fall he established high-level councils to set and manage overall program directions and allocate resources consistent with the established directions. In this way, budgeting would be more firmly based on planning rather than on reactive decisions.

An additional external requirement will impose increased formality on the Lab's budget process. The law that established NNSA also directed the agency to develop and implement a Planning, Programming, Budgeting, Execution and Evaluation System.

The PPBES process has long been used by the Department of Defense, and NNSA will officially integrate such a process beginning with the Fiscal Year 2004 budget. Under the PPBES process budgets are developed within the context of a five-year plan and the expected results to be delivered through a budget are clearly defined.

Tom Palmieri, the Lab's chief financial officer, is leading the Lab's effort to establish a process that will satisfy the NNSA and Department of Energy requirements, which are still being developed.

Enterprise Project

Part of being able to demonstrate fulfillment of expected results is access to good data. The Enterprise Project, which began last August, will integrate business practices and financial controls to give managers timely access to data. The four-year effort will implement a new computer-based system that will improve how the Lab handles all of its administrative functions.

Recruitment

Although hiring decisions remain within the local authority of Lab groups and divisions, there are institutional goals associated with hiring overall.

The Laboratory intends to hire 1,000 people this fiscal year, about 400 of those in response to expected retirement or other attrition and about 600 representing new personnel to shoulder the Lab's increasing programmatic workload. The majority of the hires will be for technical positions.

The Lab has directed that new hires meet some or all of the following criteria: entry level (within five years of most recent degree), diverse, strategic (skills that can support the Lab for the long term) and quality. The Lab set an ambitious goal of 80 percent entry-level hires.

Deputy Director for Science and Technology Bill Press recently described several efforts the Lab has undertaken in support of institutional recruitment.

- Generic job ads recruit for a specific skill area, rather than to a specific job and thus are a standing invitation for résumés from candidates in the skill area.
- Funding to augment hiring packages when necessary to help get promising recruits on board.
- Funding to support travel that includes recruitment efforts.

Next Steps

Progress toward Integrated Management continues on many fronts: the realignment initiated last year continues to take root; the Senior Executive Team provides high-level guidance through institutional goals and councils; and the requirements in Appendix O of the University of California management contract dictate the demonstration of real progress in a number of areas representing not only our own internal ability to work as a team but also to work in effective partnership with Lawrence Livermore National Laboratory.



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Los Alamos enhances global security by ensuring safety and confidence in the U.S. nuclear stockpile, developing technologies to reduce threats from weapons of mass destruction and improving the environmental and nuclear materials legacy of the cold war. Los Alamos' capabilities assist the nation in addressing energy, environment, infrastructure and biological security problems.



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Coming to a mail stop near you ...

by Jacqueline Paris-Chitanvis

Sometimes you just can't stop people from "tweaking" things. They read, see or hear something that seems pretty good, but they can't resist the urge to make it better. I confess that in this sense, we in the Public Affairs Office are guilty. We continually look for ways to make our employee communications products better and more useful to the Laboratory community. Most recently, we revamped the layout of the online Daily Newsbulletin to make the content more easily accessible to users. And we're at it again. This time, we've turned our sights on the bi-weekly Los Alamos News Letter.

As of the week of May 13, the news letter will have a larger, more vibrant look. That is, it will be a tabloid-size, four-color publication. The longer, tabloid size allows for more copy to be included in each issue. And having access to color means we can use charts, graphs and other visual images

that rely on color for clarity. Advances in printing technology, such as the heat-set web process, make it more economical than ever to use four-color printing for employee publications. Public Affairs also has reduced the number of publications it produces with the recent discontinuation of "Dateline: Los Alamos," a monthly publication that focused on Lab technology and was distributed to Congress, funding agencies, academia and other external audiences (a pending publication out of Communication Arts and Services [IM-1] will better address this communications need).

Visual changes are just the beginning. We intend to punch up the newsletter's content by including more of the kinds of materials employees want and need to know about. For instance, the newsletter will have more articles on Lab successes (individual and organizational) and more news about the institutional goals, policies and procedures and other factors that affect why and how you do your jobs.

We also are putting more emphasis on *you*, the employee, and your contributions to the success of the Lab's mission. Articles will showcase the myriad work that is done at Los Alamos, while giving readers a glimpse of the diverse and talented people who work here. The presentation of information will be crisp, clear and concise. We've learned you don't have to be long-winded or deadly dull to effectively convey information, and we intend to demonstrate this. Our staff wants the Los Alamos News Letter to be something employees will want to read and take home to share with family and friends.

Your input is valued and needed to make the bi-weekly employee publication the best it can be. To that end, we will continue to solicit input from you on what's working in the publication and what's not.

So, keep your eyes open the week of May 13. A new-and-improved Los Alamos News Letter is coming to a mail stop near you.

Supercritical carbon ...

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certain kinds of metals. The effectiveness of this method, however, is limited.

Water could be a desirable transport medium in a supercritical solvent system, McCleskey said, except that water does not stabilize in carbon dioxide. What's more, water by itself tends to trap on the surface of solid materials and in low volumes cannot effectively penetrate deep into the pores to get at all of the contaminants.

To test their theory that small amounts of water could be employed in metal-contaminant remediation, the team worked with a supercritical carbon

dioxide microemulsion modified with the addition of an inert polyether known to stabilize water. They used the emulsion to extract copper and europium from filter paper, wood, cement and activated carbon. Copper and europium were selected for extraction because these elements are spectroscopically active and would yield information on the microemulsion's effects.

After applying the microemulsion to the materials, the team achieved 98 percent contaminant recovery. "We found

that the metals targeted for extraction concentrated in the nanodroplets of water in the microemulsion, allowing us to separate the metals from the contaminated materials easily," McCleskey said. "In addition, the properties of this microemulsion allow penetration even into small pores of contaminated materials usually not accessible to bulk water."

Microemulsions are especially advantageous for extracting metals from waste, he said, because the amount of water required is proportional to the amount of contaminant being removed, not to the amount of

waste to be cleaned. "The result is that grams of contaminants can be captured with just a few milliliters of water."

To remove the captured contaminant from the microemulsion, the

team adjusted the carbon dioxide pressure and added water. This phased separation of contaminant from carbon dioxide has the potential of providing an easy recycle system for the microemulsion. One test showed that 81 percent of a microemulsion's initial capacity was retained for its second application.

If further research produces consistent results, McCleskey believes the technique has potential to become an environmentally friendly method for remediating hazardous wastes.

"... the technique has potential to become an environmentally friendly method for remediating hazardous wastes."

Revealing statistics contained in Ombuds Program annual report

by Judy Goldie

Issues of importance to the Laboratory work force run the gamut, according to the Ombuds Program Office's calendar year 2001 report.

From compensation and benefits to personal interactions and quality of work life, more employees are taking the time to tell the Ombuds staff their concerns. In fact, 50 percent of all visitors come to talk about interpersonal relationships and treatment; 36 percent involve employee-supervisor conflict. These one-on-one relationships are often the cause for seeking assistance in categories listed in the annual report as "incivility," "unfairness" or "ethics."

The Ombuds Program Office has had confidentiality as a cornerstone of its operations from its inception, and this is not breached through sharing information on trends with senior management, emphasized Ombuds Program Office Chief of Staff Jack Foley, who put together the report.

And management has responded to many of the issues raised, said Foley. Student and postdoc concerns including those affecting institutional recruiting and retention were the catalyst for the creation of the Student Ombuds Program, designed specifically to reach out to students. The creation of the Ombuds Small Business Program was the positive outcome of Ombuds staff interaction with regional businesses. The Ombuds efforts post-Cerro Grand Fire are another aspect of senior management's efforts to help not only Laboratory employees directly affected by the fire, but the communities and businesses affected by it and the Lab's two-week closure.

Some of the other initiatives supported by management include expansion of the Ombuds confidential telephone hotline as a means to



discuss concerns about sexual harassment and make appropriate referrals; enlarging the *future@lanl.gov* e-mail venue to include "Ask the Director"; and a Department of Energy, complex-wide cooperative effort to address tech transfer concerns.

"The program has grown because both managers and employees value

a neutral and confidential resource with which to safely explore options for resolving concerns," said Foley.

The Ombuds Program Office staff impacts annually between 10 and 20 percent of the work force, according to the report. Fully one-third of the visitors seeking assistance from the Ombuds Program are supervisors and managers. The report also shows that technical staff members have increased their use to 52 percent of all visitors assisted by Ombuds staff — a 6 percent increase over the past year, and that there is a 4 percent increase in use by those in the specialist staff member series.

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Ten ways to better sleep

With the hustle and bustle of everyday life, it is a wonder that most of us get any sleep at all. This is a problem that affects people of all ages and is not gender specific. The National Sleep Council has put together some guidelines to ensure better sleep.

- Give yourself "permission" to go to bed
- Unwind early in the evening
- Develop a sleep ritual
- Keep regular hours
- Create a restful place to sleep
- Sleep on a comfortable supportive mattress and foundation
- Exercise regularly
- Cut down on stimulants
- Don't smoke
- Reduce alcohol intake

For more information on getting a good night's sleep or to download a copy of the Better Sleep Guide, see the Better Sleep Council's Web site at www.bettersleep.org.

New truck-inspection station to open

Location improves security for deliveries to Laboratory

by Kathryn Ostic

A new truck-inspection station located near Technical Area 72 off East Jemez Road and NM 4 will be fully operational by mid April, according to Ed Hoth of Utilities and Infrastructure (FWO-UI).

"The purpose of the new inspection station is to screen packages intended for the Laboratory. This added security precaution is especially important because of Sept. 11, 2001," said Hoth.

"All Laboratory truck traffic must enter the truck inspection station, which is located on the north side of East Jemez Road just off the intersection of west-bound NM 4," said Hoth. He noted that signage according to Laboratory standards will be clearly posted. After passing inspection, permits are issued and required to deliver packages to Lab warehouses. "Trucks that have inadvertently gone to the townsite to make deliveries via the Main Hill Road will have to return to the bottom of the truck route for inspection to enter Lab property," explained Hoth.

Crystal Rodarte of FWO-UI, noted that "the new truck inspection station will eliminate trucks from crossing east on the roadway in front of oncoming traffic thereby increasing safety. The new location is an excellent choice from a security standpoint because it's at the bottom of the hill and away from TA-3."

The Security and Safeguards (S) Division is funding this project, which will cost about \$214,000. A joint survey by S and Health, Safety and Radiation Protection (HSR) divisions and FWO-UI was conducted to determine traffic volume before the new site was approved. "The survey results indicate that traffic volume is lower in the mornings



Work continues on the new truck-inspection station located off of East Jemez Road west of the intersection with NM 4. The inspection station is scheduled to open later this month. Photo by John Bass

for trucks traveling west on the truck route," said Hoth.

"Confirmation of the new site was approached from a safety and security perspective," said Darryl Overbay of Security Integration (S-2). "The planning, sighting and operations of the truck-screening station followed Laboratory Director John Browne's five-step integrated safeguards and safety management process as it was intended," he said.

A number of traffic-signal and road improvements are being implemented by FWO-UI around the Lab. Information on these improvements is available on the FWO-UI Web site at http://arania.lanl.gov/utilities/index_utilities.html.

For more information about additional security controls at the Lab, see the Dec. 20, 2001, Daily Newsbulletin at www.lanl.gov/newsbulletin.

Revealing ...

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Usage by other job categories remained the same.

Delving further into demographics, there is "almost an equal number of males and females" who have used the program from its inception, even though females are only one third of the work force. By ethnicity, visitors

use the program in proportion to their representation in the work force.

As long as the issues bringing people into the Ombuds Program Office are under the control of the University of California, its services can be accessed by the entire work force, including students; contractors; members of the community; and those who do, or would like to do, business with the Lab.

To read more detail on the various

Ombuds Program Office services, to contact that office or to read the complete annual report, go to the office's Web site at <http://www.lanl.gov/ombuds/> or call the office for more information at 665-2837 (OM5-BUDS).

Located in Los Alamos at 113 Central Park Square, the office is open from 8 a.m. to 5:30 p.m. Monday through Friday. Special appointment hours may be arranged if needed, said Foley.



NEWSMAKERS



Carol Sutcliffe

Carol Sutcliffe recently was named group leader of Tritium Science and Engineering (ESA-TSE).

Since 1981 Sutcliffe has been a Laboratory employee and has

more than 11 years of Laboratory management experience. At the Lab she has worked for the former Environment, Safety and Health (ES&H) Division; Los Alamos Neutron Science Center (LANSCE); and Environment, Safety and Health Facilities Risk Management (ESH-3). She's been acting TSE group leader for the past 18 months.

Sutcliffe received a bachelor's degree in chemistry from Florida State University, master's degree in organic chemistry from University of North Carolina and master's in business administration from the University of New Mexico.

Kirk Christensen is the newly appointed group leader of Design Engineering (ESA-DE). Christensen has been at the Lab since 1979 and has experience in design and project engineering and line management. He has delivered a variety of complex hardware devices for application in the defense, energy accelerator and space science fields.

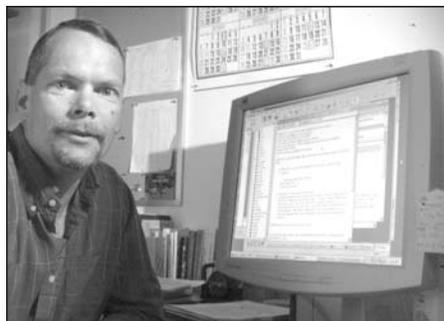
Christensen currently is the group leader of Mechanical Systems Engineering (SNS-3)



Kirk Christensen

where he has worked for approximately two years. He will continue to be group leader of SNS-3 under a joint appointment until key milestones are met. Christensen also was deputy group leader for Hydrodynamic Applications (DX-3) and team leader for Engineering Sciences Applications (ESA-DO).

Christensen has a bachelor's degree in mechanical engineering from the University of Alabama and a master's in engineering, mechanical emphasis, from the University of Texas at Austin.



Michael Weaver

Michael Weaver is the new group leader for Weapons Emergency Response (ESA-WER). He was hired at the Laboratory in 1986 to work as an engineer in the Nuclear Explosive Safety and Assembly Team to support the Nuclear Underground and Hydro Test Program. Since then he has worked in a variety of positions in the Nuclear Weapons Engineering Program with ESA and its predecessor Design Engineering (WX) Division.

Weaver has strong technical

knowledge in the area of weapons engineering, emergency response and has a very supportive leadership style, according to Earle Marie Hanson, Engineering Sciences and Applications (ESA) Division director. As a key member of the emergency response community since 1990, he has held increasingly demanding roles.

Weaver received both bachelor's and master's degrees in mechanical engineering from Montana State University.

The University of California recently announced the appointment of **Cory Coll** as the director for Laboratory Collaborations.



According to the UC news release, this is a key position in the UC Office of the President for strengthening technical collaborations and interactions among the three UC-managed Department of Energy laboratories and the 10 UC campuses.

Coll will work closely with faculty on the campuses and with research leaders at UC's three national laboratories.

Coll received his bachelor's degree in physics from Johns Hopkins University and his doctoral degree from the University of Pennsylvania.

Coll most previously had been at Lawrence Livermore National Laboratory where he was deputy director of the Office of Defense Department Programs. Before joining LLNL, he had been an adjunct assistant professor of physics at UC Los Angeles.

In Memoriam

Bernard "Jack" Eutsler

Laboratory retiree Bernard "Jack" Eutsler died March 20. He was 78. Eutsler began work at the then-Los Alamos Scientific Laboratory in 1951. He worked his entire 33-year career in Industrial Hygiene (H-5) as a chemist. Two of his children, Peggy Durbin of Information Management (IM-DO) and Bobbie Simpson of PIT-Disassembly and Surveillance Technology (NMT-15), are current Laboratory employees. He is also survived by his former wife, Lab retiree Maggie Eutsler; three other children; four grandchildren; and numerous other relatives. A memorial service was held April 5 at Fuller Lodge.

Family Days 2002

Lynne Cash, daughter of Tim Cash of Experimental and Diagnostic Design (DX-5) and Michelle Cash of Engineering Sciences and Applications Weapons Emergency Response (ESA-WER), gets up close and personal with Picasso, a five-year old iguana, near the Otowi Building. Ecology (RRES-ECO) brought Picasso to Family Day as part of its effort to introduce people to a variety of wildlife and wildlife conservation. The three-foot long lizard, handled by ESH-20's Sherri Frybarger, patiently spent the day getting acquainted with hundreds of kids.



Below: Manning a Humvee's turret-mounted M-60 machine gun is Adam Hahn, whose dad Thad Hahn works in Chemistry and Metallurgy Research, Facility Management (NMT-13). The Humvee was set up, along with other weaponry, at the Protection Technology of Los Alamos firing range at TA-72 to demonstrate PTLA's physical security capabilities. PTLA personnel also carried out live-fire demonstrations and gave visitors hands-on experience with their "shoot-don't-shoot" simulator



Snake awareness was the goal of Wildlife Center volunteer and Lab employee Tom Wyant, right, of Network Engineering (CCN-5) as he shows off a pair of non-venomous snakes to Melinda Wolinsky and her kids, Jake and Emma, whose dad, Murray Wolinsky works at the Health Research Laboratory in the Barbara McClintock Resource (B-1). Also on display, but kept safely behind glass in an aquarium, were a couple of slightly less friendly rattlesnakes.

Photos and text by Kevin Roark



Bill Robertson, a.k.a. Dr. Skateboard, of Enterprise Support and Computer Education (IM-2) enthralled a crowd of about 90 Lab employees and their families on Saturday with his skill at the "reverse wheelie" and some lively skateboarding banter. Robertson demonstrated the "physics of skateboarding" as part of the Lab's Family Day in front of the Otowi Building at Technical Area 3. A skateboarder for 26 years, he does about a dozen demonstrations a year, mostly at fairs and festivals.

Adoptees pose to benefit area shelters

by *Lecole Trujillo*

It is said that a picture is worth a thousand words. But for a group of animal lovers who put together a collection of photos for a calendar to benefit animal shelters, a picture can be priceless.

The calendar date book produced by Friends of the Shelter includes photos of animals adopted by families in the area surrounding Los Alamos. Proceeds from sale of the calendar will be used to spay and neuter animals; keep animals in foster care until homes for them can be found; and transport animals to homes, according to Wendee Brunish of Geophysics (EES-11), one of the organizers of the calendar and a volunteer for Friends of the Shelter.

Getting animals adopted is the most important message from the group. "These animals need homes and want to be part of a family," said Brunish. There are a variety of animals in shelters, including purebred animals. Volunteers in this program go to the shelters and play with the animals on a regular basis so that the pets are friendly



Grace, who was once on "death row," now has a full life with Kathy DeLucas of Communication Arts and Services (IM-1).

and more adoptable. The group also promotes spaying or neutering animals and vaccinating them.

Kathy DeLucas of Communication Arts and Services (IM-1) adopted one of her favorite dogs, Grace, from a shelter in Taos. A German Shepherd, Grace was abandoned. She was picked up by the animal shelter for chasing livestock and put on "death row." DeLucas adopted Grace with the intention of finding her a home. Once DeLucas took Grace home, she fell in love and had to keep her. DeLucas says when she comes home, Grace greets her at the gate, waiting to get a hug.

Another contributor

James Biggs of Ecology (RRES-ECO) is the proud owner of two coyote-mix dogs, Keely and Loa



Sammy and Hobbes have made themselves at home with Stephanie Frankle of Diagnostic Applications (X-5).

to the calendar and dog lover is James Biggs of Ecology (RRES-ECO). Biggs went to an animal shelter in Albuquerque with some friends because they wanted to add a new member to their family. He said he never wanted a dog and wouldn't even let animals in his car. That is until he saw two coyote-mix puppies, Keely and Loa, in the Albuquerque shelter. He became the proud owner of both puppies in March 2000. Biggs said he knew that they weren't ordinary dogs, because they looked different and were yelping. Now Keely and Loa have a wonderful home and enjoy playing aggressively, swimming in water and jumping in the snow.

Stephanie Frankle of Diagnostic Applications (X-5), adopted two kittens from the shelter in Pecos. She had seen an advertisement for the cats at the shelter, and she felt she was ready to have another pet after her dog passed away in 1994. Her cats, Sammy and Hobbes, have a wonderful home, and Frankle admits they are spoiled. Each one requires plenty of cuddling and tummy rubs, she said.

These people have come together for a great cause and are asking other people to step forward and volunteer. Anyone interested in volunteering can call Sally Wilkins at 662-2773 or Nyree Cox 662-2054. For more information about Friends for the Shelter, a Laboratory-sanctioned organization, visit <http://www.cyberanimals.net/~fos> online.

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