

Methane hydrates

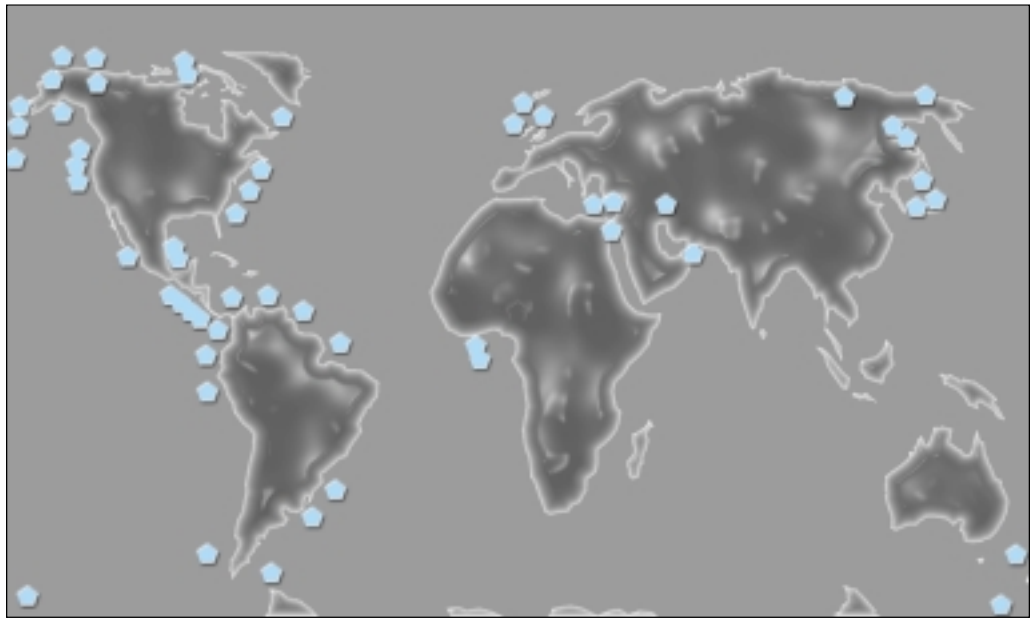
Methane hydrate isn't a familiar term to most, but it is gaining popularity in the energy sector. In the realm of energy R&D, methane hydrates are being evaluated as a potential fuel for the future. Some believe there is enough methane in the form of hydrates—methane locked in ice—to supply energy for hundreds, maybe thousands, of years.

Lorie Langley, who is leading ORNL's Gas Hydrate program for the Fossil Energy Program, believes ORNL can contribute significantly to DOE's and Congress's research agenda. Last month President Clinton signed the Methane Hydrate Research and Development Act, which authorizes approximately \$50 million over five years to develop an understanding of the nature, behavior and abundance of this clean-burning energy resource.

Explains Langley, "Gas hydrates are clathrate compounds. A clathrate is simply a structure in which water molecules under certain conditions bond to form an ice-like cage that encapsulates a gas molecule, known as a guest molecule. When that guest is a methane molecule, you have methane hydrate."

Methane hydrates, which form at low temperature and high pressure, are found in sea-floor sediments and the arctic permafrost. They can be scattered through several-

The fuel of the future may be ice that burns



Methane hydrates, a promising natural gas resource, are believed to reside throughout the globe in sea-floor sediments and permafrost.

hundred-meter depths and at various concentrations. The gas hydrates being evaluated by ORNL researchers are methane hydrates and carbon dioxide hydrates.

Although some research has been carried out in the past, little is known about the location,

formation, decomposition, or actual quantities of methane hydrates. However, national and international research and exploration over the last 20 years by various governmental and industrial entities have resulted in general

(See HYDRATES, page 2)

Closing the gap

Overhead shortfall measures offer insight into the new management team's approach

It wasn't the kind of first all-staff message Bill Madia envisioned delivering as ORNL's new director, but that's the way the cards fell. The Lab, he said on May 3, was facing an overhead budget shortfall of \$9 million for the fiscal year.

The leadership team immediately enacted a series of deliberate moves meant to close the gap without raising the Lab's overhead rate. Lab managers also wanted to avoid any short-term staff reductions.

Toward that goal, rates for space and materials handling were raised, reserve funds for Laboratory Directed R&D and program development were reduced, and overhead costs reductions for support organizations were sought, among other measures.

Jeff Smith, the Lab's deputy director for Operations, explains the Lab's reluctance to raise the overhead rate.

"A staff concern we hear over and over again is that the overhead rate is too high," he says. "There are several different rates, but the one most visible to our science and technology staff is the 'overhead composite rate.' It is currently at 41.7 percent."

And that cost of doing business, say Smith and Chief Financial Officer Greg Turner, is considered too high. In the long term, fixing the \$9 million shortfall by simply raising the rate could hurt the Lab more than the strong medicine it's currently having to swallow.

What caused the shortfall?

Several singular events played a role. The largest was a miscalculation of the loss of labor base because of workers transferred to the management and integration contractor for Environmental Management. Those losses to the recovery base historically have been hard to

estimate. The impact was a \$15 to \$20 million loss of recovery base, depending on which rate is cited.

Second were several unexpected cost increases. Among them were contract transition costs, higher costs associated with the protective services contract and a larger than expected bill for vacating space at the Y-12 Plant. UT-Battelle arrived April 1 to find that, like with many things in life, everything costs more these days.

Third, and compounding the problem, was a depleted central reserve fund, which is traditionally used to fill in budget gaps. In fact, it was overcommitted by about half a million dollars. No wiggle room there.

With activities as complex as contract transitions, the unexpected often looms large. Part of the \$2.5 million increase in the

(See GAP, page 6)

Hydrates

Continued from page 1

agreement that methane hydrates should be evaluated as a potential primary energy source for the future.

The growing demand for natural gas points to a need for this resource, Langley says. "The United States consumes about 21 trillion cubic feet of natural gas per year. We import three percent of that. Demand is expected to grow to 32 trillion cubic feet by 2020."

The natural gas infrastructure is growing also. Much of industry has already converted to natural gas. Public utilities are headed that way as well.

DOE's research agenda is structured around four major R&D elements: resource character-

Estimates on how much energy is stored in methane hydrates range from 350 years' supply to 3500 years'.

ization, production, global carbon cycle, and safety and sea-floor stability.

Resource characterization: This is essentially the baseline research toward understanding how methane hydrates behave, where and how they occur and what energy potential they actually represent. This work will require extensive data management, computer modeling and laboratory and field studies.

Production: Methods of harvesting methane hydrates will have to be developed. Langley emphasized that production methods for methane hydrates will be evaluated and will probably be similar to those of the oil and gas industry: depressurization, thermal stimulation or possibly solvent injection.

Global carbon cycle: Since methane is a greenhouse gas, understanding methane as a primary gas or a trace gas will be important in today's climate change initiatives. Hydrates are being evaluated as a potential storage mechanism for CO₂ sequestration and for storing methane for use as a transportation fuel. Langley points out that although methane when burned is a clean fuel, more information is needed on the emissions from various methane sources to fully understand its atmospheric implications.

Safety and sea-floor stability: The oil and gas industry continues to explore deeper beneath the ocean floor. Industry has concerns about drilling through hydrate zones, which can destabilize supporting foundations for platforms and production wells. The disruption to the ocean floor also could result in surface slumping or faulting, which could endanger work crews and the environment.

Langley and ORNL Fossil Energy Program Manager Rod Judkins recently wrapped up a call for proposals for methane hydrate research. Research is already in progress:

ORNL researchers currently are developing and producing hydrates in the Sea-floor Process Simulator in the Environmental Sciences Division and have completed support for the installation of a research well in Canada's Northwest Territories. Data

fusion and resource assessment activities are under way in the Computer Science and Mathematics Division to develop a model that will better estimate the resource. Proposed projects in crystallography by the Metals and Ceramics Division will provide hydrate structural data through neutron diffraction.

"Estimates on how much energy is stored in methane hydrates range from 350 years' supply to 3500 years'

supply based on current energy consumption. That reflects both the potential as a resource and how little we really know about the resource," Langley says.

"ORNL is and will continue to contribute to all four of the research areas. Methane hydrates have the potential to offer a clean source of energy, but we need to know much more about this ice."—B.C. [ornl](#)



Hydrates, the small specks, have been formed in ESD's Sea-floor Process Simulator.

New for campaign: Series I savings bonds

ORNL's U.S. Savings Bonds campaign started June 5 with a planned visit by Rep. Zach Wamp to kick off the drive. That first day also included a special All-American lunch at the Cafeteria.

During the campaign, drawings will be held for five \$100 bonds per week (for a total of 15) and additional prizes. The pool of names for the weekly drawings will come from current

savings bond participants and new enrollees.

U.S. Savings Bonds now offer, in addition to the Series EE bond, the new Series I bond. Series I bonds are sold at face value and pay a fixed rate over and above the inflation rate, for 30 years. With Series I bonds, your investment is guaranteed to stay ahead of inflation.

Series EE bonds are sold a half their face value and earn rates based on the market returns of five-year U.S. Treasury certificates.

Both Series EE and Series I bonds are backed by the U. S. government. Special tax benefits are available for investors who use savings bonds to save for their children's education. If you qualify, you can exclude all or part of the interest earned by your bonds from your federal income taxes when you redeem them to pay for college.

This year's campaign is chaired by Jamie Crigger and Danny Cantrell. It runs until June 23. Learn more about U.S. Savings Bonds on the Web at www.savingsbonds.gov.

Next blood drive starts July 6

The next Medic blood drive at ORNL is scheduled for July 6–11. During April's drive, 388 employees successfully donated at the drive's new location at Building 1503 and at HFIR, 701 Scarboro and Robotics.



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Curtis Boles

At last month's Asian Pacific American celebration, you could get a bookmark with your name on it—in Chinese. The Environmental Sciences Division's Jie Chen (left) and Connie Wang were among the calligraphers. There was also music, art and lots of food.

DOE Inspector General Hotline: 1-800-541-1625

Lab Notes

Lab, TVA unite for "green" power

Two of the region's heavy hitters have pledged to work together to promote sustainable energy technologies. ORNL and the Tennessee Valley Authority signed two memoranda of understanding on May 17 to collaborate on "green" power.

In the first agreement, DOE will commit to purchase green power for ORNL, making the Lab TVA's first industrial participant in its Green Power Switch program. The program offers power produced using sunlight, wind and landfill gas as renewable energy sources.

The second agreement is between ORNL and TVA's Public Power Institute to enter into mutually beneficial collaborations in the field of energy production and use. The agreement enables ORNL and the Public Power Institute to develop, demonstrate and deploy technologies for efficient and environmentally beneficial renewable energy production and use.

"This is a great example of using leading-edge technologies from ORNL that can improve our environment for our children's future," said Bill Madia, ORNL director. Also on hand were Dan Reicher, assistant secretary for Energy Efficiency and Renewable Energy and Kate Jackson, TVA executive vice president of River System Operation and Environment.

Threatened swans find a home

"Beaky" is a swan, one of the brood from last year, who somehow got his bill damaged in his early days at the Swan Pond. Missing the upper half meant the hapless bird had to be fed a special mush. Adding to his misery, the other swans tended to pick on him.

Larry Smarsh, who works in the Plant and Equipment Division, agreed to take Beaky to his place near Lancing. Larry reports that Beaky, special diet and all, is doing just fine at his new place.

Smarsh also took home two other cygnets, the remains of this year's brood that was decimated by some sort of predator or predators. The Lab's volunteer swankeepers have a gallery of suspects ranging from turtles to muskrats to the latest—a family of foxes that was spotted slinking around the area.

Having an area that's so rich in wildlife is a Oak Ridge National Laboratory

double-edged sword: The critters tend to eat each other. The foxes, or whatever the predators are, are also keeping the duck and goose population in check.

At the Smarsh's, the cygnets were reported doing well. Beaky was even protective of them.

ORNL's feathered friends frequently amaze and amuse. When it was reported—

rumored, really—that steps may be taken to discourage barn swallows from nesting in the "canyon" between buildings 4500-North and South, *ORNL Today* readers sprang to their defense, citing the aerial show they put on and the bugs they eat. On the other hand, most also said they wouldn't mind seeing the birds' leavings cleaned up from time to time.

Finally, observers noted that two birds of a different feather were following a mama goose



Jim Richmond

A goose family, except the black ones are ducks.

around the grounds. They are ducks whose eggs were deposited in, then ejected from, the swans' nests. So the keepers put them in a nearby goose's nest. It worked for the duckies, apparently.

20 years later, still learning

It's been 20 years since Mount St. Helens blew its stack, sending ash down upon much of the Northwest and providing scientists with a once-in-a-lifetime chance at post-cataclysmic field research. Among those who studied the devastation was Virginia Dale, then a Seattle resident. The Environmental Sciences Division researcher has studied plant regrowth in the debris avalanche area ever since.

Virginia attended a conference, sponsored by Washington State University, Vancouver, in conjunction with the Mount St. Helens Monument, marking the anniversary. Virginia told *Newsday* that,

of 286 plant species present before the eruption, 156 had re-established themselves on the debris avalanche by 1994. Areas that were strewn with huge, dead trees are now green again with head-high saplings.

She and other researchers remarked on how rapidly many species reestablished themselves after such seemingly utter destruction, and the lessons it offered about other kinds of disturbances.

"The real value of all these studies is what we can learn about management for other human-created systems," Virginia told *The New York Times*. "We have strip mines and roadsides and all kinds of devastation created by human activities."

OR contractors set up Los Alamos fund

Last month's catastrophic forest fire in Los Alamos, N.M., hit the fellow national laboratory community hard, destroying more than 200 homes. The Oak Ridge community has come together to help out.

UT-Battelle is participating with Bechtel Jacobs Company and Lockheed Martin Energy Systems in an account to which interested employees may contribute funds to help Los Alamos residents who have lost homes or other property in the Cerro Grande fire. UT-Battelle is contributing \$5,000 to the fund.

Employees who would like to help victims of the fire can make their checks payable to "Los Alamos Disaster Relief Fund" (specify "Account #47922" on the memo portion of the check) and send them to the Y-12 Federal Credit Union, P.O. Box 2512, Oak Ridge, TN, 37831-2512. Checks or cash contributions may also be taken to the Y-12 Credit Union offices at 501 Lafayette Drive. Employees who have Y-12 Credit Union accounts may request an electronic funds transfer.

Reported by Bill Cabage



Three Oak Ridge contractors recently contributed \$22,500 each to the Claxton Optimist Club for a new playground. Posing with a big check before a flock of kids at the Claxton Community Center are, from left, Bechtel Jacobs' Jim Thiesing, Optimists Club President Carl Scarbrough, Lockheed Martin Energy Systems President Bob Van Hook and UT-Battelle President and ORNL Director Bill Madia.

Mountain air

ORNL researchers seek involvement in backyard southern Appalachian initiative

The southern Appalachian Mountains, as beautiful as they are, are cloaked in air quality issues. Directly in the path of prevailing winds, the peaks receive airborne pollution from the surrounding region. This degraded air quality directly affects the mountains' flora and fauna and indirectly affects our quality of life.

Eight southeastern states joined several years ago in an initiative to study the issues and to provide policy guidance to state governments. The Southern Appalachian Mountains Initiative, through tools such as emissions and atmospheric modeling and impetus such as the recently revised Clean Air Act, is developing strategies to "remedy existing and prevent future adverse effects" of air pollution on the mountains. These policy recommendations will be based on a consensus built among participating government agencies, environmental groups and industry.

Although ORNL is increasingly drawing on the mountains in its own backyard to symbolize the Lab, neither it nor DOE are active players in SAMI. But Energy Division's Jan Berry is "working on that."

"DOE's work is important to management of air quality, particularly in predicting emission changes as new technologies come into play," Berry says. "Understanding the state of the art of energy technology, for instance, can help predict what diesel truck emissions will be in the year 2040. ORNL has a wealth of knowledge that can be applied to developing strategies for managing air quality."

"SAMI will identify emission levels necessary to protect natural resources in South Appalachia. ORNL can help develop, demonstrate and advance a mix of energy technologies that can achieve emission levels that are protective of mountain air and stream quality."

Berry says the National Park Service is particularly

interested in these kinds of studies and in the deployment of advanced technologies. They've already seen adverse effects of air pollution in the form of acidified and dead mountain streams in the Shenandoahs. In other areas, including the Smokies, air pollution has been cited as a contributing factor in species die-offs—the Fraser firs as one example.

Socioeconomic impacts result, either directly or indirectly. For instance, the tourism industry warns of a dropoff in revenue as tourists become increasingly discouraged by murky vistas.

"SAMI's stakeholders range from both sides of the issues, from green activists to industries," she says. "During the Second Governors' Summit on Air Quality, governors



On a clear day, you can see the top of Mount LeConte in the Smokies. But those good days are getting fewer and farther between.

Sundquist (Tenn.), Barnes (Ga.), Hunt (N.C.) and Hodges (S.C.) recognized the importance of this type of consensus process to solving tough and wide-ranging issues over air and water quality."

For instance, several major regional industries participating in SAMI contribute their share to air quality issues in the Appalachians. ORNL's capabilities in assessments, computer modeling and technology development can help ensure that proposals are not only technically but also economically viable.

These industries, Berry says, know that sound science and technology are critical to remedying existing and preventing future adverse effects of air pollution on the mountains. This effort starts with meeting the requirements of the Clean Air Act and culminates in simply being good neighbors—maintaining and improving our quality of life.

"Energy Division works at the interface between the environment and the economy," Berry says.

DOE's Office of Energy Efficiency and Renewable Energy (EERE) supports an important ORNL program that includes projects that could improve air and water quality. As an energy lab with decades of experience in integrated assessment, technology development and field experiments, ORNL is well poised to help SAMI predict what new technologies will best help reduce the effects of pollution and which new technologies might best catch on with the

public. The industrial participants, including utilities, are interested in analyzing new technologies that can reduce emissions through energy efficiency, such as microturbine power plants and fuel cells and alternative fuels such as ethanol. They are likewise very interested in their economic viability.

Some states have already taken steps to introduce technology by using their environmental policies. North Carolina, for instance, recently passed a statute requiring all state fleet vehicles to convert to natural-gas-fired engines.

Among Lab resources that SAMI can draw upon is the Energy Division's Buildings Technology Center, which relentlessly promotes driving new, efficient technologies to the marketplace. The transportation research capabilities of the Center for Transportation Analysis could contribute, in that auto exhaust is a prominent contributor to mountain air-quality issues, particularly in the well-traveled Smokies. Chemical Technology Division could contribute its technology development capabilities, such as the ORNL Biochemical Research and Development Center.


The Environmental Sciences Division has a wealth of continuing research, including that done by its Atmospheric Chemistry and Aerosol group, that could lend volumes of data to help SAMI weigh proposals and options related to its mission. Other ESD activities represented—such as the Carbon Dioxide Information and Analysis Center, which is a global clearinghouse for atmospheric carbon dioxide data—are valuable DOE resources that could benefit state and industry initiatives aimed at similar environmental missions.

Some states have already taken steps to introduce technology by using their environmental policies.

Berry is currently working on a proposal with SAMI to evaluate the performance of distributed power generation: specifically, powering a school with a stand-alone natural gas-fired microturbine power generator that uses waste-heat recovery and desiccant technology.

Tennessee is a lead participant in SAMI, joined by Georgia, Kentucky, Virginia, West Virginia, North Carolina, South Carolina and Alabama. Gov. Don Sundquist announced at a recent meeting that East Tennessee would host next year's SAMI meeting. Berry and other ORNL researchers would like to see a prominent ORNL presence at the meeting.

"Researchers who work at ORNL love East Tennessee," says Berry, who has worked previously in environmental management programs both in Tennessee and at Hanford, Washington. "ORNL can lend much credibility to SAMI's process. We should use our intellectual capital to help this region."

If you would like to know more about SAMI, contact Berry at 241-1939, berryjb@ornl.gov.—B.C. 

Much to learn about atmospheric effects

Energy Division's Moonis Ally is another Lab researcher enthusiastic about building a rapport with SAMI. He's pursuing proposals on further research into aerosols, or atmospheric pollutants in chemical form.

Ally's interest in atmospheric aerosols is an outgrowth of earlier work with retired ORNL chemist Jerry Braunstein to model the behavior of electrolytes—substances that ionize in water. He believes the same principles can be used to predict how aerosols can become supersaturated in the atmosphere. Ally and the Chemical and Analytical Sciences Division's Mike Simonson received a seed money grant to explore the possibility.

"We had no idea that someday we would be able to apply our theories to predicting the properties of supersaturated aerosols in the atmosphere," Ally says. "Man-made aerosols in the troposphere can reach concentrations that are unimaginable in ordinary circumstances."

The effects can be hard to predict. Ally says that some of the chemicals found in the troposphere, both manmade and naturally occurring, have an opposite effect to that of greenhouse gases in that they assist radiative cooling of the atmosphere. However, he says that should be no reason for complacency based on a belief that global warming could be alleviated by tropospheric aerosols.

"It wouldn't be judicious to ignore the delicate and dynamic interrelationships that make natural processes tend toward equilibrium," he says. "I didn't know about SAMI when I started this work, but I think the Lab's research in these areas can benefit the surrounding states by improving technology to reduce environmental impacts and ultimately realize economic benefits. It's important globally, to be sure, but it's also important regionally."

Lab technology vies for Savannah River project role

Another ORNL technology has been added to the list of candidates for a cesium removal project at the Savannah River Site. *ORNL Reporter* described the collaboration between ORNL and the South Carolina facility in last October's issue. SRS is studying methods to remove cesium and other contaminants from high-level salt waste stored in underground tanks there.

Based on results obtained in the coming year by collaborators at ORNL, Argonne National Laboratory and the SRS, a technology will be selected and ultimately implemented in a billion-dollar facility at the SRS.

Two technologies that have been under consideration are small tank TPB precipitation and an ion-exchange process.

Since the October article appeared, a young technology has been rapidly developing and is now being considered. It's a solvent extraction process called the CSEX process, for cesium extraction. The Chemical and Analytical Sciences Division's Bruce Moyer is the lead researcher.

"Our technology is very new, but it was a front runner early on," Moyer says. "Back in 1998 when the choices were being narrowed down, the other two technologies were much further along. Owing to the aggressive schedule at the SRS, CSEX was actually dropped from the list for a while."

A National Academy of Sciences report on the project recommended resuming testing on solvent extraction, which removes cesium from a waste liquid by use of an extractant that has a strong and selective affinity for the element.

"It is a very interesting molecule," Moyer


says of the extractant, called a calixarene. "The molecule forms a cavity that is very complementary to cesium but much less so for other metals."

By itself, the calixarene is a poor extractant, but Peter Bonnesen in CASD's Chemical Separations group devised an additive, or "modifier," that boosts the calixarene's performance. The solvent, composed primarily of the calixarene and the modifier in a process-suitable diluent, is mixed with the waste, resulting in the extraction of cesium into the solvent. The mixing is carried out in seconds in elegant centrifugal contactors being demonstrated in ORNL's Chemical Technology Division and at Argonne.

After the cesium is extracted, the loaded solvent easily releases its cesium upon mixing with very dilute nitric acid, regenerating the reusable solvent. One of the primary advantages of the CSEX process is that it

produces a purified stream of concentrated cesium that is highly compatible with vitrification, Moyer says.

Moyer admits that the calixarene is expensive, but because of its low concentration and the use of high-throughput contactors, the overall cost of the process remains competitive in cost with the other two technologies. One of the pleasant lessons he says he has learned in developing this technology is that elegant molecules have a place in industrial processes such as nuclear-waste cleanup: High performance offsets the high cost of the molecule.

Testing on the solvent-extraction process will be performed at ORNL, Argonne, and the SRS in the summer and fall of 2000. "What makes the CSEX process exciting for ORNL is that it is an ORNL invention," Moyer says.—B.C. 

Three seniors win LM scholarships

Three high school seniors whose parents are ORNL staff members have received Lockheed Martin Foundation scholarships. The scholarships, which will be the last from the Lockheed Martin program at ORNL, are \$3,000 per year for four years of undergraduate study. The winners and their ORNL parents are

Sanjana Ahmed, daughter of Abu B. Ahmed of the Operational Safety Services Division. Sanjana, a graduate of Oak Ridge

High School, plans to attend the University of Tennessee.

Graham Beattie, son of Kenneth L. Beattie of the Life Sciences Division. The Cumberland County High School graduate is enrolling in UT's premed program.

Rachel McCord, daughter of Raymond McCord of the Environmental Sciences Division. Rachel is this year's valedictorian for Webb School of Knoxville. She plans to attend Davidson College in North Carolina.

Gap

Continued from page 1

protective services contract, for instance, is an unanticipated result of the transition. In addition to some cost increases driven by the new security contract, a portion of security costs for Lockheed Martin Energy Research were previously subsidized by Lockheed Martin Energy Systems. "We have to pay the full burden cost, whereas LMER didn't," Smith says.

Likewise, Y-12 deactivation costs were budgeted at \$1.5 million. The actual cost is expected to be \$3.3 million.

"Getting out of Y-12 is the right thing to do, and we were about two-thirds of the way there. But it's going to cost us more to finish the job," says Smith.

Says CFO Turner, "If we hadn't missed the base, or hadn't had this barrage of singular events—if we had one or the other, we might have been able to recover. But with all these factors, along with the lack of reserves, we had to take these rather drastic actions."

Prospects of flat or lower budgets also exacerbate the overhead situation, says Smith. "When budgets are growing, you can bet on growing the Lab as well. Our intent is to eventually do that, but at this point we're simply not ready to resolve this problem on projected growth."

Says Turner, "In the past we could do that, plus use our reserves to keep things in balance. We just didn't have those options this time."

The overhead rate

Some asked, why not just raise the overhead rate? As Smith and Turner cited previously, because that's what the science and technology staff members decidedly do not want the Lab to do.

"Staff are concerned about the lack of stability in overhead rates," Turner says. "The R&D staff should be able to depend on overhead rate stability. No one likes to come to the end of the fiscal year and get hit with a retroactive rate increase. This leadership team takes pride in having stable rates that you can depend on. That requires good, high-quality input on the front end of the budget process."

The UT-Battelle team intends to zero in on the Lab's cost of doing business, which Turner characterized as being on the "wrong end of the scale." As an example, the average hourly rate for a mid-level researcher at ORNL is \$117, whereas at other DOE labs it is less than \$100. That approximately amounts to the 20 percent overhead reduction over three years that UT-Battelle has pledged for ORNL.

"We need a systematic review of our cost structure and cost drivers, and that's when we get to the organization burdens and lab-level overheads," Turner says. "That's still a work in progress on our part, and we will draw upon

staff input. It is critical that tech organizations be involved."

In fact, Smith and Turner cite that while many overhead reduction efforts have in the past fallen on support organizations, overhead in research divisions has risen, not dropped. Division managers counter that's because costs have been shifted rather than reduced, which is true to some degree.

Nevertheless, those organizational burden figures will be looked at closely. Smith points to a move away from services imbedded within divisions, which he says over time tend to swell the payroll. The preferred model, he says, is support organizations that fill the needs of research organizations and have the flexibility to move resources to where they are needed.

"We're really going after 'hard' cost savings versus 'soft' savings," Smith states, alluding to cost "avoidances" that haven't materialized in the bottom line. "We'll have to solve this as a team, and what won't be tolerated is turf protection."

The frontiers of space

Smith estimates the net increase on space and materials rates will amount to about \$2 million for space and \$900,000 for materials handling.

"The procurement dollar won't go as far, and the space issue is tough," he says. "But in truth, the space charge is artificially low now. We'd like for the space charge rate to reflect what it really costs to manage space."

The reason, Smith says, is that changes in how we think about space are coming. Whereas divisions now have little incentive to vacate space and tend to hold on to it for future needs, the future dictates a more compact environment.

"ORNL has about 4.7 million square feet of space," Smith says. "For this size of business, in research volume, we could probably do our work in a million less square feet. This extra space is old and expensive to maintain."

That's where ORNL's facilities upgrade plans can pay off.

"The sooner we can get out of these old, expensive facilities, the sooner we can put those research dollars toward supporting new facilities and new programs," Smith says. "In the meantime, people should re-assess the space they need."

Turner says another plan for stretching research dollars entails simplifying ORNL's business rules. Many current rules stem from the legacy of the single contractor, which has saddled the Lab with production-oriented business rules. Lab managers have complained about that for years.

"We hope to simplify the rules," Turner says, "and that will require feedback from both our S&T staff and from DOE. We have an opportunity here to deviate from that production focus to a set of business rules

more attuned to an R&D organization."

Acknowledging that the drastic steps will immediately result in less research for the dollar, Madia closed a talk to staff members on May 3 with a warning that the tough steps only solved the problem for the rest of the year. He could not rule out future staff reductions, and said "all options" would have to be considered.

On the other hand, the shortfall can serve as an opportunity to put new ideas on operating and growing ORNL on the fast track. With plans to build new facilities, reduce the cost of doing business and rebuild the Lab's business structure to more closely resemble an R&D organization, the leadership team's plans for ORNL go way beyond a balanced book on September 30.—B.C. [ornl](#)

Service Anniversaries

40+ years: Edwin H. Krieg, Jr., Engineering; Leonard E. McNeese and Dwight H.

Newman, Chemical Technology; William T. Milner, Physics; Robert T. Santoro, Computational Physics and Engineering; Robert W. Swindeman, Metals & Ceramics

40 years: Margaret B. Emmett, Computational Physics and Engineering; Francis R. O'Donnell, Environmental Protection & Waste Systems

35 years: Kenneth W. Isham, Life Sciences

30 years: Peggy S. Johnson, Chem Tech; Clarence E. Mee, Plant and Equipment

25 years: Willie J. Allen, F&O Strategic Planning; William J. Allington, Engineering Technology; William L. Bryan, Instrumentation & Controls; John M. Cole, Chem Tech; Raymond T. Cox, Rickey D. Madison,

Thomas C. Wright and James M. Ellis, P & E; Gary A. Hampton, Contracts and Procurement; Ralph C. Isler, Fusion Energy; John C. Rowe, Robotics and Process Systems; Marti Salk, Environmental Sciences; David C. Sharp, Logistical Services; Nermin A. Uckan, Fusion Energy; David P. Vogt, Energy

20 years: Lloyd F. Arrowood III and Tammy S. Darland, Computer Science & Mathematics; Paul F. Becher, Metals & Ceramics; Stephen E. Burnette, Research Reactors; Benjamin A. Carreras, Fusion Energy; Larry R. Conner and Joseph F. Walker Jr., Chem Tech; David R. Cunningham, EP&WM; Michael S. Emery and Paul D. Ewing, I&C; Teresa D. Ferguson, Energy; Gail R. Hamilton and Wilfred M. Post III, Environmental Sciences; Nathaniel L. Hardin and John K. Mongar, P&E; Lejean M. Hardin, Computing, Information, and Networking; Tammy K. Hill, Business & Information Services; Betty A. Lawson, Logistical Services; Joel C. Lewis, Robotics and Process Systems; Sydney N. Murray Jr., Physics; Susan D. Patty, Computational Physics and Engineering; Leroy E. Stratton, F&O Strategic Planning; Dorothy J. Tate, Fusion Energy

"We could probably do our work in a million less square feet."

Bicycles: Same roads, same destination, same rules

Several ORNL employees marked a national “bike-to-work” day on May 19 by doing exactly that: riding their bikes to work.

It wasn’t a Lab-sponsored or recognized event. Lab officials had very real safety concerns related to traffic, road construction and the nature of the area’s winding roads. But a few employees ride bikes to work daily, and the roads on the Oak Ridge Reservation

often feature two-wheelers on the shoulder.

Bicycles are also, in fact, a means preferred by many for getting around the Lab campus. *ORNL*

Reporter even pedals around on its own rig.

Motorists and bicyclists share an uneasy existence. Motorists are often frustrated when they approach a bicyclist and are forced to slow down. Cyclists are often tense and nervous when approached by an automobile. A lack of instruction and poor habits often culminate in unsafe situations.

“Cyclists share the same roads with

automobiles and are subject to the same rules,” says Ray Brittain of the Instrumentation and Controls Division. “Many motorists believe that bicycles should not be on the roads. In fact, federal law requires states to make bicycling and walking safer and more viable ways of travel.”

Ray passes along a few tips toward a détente between motorists and cyclists.

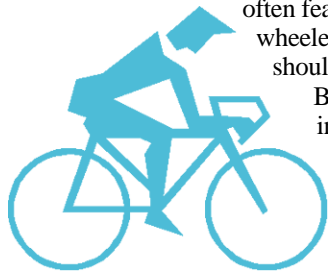
Safety tips for cyclists

- Always wear a helmet. This is your most important piece of safety gear.
- Be alert. Always be aware that a motorist might not see you.
- Signal your intentions—use hand signals to indicate turns and stops.
- Use a mirror. This allows you to be aware of traffic approaching from behind.
- Follow traffic rules as if you are driving an auto. Ride with traffic, not against it.
- Ride as near to the right-hand side of the road as practical, while avoiding road hazards that could cause you to swerve into traffic.
- Be predictable. Do not weave in and out of traffic or parked cars.
- As is the case with all slow moving vehicles, you are required by Tennessee law

to get off the highway when more than five vehicles are unable to pass.

Safety tips for motorists

- Be alert. Like motorcycles, bicycles are harder to see than autos.
- Don’t honk. This can startle a cyclist and cause him or her to swerve.
- When passing, be sure to clear the cyclist before moving back into your lane.
- Cyclists who are not on the extreme right-hand side of the lane are not being careless, but are in fact attempting to avoid hazards that could cause an accident.
- No cyclist’s speed can be taken for granted. With today’s improved equipment, some bicyclists may be traveling 25 or 30 miles per hour, if not faster. Others will be travelling at much slower speeds.
- Drivers turning left in front of oncoming cyclists cause a large percentage of car/cycle accidents.
- Overtaking, then making a right turn in front of the cyclist is also a cause of many accidents.—*B.C. ornl*



Matching contributions won’t continue

UT-Battelle will not continue to match employee contributions to higher education with corporate funds. Communications and Community Outreach Director Billy Stair made the announcement to staff on May 17.

Officials for the new contractor instead referred to an annual \$1.25 million commitment to education, development and cultural programs in the region.

“UT-Battelle management has examined this issue closely for several weeks, attempting to determine whether we can afford to fund the matching gifts program and also undertake our other important initiatives in education and economic development for the Oak Ridge region,” Stair said. “After careful consideration, we have determined that we will be unable to continue the matching gifts program.”

Stair cited several issues in the decision. The matching gifts program existed when there was one corporate contractor in Oak Ridge—Lockheed Martin. Funds for the matching gifts program were supplied by that corporation’s headquarters and did not come from a fixed management fee, which would have been the case with UT-Battelle. ORNL’s annual matching funding requirements in recent years ran up to \$280,000.

“UT-Battelle was formed as a partnership founded solely for the purpose of managing Oak Ridge National Laboratory. Any

community-related initiatives we undertake will be funded from the management fee awarded UT-Battelle from the Department of Energy,” Stair said. “UT-Battelle has committed approximately \$1.25 million annually from its management fee for a variety of initiatives designed to support the region’s educational, cultural and economic development programs. Of this total, UT-Battelle has committed roughly \$600,000 annually to economic development initiatives and about \$400,000 to efforts we hope will strengthen math and science programs and education and economic initiatives.

“Requests from a multitude of other area civic and cultural projects leave UT-Battelle without the resources available from our management fee to continue the matching gifts program.

“We regret that we are unable to continue the matching gifts program. Our hope is that by committing some \$6.3 million in targeted investments over the next five years, we can make a lasting improvement in areas of comparable importance to the citizens of the Oak Ridge region,” Stair said. *ornl*

Deaths

Jimmy A. Kilby, 35, who worked in the Operational Safety Services Division, died on May 16. He was a resident of Ten Mile.

ORNL plans new recreation program

ORNL’s Human Resources Division is currently putting together a recreation program for the Lab. HR Director Darryl Boykins says the program should be ready to go in time for most summer activities.

Lockheed Martin ended its local program recently. UT-Battelle is setting up a program to fill the gap at the Lab.

“UT-Battelle recognizes the value of a recreation program as a contributor to a positive work life,” Darryl says. “We will be unveiling our program very shortly.”

Boykins indicated that the recreation program will operate under a participant-managed model. Teams, leagues or clubs will be eligible for corporate funding and other support, but will actually self-manage events and participation under general company guidelines.

“My experience is that employees, rather than a company recreation department, are better able to design and produce events in a sport of choice. Those with the interest and expertise are best able to manage and coordinate a particular event or sport,” Darryl says.

The recreation program will soon be available as a Web-based link from the Human Resources and Diversity Programs Directorate site at www-internal.ornl.gov/HR_ORNL/hr.htm. Watch the site for information on the recreation program’s guidelines, contacts, and individual program information or contact Ron Honeycutt (honeycuttra@ornl.gov). *ornl*

Lab volunteers are 'fair' judges of future scientists' projects

Many future scientists get their first hands-on experience with scientific method in the school science fair. Like many other competitions, science fairs can be formative events that can influence a young student's eventual career path.

For that reason, judging their exhibits can be a weighty responsibility. A number of ORNL researchers have taken on that challenge recently, lending their expertise as science fair judges for student competitions.

Seventeen ORNL staff members recently served as judges for the Southern Appalachian Science and Engineering Fair. The fair represents the best projects by students from 26 participating East Tennessee counties.

The more than 50 volunteer SASEF judges, representing the ET science community, review exhibits and interview the students. This year more than 400 students participated, sponsored jointly by the Instrumentation and Controls Division and the University of Tennessee. I&C's Chuck Britton will serve as SASEF's president for the next two years.

At stake for the students are scholarships ranging in value from \$100 to \$1000. Senior division grand and reserve champions also receive a trip to the International Science and Engineering Fair in Detroit. More valuable than the prizes, however, is the experience—both for the students and the judges.

"Many years ago my son's science fair project was selected by his school to represent it in the Southern Appalachian Science and Engineering Fair," says I&C Division Director Dan McDonald. "It was a big deal for both of us and a very proud moment for me. The awards ceremony was in the gym at the old UT basketball building. There were hundreds of students there with their projects. As I

wandered through the exhibits I thought about all of the effort that went into these projects and thought that it was too bad that only a few would be recognized as 'winners.'

"My son won a copy of the *Handbook of Physics* from the local chapter of the IEEE Computer Society. He couldn't have been prouder and to this day has the nickname 'Champ' for having won that honor."

A new wrinkle in science fairs is the on-line fair. Three ORNL researchers recently volunteered to judge for the Internet Science and Technology Fair. In that contest, elementary, middle and high school students from around the nation apply National Critical Technology applications to real-world problems. Their results are provided to judges in a Web-page format.

Engineering Technology Division's Dan O'Connor, Energy's Steve Fischer and Solid State's Richard Kerchner volunteered to judge that one this spring. Writes O'Connor, who put in two hours of judging on each of three projects: "I think this kind of a competition is good and benefits the students. I am sure all of them know more about putting together a Web page than I do after this effort. I would recommend this competition to area schools."

Another development that pleasantly

surprised Andy Andrews, who judged in the SASEF fair, is more girls participating.

"I've been a junior division physics judge something like five out of the last seven years, and it has always been dominated by boys—typically one girl and 15 or so boys.

This year we had about 24 competitors in the division and only three or four were boys," says Andrews.

"I have no idea what caused this change. Maybe it was just a statistical fluke. I hope it was a trend!"

Besides Andrews, this year's SASEF judges were Martin Hunt, Jim McEvers, Dick Anderson and Marc Simpson of I&C; T.J. Blasing of the Energy Division; Martin Grossbeck of the Metals and Ceramics Division; Sigmund Mosko of the Physics Division; Jim Conklin, John Whealton, Uri Gat and Bruce Bevard of the Engineer-

ing Technology Division; C. Wayne Parker of the Engineering Division; and Stephen Storch and Hank Cochran of the Chemical Technology Division. Award presenters were I&C's McDonald and Glenn Allgood.

McDonald has seen the science fair pay off first-hand.

"I recently had a great thrill when a graduate student employed by our division took me over to our Science Fair Board of Honor display and pointed out his name as a past division award winner," he says. "That's when you realize that supporting these events does make a difference in the lives of young people and in the future of science."—B.C. ornl



I&C's Dan McDonald congratulates a fair winner: Whitney Stich, a seventh grader at St. Mary's School.

ornl reporter

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Number 16, June 2000

Methane hydrates, page 1

The budget, page 1

Lab Notes: Green power, birds, Mount St. Helens, page 3

Mountain air, page 4

New tech for SRS, page 5

Bike safety, page 7

Inside