



# Solid Waste News & Notes

*A Newsletter from the Solid Waste Unit of the Hazardous Materials and Waste Management Division*

Vol. 5, No. 1

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## RECYCLE! 2000 Fahrenheit

~GUEST FEATURE~

Everybody loves a nice, warm fire on a cold winter's day. Yet none of us enjoy the periodic cleanup of all that messy ash. And what do you do with that ash? Imagine dealing with tons of ash, or even millions of tons! This is the situation for the utility industry, where coal is burned to produce the electricity we use every day.

The ultimate waste you say? Coal ash has gotten a bad rap.

Coal combustion by-products (CCBs) are produced when pulverized coal is burned in coal-fired power plants. Each year in the United States we produce over 100 million tons of CCBs.

CCBs break down into several distinct materials. They include fly ash, bottom ash, dry flue gas desulfurization (FGD) ash and other, less abundant combustion products. Each has its own properties and potential uses.

Currently only about 30 percent of the fly ash, and less than 10 percent of FGD ash, is beneficially utilized in the United States. This is compared to nearly 100 percent utilization in some western European countries.

Platte River Power Authority's Rawhide Energy Station produces, on average, approximately 60,000 tons of dry FGD ash and 8,000 tons of bottom ash each year. From its startup in 1984, almost 100 percent of Rawhide's ash has been landfilled on-site.

Rawhide's dry FGD ash is difficult to market because its stack exit gases are dry scrubbed to remove sulfur dioxide (SO<sub>2</sub>). Over 80 percent of the SO<sub>2</sub> that is removed by the scrubbing process ends up in the ash as calcium sulfate. The calcium sulfate radically changes the chemical characteristic of the ash, making it unsuitable for concrete application -- a common use of fly ash.

Power plants that do not dry scrub for SO<sub>2</sub> removal are able to market their ash to cement and concrete manufacturers, due to the ash's cementitious and pozzolanic properties. The concrete industry cannot use Rawhide's ash due to high sulfur levels, which continue to react over time causing deterioration and loss of concrete strength. Approximately 20 percent of the coal-fired plants in the United States scrub for SO<sub>2</sub> removal, but with ever-changing federal regulations that is changing.

In 1997, the electric utility industry was added to the US Environmental Protection Agency's (EPA) Toxic Release Inventory (TRI) reporting program. CCBs that were normally stored in state-approved and inspected landfills are now considered by the EPA to be releasing toxic chemicals. Under TRI requirements, Platte River has reported more than 720,000 pounds of reportable chemicals that are bound up in ash as a release to land for each of the past three years. Other electric utilities that do not dry scrub for SO<sub>2</sub> are able to market a large percentage



Colorado Department  
of Public Health  
and Environment

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## From the Unit Leader

Just where does this money go that I collect at my facility?

This question, in many related versions, is asked often about the "tipping" fee that is collected on waste going into solid waste facilities. "Tipping" is the Hazardous Substance Response Fund (HSRF) that was created by the Colorado legislature in 1985. Collection of the fee began in January 1986 (CRS 25-16-104.5).

The fee was originally enacted at \$0.15 per cubic yard and was changed in the early 1990s to \$0.30 per cubic yard, then lowered to \$0.20 per cubic yard in 1998. In

2001, the fee was reset to \$0.17 per cubic yard for most facilities and \$0.20 for facilities associated with a National Priority Listed site.

Now with that brief background, I will address the question at hand. The larger portion of the monies collected is dedicated to match federal dollars for Superfund work. Generally for each dollar put up by the federal government, the state has to provide a 10 percent match. Over the years, the money has been used for projects, such as the Summitville Mine site, Lowry Landfill, Marshall Landfill, the Smuggler Mine site, Chemical Sales, Broderick Wood Products, for screening

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## 2000 Fahrenheit

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of their CCBs. When the CCBs are reused in a product, it no longer counts toward TRI reporting.

Two Thousand Fahrenheit, Inc. (2KF), a Minnesota company, has spent the past eight years developing a process that would stabilize sulfur in dry FGD ashes. Currently, 2KF is producing two marketable products using dry FGD ash that would have otherwise been landfilled.

2KF uses a cold-bonding process requiring no external heat source for the curing process. The big plus is that 2KF's products are environmentally friendly -- no air, land or water emissions are produced as a result of production. Its first plant in Becker, Minnesota, became fully operational in July 2001.

Platte River is in the final phase of discussions with 2KF concerning the possibility of building a plant at Rawhide to process its dry FGD ash. The plant, scheduled to be operational some time in 2002, would process Rawhide's ash to produce a lightweight aggregate and concrete additives for the manufacture of concrete construction products. It is anticipated that after the first two years of operation, 2KF will be able to process all of Rawhide's dry FGD ash.

The advantages of this project to Platte River are many. Not only will ash disposal cost and landfill space

requirements be significantly reduced, revenue will be generated from ash sales to 2KF. Another important advantage of this project will be the elimination of approximately 78 percent of Rawhide's TRI reportable chemicals bound up in dry FGD ash.

Additional benefits include the reduction of greenhouse gases, and possible carbon dioxide (CO<sub>2</sub>) credits. One ton of carbon dioxide is emitted for every ton of cement produced. 2KF claims that products made from Rawhide's ash can reduce the amount of cement required in a project by 20 to 40 percent. Greenhouse gas emissions are also embodied in the energy savings related to the production and transportation of cement imports from foreign suppliers.

The completion of this project will be a significant environmental accomplishment for Platte River.

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## From the Unit Leader

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a large number of potential sites and related activities. Beginning in July 1998, a portion of the fee was directed by the legislature to the state solid waste program. These monies replaced the solid waste registration fee that some of you may remember. Eventually state general fund dollars were also removed as a partial funding source for the solid waste program. Therefore, the solid waste program is funded mainly from a portion of the "tipping" fee and partially from the hourly review fee.

We have used solid waste monies to increase our compliance assistance presence at selected facilities. Over the past three years, we have been spending considerable staff time in increasing the compliance of the smaller facilities in the state. We have achieved this, not only through an increased number of inspections, but also through an increased amount of time spent on a given inspection. This has allowed staff to work more closely with the facility's personnel to achieve increased compliance. We have

also developed and presented, or co-developed and presented, a variety of small training seminars held across the state, and these are often in conjunction with the Rocky Mountain Chapter of the Solid Waste Association of North America (SWANA). We have presented topics such as air quality issues at solid waste facilities, hazardous waste screening and financial assurance, and we are presently involved in developing a session on ground water monitoring. We have been active in attending regular meetings held by the Great Plains Landfill Operators Association, formed years ago by landfill operators in northeastern Colorado [a BIG hand of applause to all of them!!]. Operators in the southeastern portion of the state are considering a similar organization. We strongly encourage this, as it will be a great benefit to everyone and all facilities will become better at what they do.

It is our hope that the results of the efforts

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# From the Unit Leader

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mentioned above will yield a much better compliance level once our 2002 calendar year inspections are conducted.

In addition to working on technical and operational compliance at facilities, the unit has completed a set of HSRF facility audits. In late 2000, we contracted with TechLaw to perform audits on six selected landfills regarding the collection of the HSRF. The first audit was conducted in January 2001 and the last one in June 2001. Errors between the quarterly reporting form that we receive from you, and what was actually found onsite, were generally quite low, on the order of a percent or so. However, it was discovered that some issues do need to be worked on. These are being dealt with at the present time.

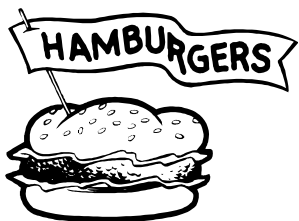
We expect to conduct more audits in the future.

## Compliance Orders

Enforcement to obtain compliance has become a larger issue with the unit over the past few years. We issued Orders (both Unilateral and Orders on Consent) on several occasions. Currently we have Orders on Consent for a scrap tire cleanup, a Unilateral Order on a scrap tire site and a Unilateral Order on an old landfill that we are working on. These are in addition to the many Compliance Advisories that have been issued over this period. These kinds of enforcement activities are time intensive and may take a long period to reach resolution. One Order on Consent took almost two years of technical staff and Attorney General time to finalize. Another case ended up in District Court—another large use of resources.

Wherever possible, it is our preference to resolve problems prior to reaching these levels of conflict. It is a much better use of everyone's resources.

## What is behind that burger you just had for lunch?



The answer is a large industry that produces the livestock, slaughters and processes the animal and generates waste materials in doing so. Some of the meat processing waste has historically gone to rendering plants for use as

raw material in a large variety of products, including animal feed. Recent changes in federal Department of Agriculture requirements have severely limited the use of animal feed derived from meat processing waste. This has increased the costs of meat processing, especially for smaller and mid-sized operations, because they now have to pay to dispose of materials that they may have been able to sell or give away before.

The solid waste staff has worked with a large group of representatives of the meat processing industry, Colorado Farm Bureau, USEPA, Colorado Counties, Colorado Department of Agriculture, Colorado Livestock Association, Colorado State University, the Governor's Office of Energy Management and Conservation, the composting community and many others to draft a white paper that outlines a variety of methods to deal with meat-processing waste and related materials. This document should be in final form by the time you read this. It is hoped that information outlined in this paper will lead to some cost-effective and innovative methods to deal with these materials in the future and ease a burden on the meat processing industry.

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*A Question To Ponder — “What is a weed, and why should I care?”*



*The answer should appear in the next issue of this publication.*

# REGULATION UPDATE

## Contaminated Sites Redevelopment: House Bill 00-1306

In 2000, as part of Governor Owens' Smart Growth initiative, the Colorado General Assembly passed a Brownfields Tax Credit as an added incentive to develop formerly-used and possibly-contaminated properties (Brownfields). The bill provided an income tax credit of up to \$100,000 to offset clean-up costs and make the redevelopment of such properties more financially viable. House Bill 00-1306 also amended existing statute (CRS 25-16-104.6) to allow the Colorado Department of Public Health and Environment to perform cleanups on contaminated sites, using money from the Hazardous Substance Response Fund. The revised statute allows the State to remediate sites:

- that do not have a responsible party to perform a remediation
- that have been determined to present a threat to human health or the environment
- where the remediation will allow the redevelopment of the property of the public good

House Bill 00-1306 authorized \$250,000 annually from the Hazardous Substance Response Fund to be used for cleanup of sites that were not being addressed by federal programs under the Comprehensive Environmental Response, Compensation and Liability Act.

The activities under this Act are also coordinated to a degree, with Brownfields activities under the Superfund Block Cooperative Agreement with the U. S. Environmental Protection Agency. Targeted Brownfields Assessments are used occasionally to obtain additional information that can be used in subsequent Brownfields cleanups.

The Hazardous Materials and Waste Management Division developed a process whereby potential sites are evaluated by set criteria and put into a queue for cleanup. Six sites have been selected for full or partial funding for cleanup, and two sites have been completed:

- Completed residential connections to the public water supply for residents of the Pleasant View neighborhood currently using ground water contaminated with tetrachloroethylene at levels above drinking water standards.

- Partnered with Asarco, Inc., on the Lower Squirrel Creek mining waste reclamation project. This project was the final part of a \$50 million voluntary cleanup of the Bonanza Mining District performed by Asarco with state oversight.



- Currently working with the City of Loveland on the cleanup of contaminated ground water at an abandoned drycleaner. The city will condemn the property for redevelopment.
- Partnered with Boulder County, the Clear Creek Watershed Forum and a private developer to remediate the New Cardinal mill in Nederland. The project will result in new residential housing, a historic mining museum and environmental protection of the adjacent creek.
- Partnered with private landowner to clean up mine waste adjacent to the airport in Creede. The owner will donate a portion of his land to the city for an equestrian center and use the remaining portion to expand his airport operations.
- Partnered with the City of Wheat Ridge by contributing towards the clean up of DDT-contaminated soils on a vacant property. The property will be turned into a \$7 million public park.

At present, it appears that there are more sites than available spending authority. The continuing challenge will be to work on the timing of projects in the queue so that sites prioritized for cleanup receive adequate funding without causing schedule delays.

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# SAMS

## CORNER

### Innovative Final Cover Design Approved

In December 2001, the eighth largest municipal solid waste landfill in the United States became the first landfill in Colorado to win regulatory approval to use the next generation of final cover designs.

The Denver Arapahoe Disposal Site (DADS) was granted approval by Tri-County Health and CDPHE to use a new and innovative final cover design. These next generation designs have been called a variety of names, including ET Caps, Monolithic Covers and Sponge Caps. Research on innovative cover design has been going on across our country since the mid 90s.

The innovative and alternative aspect of the design is that it does not use a traditional clay barrier layer to keep water out of the landfill after it is closed. Instead, it takes its cue from Mother Nature. The design is a result of a holistic process aimed at creating an ecologically-balanced system. Think about these concepts for a moment.

The majority of active landfills in Colorado have final cover designs that include a clay barrier layer, which is built out of wet clay and compacted using very heavy machines. If you live in Colorado, how often do you water your lawn? If your children dump a bucket of water into their sandbox, how long does the sand stay wet? The answer to the first question is probably too often, and to the second, not very. Do you see where I am headed here? If you build something out of wet dirt in Colorado, especially on top of 100 feet of trash, it is not going to stay wet for very long. Consequently, the long-term performance of a traditional clay barrier layer on top of a landfill in our arid climate is questionable, at best.

Compacting wet clay on top of a landfill brings up a slew of problems. Trash is kind of squishy, and if you whomp on it (a.k.a. compaction), it has a way of bouncing back. Landfill operators, consultants and regulators view these problems in slightly different ways. To an operator, it is dollars out; to a consultant, it is dollars in; and to a regulator, it is relieving to note

that only a very small percentage of landfills have built final covers in the last 10 years.

By now you may be wondering what all this has to do with SAMS, so I'll tell you. It is in the "A" for analysis. The tools that we use to make quantitative decisions about new design concepts begin in our minds. However, as scientists, we need to be able to prove them in the real world outside of our minds in a way that others can understand. Like it or not, the best, and often the only way to do this is by using computers. They allow us to perform complex mathematical calculations in human time. We could use our pencils, paper, slide rules or calculators to make the calculations, but it would take a long time—especially when compared to using a computer with a processor operating at two plus gigahertz. While mathematics is at the core of all science, many disciplines come in to play at this party.

Agriculture, meteorology, soil-science and hydrology, to name a few, are all key players in this process. A bunch of computer programs, with names like UNSAT-H and RETC, are used to make the decision. Site-specific parameters, such as surface albedo, root density and van Genuchten, have to be defined through measurement and derivation. However, the final analysis supports the holistic process and the ecologically balanced concepts I mentioned earlier.

Simply put, the cover uses three feet of dirt to hold water long enough for the plants to use it before it can reach the trash. The plants are native and hardy, with different blooming seasons. Solar power is used to evaporate the water that the plants can't use. When the trash starts to decompose and differential settling begins, the cover should be able to heal itself. It will certainly hold up a lot better than wet clay. Ultimately, the only difference between the landfill and the native terrain will be in elevation. At DADS, I hear the local golfers are already calling it Mount Murphy—that sounds good to me.

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# THE LIFE AND TIMES . . . STAFF BIOGRAPHIES

## Ms. Judy Waddill

Gasoline is to a car, and food is to the body – these analogies have one thing in common—they illustrate the fuel that keeps an engine running. Add number eight in our biography series to this, and the role she plays as part of the Solid Waste unit becomes immediately clear – the “behind the scenes” fire that keeps the unit running smooth and the inspectors better able to focus on their individual responsibilities. Who is this dynamo you ask? Believe it or not, another Colorado native born and raised in Denver!

Judy Waddill called west Denver home, attending West High School until her senior year when she transferred to Sheridan Union, due to a family move, she graduated in 1957. Devoted to the Cowboys, however, Judy considers West High her school and is an active member of their reunion committee to this day.

The end of high school took Judy to Greeley, where she attended UNC for a year, studying to become a teacher. Plans changed, however, and in 1958, Judy got married, finished up the school year and gave birth to her first son, Don, whom she affectionately refers

to as Donny. Judy acknowledges how young she was when she had her first child, saying, “they grew up together.” She and her new family moved to Englewood, where over the next six years she had two more sons, Rob and Steve.

Christmas 1965 brought Judy to Montgomery Wards (“Monkey Wards” to true natives), where she was hired as 30-day-holiday help, but stayed for the next 20 years. Judy laughs when admitting that “yes, I really roller-skated to fill orders.” She moved on to working in the catalog area and saw the institution of computer-based ordering.

Having worked one job for 20 years left Judy concerned about future work opportunities, prompting her to enroll at Arapahoe Community College (ACC) for a year of secretarial, office and computer-based courses. While Judy learned new skills at ACC, a number of her fellow laid-off Monkey’s employees had been hired by the State of Colorado, and they urged her to apply. Eager to get back to work, Judy sat for the State General Administration test. Shortly thereafter, in October of 1986, she walked into the Hazardous Materials and Waste Management Division for

the first time as a receptionist working for Ken Waesche, division director.

One year later, Judy was approached by then Solid Waste program manager Ken Mesch, who asked, “Judy, can you type?” She replied, “yes,” and because of her excellent reputation for being good with customers, she was hired on the spot. So began Judy’s life with the Solid Waste unit.

In 1987, the unit was quite different, as was the Division itself. Solid Waste staff numbered four to five and the Division only 50. Judy’s responsibilities were general clerical, including typing and responding to numerous public requests.

The Underground Storage Tank unit moved downtown to become part of OIS under the Department of Labor and Employment, and the Solid Waste program merged into the Compliance Program under Gary Baughman – Judy’s current supervisor. This major change affected Judy’s position by broadening her duties and adding more variety. She is currently the

program assistant for the Compliance Program and includes significant responsibility to Glenn and his staff.

So what does this fuel do to keep the Solid Waste unit running? In short, A LOT! More specifically, Judy is responsible for all data entry relating to Colorado’s landfills, managing the Solid Waste management tracking system that contains all inspection information for all landfill facilities, maintaining the HSRF, invoicing and billing and tracking enforcement orders and their resolution. A “typical” day finds Judy dealing with a variety of public inquiries and interacting with unit staff and, along with staff, revising the Solid Waste regulations. In Judy’s tenure, she has seen these regulations go from 30 pages to more than 160 pages – now including the recently-adopted composting rules.

Judy’s ability and enjoyment for working with the public is a huge asset as she works with landfill facilities, the Board of Health and Division staff on a daily basis. When asked what she will miss most when she retires at the



Steve Waddill, Judy’s fiancé Bob Orr, Judy and nephew Donnie Dolezal pose at a charity golf tournament for Children’s Hospital

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## LIFE AND TIMES

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end of April, she responded, “the staff and public will make it hard to leave.”

Retirement can be an exciting yet scary time for most people, and for someone like Judy who enjoys her job, change can be especially difficult. But her involvement in two golf leagues, annual trip to Las Vegas with her sons for the Superbowl (“you learn to love football with three sons!”), her two wonderful grandchildren – Lance, 15, whom Judy is teaching to drive, and Nicole the gymnast – *and* her part time job in her son’s motorcycle shop (“doing everything a mom would do and no one else would”) should keep her pretty busy.

Still, Judy says even though she is looking forward to more time to enjoy being outside gardening and bike riding with her fiancé Bob, she will miss the fact that “you just don’t know what’s going to hit when you walk in the door of the Division – it was never boring.”

Judy responded to the question, “What best describes you?” by saying, “A positive attitude,” and that she hopes people remember her as someone who made some impact, someone who set goals and accomplished them. Well, Judy, speaking as a former Solid Waste staff member, you *definitely* made an impact, and finding an alternate fuel source will be difficult at best. Thank you for your dedication Judy, enjoy your future – you’ve earned it!

—**Brenda Lujan, Contributing Columnist**  
***Extended Family and Former Solid Waste unit staff member***

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Judy,

In your retirement, you will be missed, but not at all forgotten. In the many years that we have worked together, your bright smile and cheerful attitude have meant more than words can express. Your position may be filled, but you cannot be replaced. You will be leaving behind a legacy to be proud of, and an example for all of us to follow.

May the world smile on you and yours—you deserve it!

All the very best in your future.

With deepest regards,

Glenn

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