

Atlantic Alliance Meeting  
September 22-23, 2005  
Orlando, Florida



# State of Mining Engineering Programs and Recruitment in the U.S.

and

# Training New Miners





# **State of Mining Engineering Programs in the U.S.**



# Labor shortage forces coal companies to woo miners from rivals

Situation will worsen with the next wave of retirements

BY CHARLES SHEEHAN  
The Associated Press

PITTSBURGH — While much of the country struggles with a difficult job market, coal companies are in a heated competition for workers. They're raising one another's employees, renting billboards, and even paying for banner-towing planes at beach resorts with generous offers of pay and benefits.

America is looking for coal miners. Demand for coal is increasing, and some of the biggest energy companies say they desperately



Coal miner Kenny Rothermel (right) takes a break at Rattling Run Coal Co.'s anthracite mine in Trevorton, Pa.

The number of coal miners nationwide dropped to 99,358 at the end of 2003 from 100,777 in 2000.

of state and federal agencies, including the Mine Safety and Health Administration, which needs employees familiar with mine work and has been holding recruiting drives

family tradition they had believed was lost with their fathers.

"I'm proud to say I'm a fifth-generation miner ... that's on both sides of my family," said Jeff

Smock had trained as a welder but the pay and benefits were where near what can be made the miner, he said.

"We're pretty much writing

Elko Daily Free Press

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Thursday, September 23, 2004

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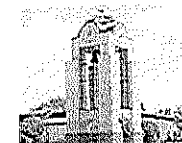
Worker shortage boosts miner pay

By ADELLA HARDING, Staff Writer

INCLINE VILLAGE - Nevada Mining Association's new report on the mining industry shows that the average annual pay in the metal mining sector in 2003 was \$67,795, an increase due in part to a shortage of job applicants.

Elko County Democratic Party

The Elko County Democratic Party  
Gathered supporters  
from the local mining community  
at the Elko County Fair.



WOMEN  
IN  
MINING

## The National Quarterly

Volume 25, Issue 3

Winter 2005

### AN INDUSTRY IN NEED

By Adela Woulford, Winnemucca Chapter Treasurer

The mining industry, world wide is finding it difficult to fill their many openings, in both skilled and professional as well. Many of today's workers are nearing 50 or over and very few replacements are looming on the horizon.

This has led some companies to raid each others workers, offering generous pay and benefits, others are using creative advertising to lure previously laid off workers back into the industry and some companies are opening their own training academies to fill their skilled worker ranks.

Inside this issue:

Feature Article 1

WOMEN IN MINING is a  
nonprofit 501(c)(3) organiza-

## Finding Tomorrow's Miners

By Adam Madison



AMERICAN

# LONGWALL

MAGAZINE

www.longwall.com

August 2005

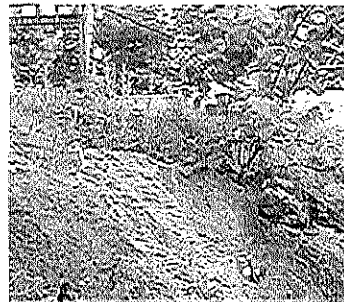
EDUCATION

AUGUST 2005 AL

## School crisis an acute problem

THE outlook for coal may be rosy, but the industry forecast for qualified mining professionals coming into the field is anything but. American Longwall Magazine asked Dr R Larry Grayson, chair of the

number of mining programs has created a severe shortage of workers. The problem is they have a huge gap, not only in experience but in familiarity with the kinds of situations you can get into that can be quite



International Longwall News + Growth bottleneck

Page 1 of 2

### Growth bottleneck

Wednesday, December 29, 2004

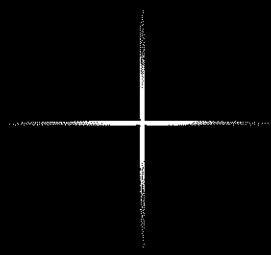
**AUSTRALIAN mining is booming, but will a lack of professionals restrict industry growth?**  
**Andrew Okely\***

The Australian mining industry is in the midst of a significant period of capital investment and growth. Many believe the approach China will ensure this growth continues for some years to come. With iron ore, coal, gold, copper and nickel prices all strong there are many greenfield and brownfield projects in the pipeline. All of this has highlighted the growing problem of a lack of professionally trained engineers and scientists in the industry.



# **Factors for Closure or Decline**

(12 accredited programs left in U.S.)

- 
- Student enrollment
  - Lack of cogent public message of value
  - University economics
  - Dearth of federal research support





**Student**

**Enrollment -**

**It is weak  
nationwide!**



Testimony

*Oversight Hearing on the Aging of the Energy and Minerals Workforce;*

*A Crisis in the Making?*

SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES  
COMMITTEE ON ENERGY AND COMMERCE  
UNITED STATES HOUSE OF REPRESENTATIVES  
WASHINGTON, DC

July 8, 2004

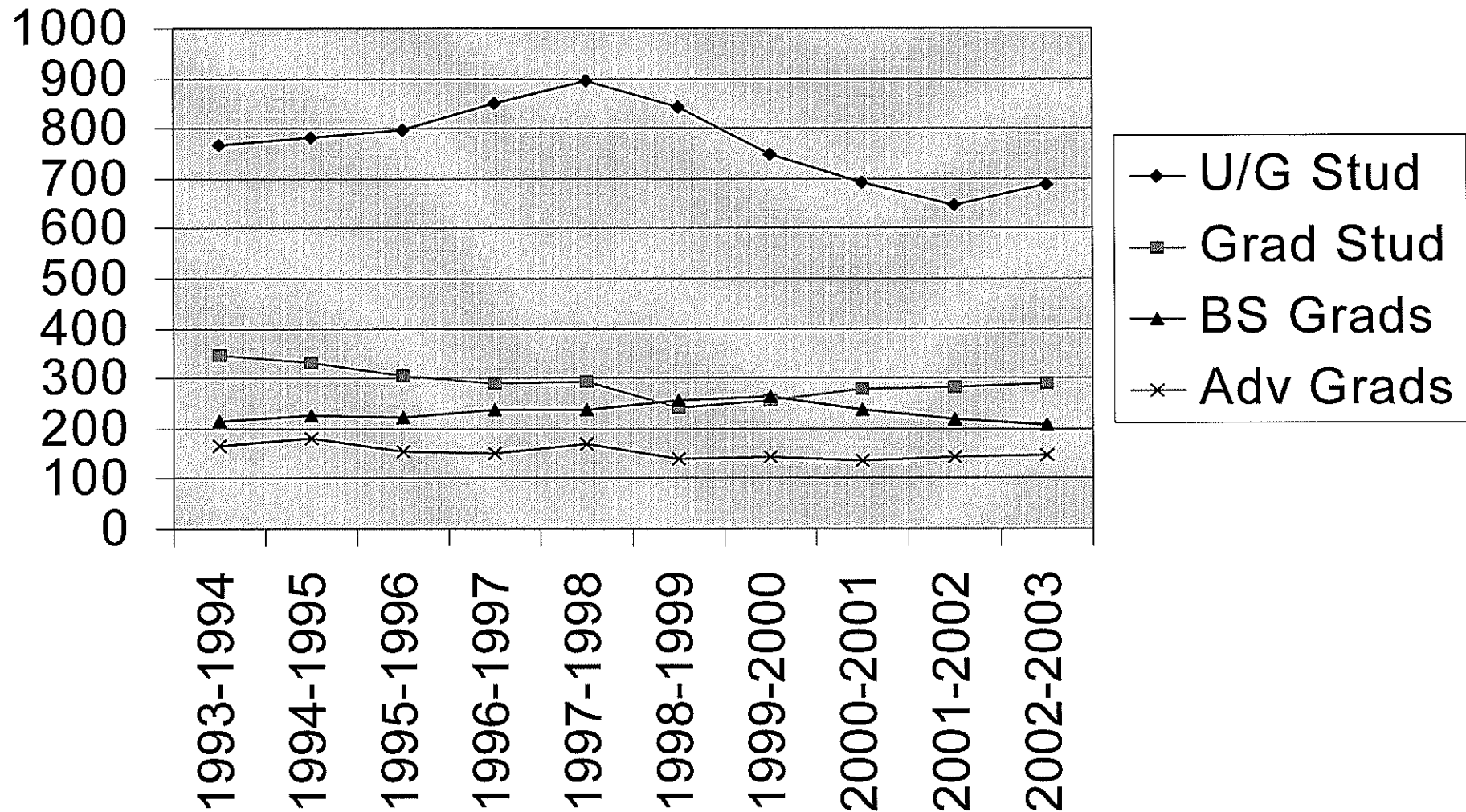
Dr. Mary M. Poulton  
Department Head and Professor  
Department of Mining and Geological Engineering  
The University of Arizona  
Tucson, AZ

## U.S. Mining Engineering Programs Terminated since 1985

- Univ. California-Berkeley
- Univ. of Illinois
- Ohio State Univ.
- Univ. of Minnesota
- Univ. of Alabama
- Univ. of Idaho
- Columbia Univ.
- Univ. of Pittsburgh
- Texas A&M Univ.
- Univ. of Washington
- Univ. of Wisconsin (2)
- Univ. of Wyoming
- Michigan Tech Univ.



# U.S. Enrollments/Graduates Trends in Mining Engineering



Source: 2004 SME Guide to Mineral and Material Science Schools



# U.S. Mining Engineering Program Enrollments

Source: 2004 SME Guide to Mineral and Material Science Schools

University	Last Report Period	Enrollments			2002-03 Number of Graduates	
		Undergraduate	Graduate	Total	Undergraduate	Graduate
Alaska	2003-2004	25	6	31	0	1
Arizona	2003-2004	28	n/a	28	2	1
Colorado SM	2003-2004	65	33	98	7	13
Kentucky	2003-2004	57	16	73	2	2
Michigan Tech**	2001-2002	36	10	46	6	2
Missouri-Rolla	2003-2004	77	31	108	21	2
Montana Tech	2002-2003	54	4	58	15	2
Nevada-Reno	2003-2004	29	10	39	3	3
Penn State	2003-2004	17	5	22	1	0
South Dakota#	2003-2004	9	n/a	9	5	0
So. Illinois	2003-2004	22	22	44	4	2
Utah	2003-2004	36	12	48	8	3
Virginia Tech*	2003-2004	115	21	136	20	5
West Virginia	2003-2004	33	25	58	6	10
	Total	603	195	798	100	46
	Average	43.07	16.25		7.14	3.29

\* Degrees offered in Mining and Minerals Engineering

\*\* Program eliminated

# Program reformed into Mining Engineering and Management

**Only 86 in 2003-04!!!!**



# Survival

## Into the far reaches of ALASKA

by Claire Faucett (denboc@umr.edu)

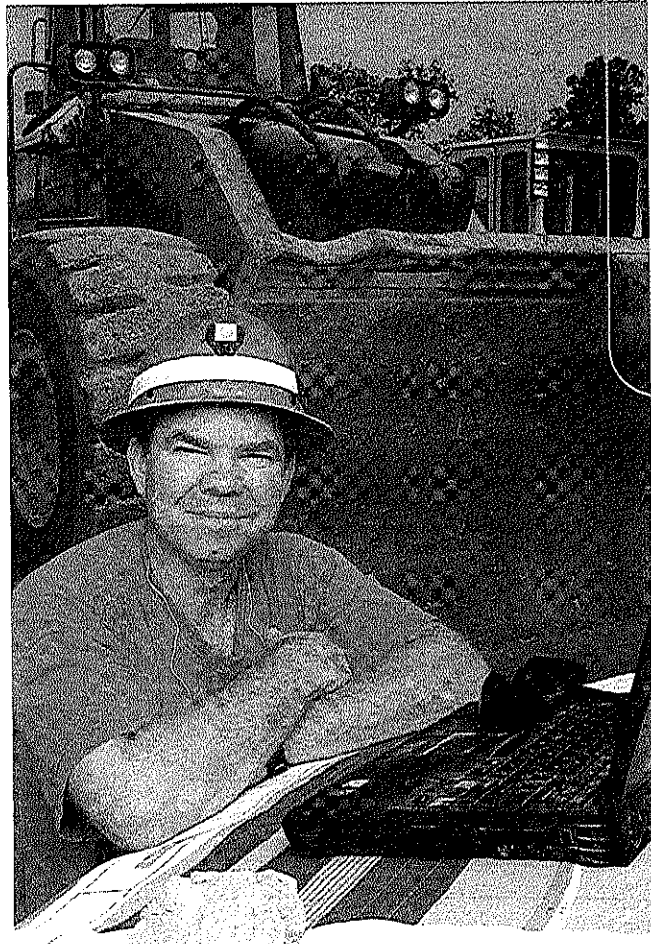


Photo by Ralf-Finn Hestoft

*This past summer, Steve Dismuke became the first graduate from UMR's online master's degree program in mining engineering. Even though the program is online, Dismuke did most of his coursework from CDs UMR mailed to him. The technology many of us take for granted hadn't reached northwestern Alaska yet.*

granted hadn't reached northwestern Alaska yet, he explains.

"I had been a mine superintendent for the last 12 years and had gotten away from the engineering work," he says. "I was concerned that one day I may have to rely on those engineering skills again, especially the way the job market changes. I thought it would be a good idea for me to sharpen my skills and do a little bit of self-improvement."

As it turns out, Dismuke was right. He is now the project engineer for Vulcan Materials Co., a construction aggregate company in Bartlett, Ill. "I'm back in an engineering role and am using things I learned in school previously, but I picked up quite a few more things from my master's work," he says. "Classroom work is great. You get the theory, but a lot of times until you see it in action, it can be difficult to comprehend."

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**Public Message**

**and**

**What to do**



# Mining's image — what does the public really think?

Nancy Bingham

The mining industry's image is molded by what the public knows, or thinks it knows about mining. As Caterpillar prepared for the production of its educational video, *Common Ground*, the public's perceptions about mining needed to be established. Before we could educate people about mining, we had to find out what they already thought.

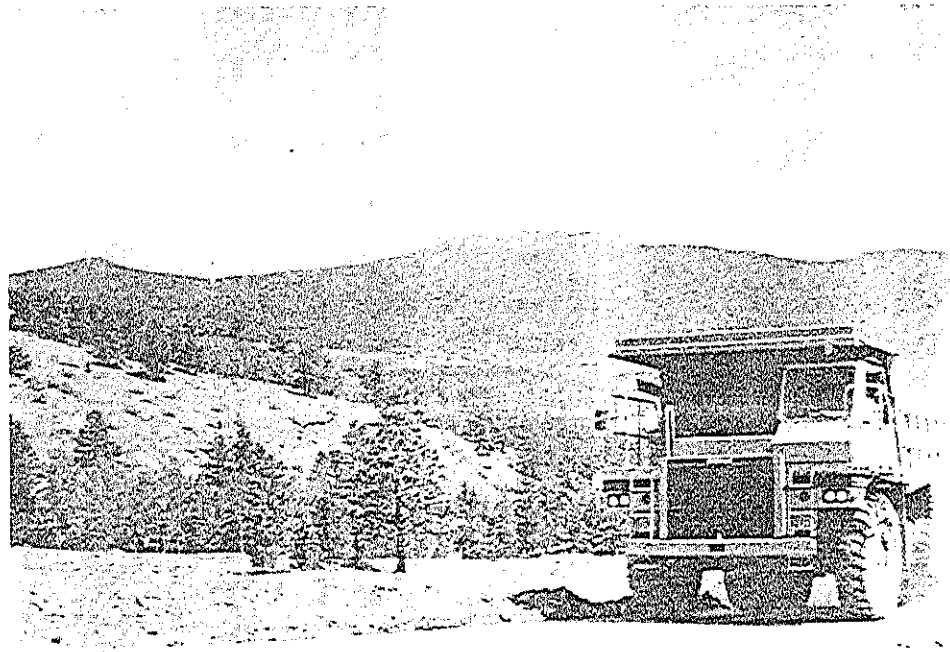
As those perceptions were analyzed, we were able to narrow the video's focus to relevant, realistic approaches. We found out what people did not know about mining. And, most importantly, facts they should know were singled out — facts that could create more favorable attitudes. This research was instrumental in the final direction of the *Common Ground* project.

## What the public believes

As these perceptions about mining were researched, it was found that the beliefs of the general public are dominated by four concepts. Quotations from interviewees are included with the discussion of each of these concepts. Figure 1 shows an overview of people's beliefs before education.

*The public believes mining  
harms the environment*

The public believes that mining has



Mine reclamation projects occur simultaneously with mine production. Pictured is a Caterpillar truck operating on a haul road adjacent to a reclaimed area.

ined. Animals losing their homes.”

- “People are most likely to associate surface mining with all forms of above-ground mining. Virtually everyone is convinced that surface mining creates wasteland.”

- “Strip mining is certainly the most visible. Miles and miles of wasteland.”

open pit with an expression of concern for the land. People think that when a mining company is finished with the mine, they simply abandon the exposed pit.

- “That was ugly. To me, it is like strip mining. Nothing is ever going to



*The public believes mining harms people in nearby communities*

The images are of dark, dingy mining towns, noise and, again, water and air pollution. This creates a general belief that mining is harmful to people in nearby communities. If a mine opened within 8 km (5 miles) of their homes, most people would expect problems with health, depreciation of land values, contaminated water, dirt in the air, noise and vibration. There is also a general concern for others and about what might happen if a mine located near them. This, too, contributes to a negative attitude about mining.

- "I just think there would be some long-term health problems. Even short-term type health problems."

- "I would worry about the hazards of mining, explosions."

- "Would the water become contaminated?"

*The public believes mining exploits workers*

Particularly among high school graduates, there is a belief that miners are exploited by big business. Since high school graduates are often employed in blue-collar occupations and apparently feel exploited, they identify to some extent with mine workers. This is not as prevalent with college graduates, but they, too, think that mining is unsafe for workers. They believe that there is potential for injury and long-term damage to workers' health. The result is another reason that people have a negative attitude about mining.

- "Low pay. Hard work."

- "Owners not sharing money with the workers."

Reclaimed land is constantly checked by taking core samples.

- "I think, too, the movie industry has really led us to believe that coal mining towns are depressing places to be."

Underground mining, particularly coal mining, is believed to be a dangerous business. There is concern about mine collapse and long-term damage to workers' health.

- "I view it as real dangerous, a lot of people being hurt. It seems that there are many people dying in the coal mines and people dying from what's in the coal mines."

- "The canaries. They used to let the canaries in there to see if it was safe. That is the only thing I keep thinking of. Send a bird in."

- "Coal miners' lung disease."

*The public believes mining has little personal benefit to the individual*

*People do not know what products*

and services come from mining, so they place little positive value on mining. They do not know how mining affects the general economy or daily life. When they see how mining affects them, they are likely to be aware of only the most basic facts. This lack of information provides a golden opportunity for creating more positive attitudes.

- "I do not really think it affects modern life. I do not think it really has affected my life at all."

- "Dying industry ... When I think of coal, I think of using coal for a steam engine."

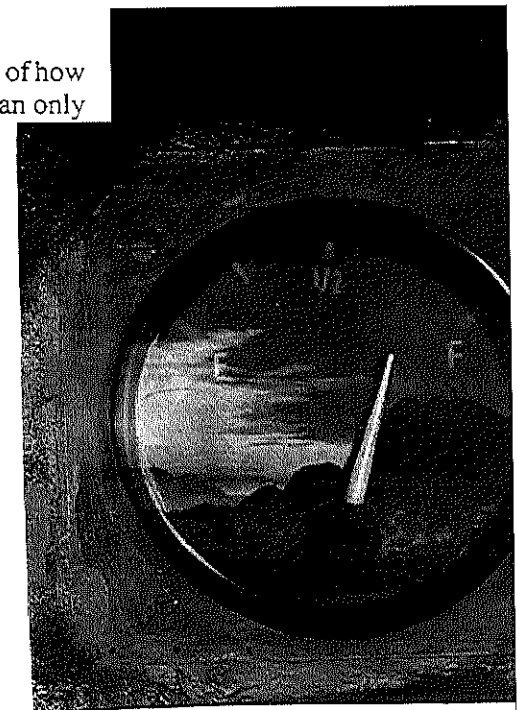
What are people getting in exchange for the harm they perceive to the environment, workers and local communi-

ties? They have no understanding of how mining affects their lives. This can only

Perhaps we should answer with a question: Would we be better off now if Stone Age toolmakers had used less flint?

# Should Society Curtail Mining?

By Julian L. Simon



CONSIDER A TYPICAL WARNING THAT WE ARE RUNNING OUT OF resources, this one by Paul Ehrlich, the best-known doomsayer:

*In the early 1970s, the leading edge of the age of scarcity arrived.*

*With it came a clearer look at the future, revealing more of the nature of the dark age to come.*

By now every schoolchild believes we are entering an age of scarcity in which our finite natural resources are running out, our environment is becoming more polluted, and population growth threatens our civilization and our very lives. The belief reverberates in conservation policies set by the federal government and by the states.

Should we cut back on our use of natural resources? The preliminary, crude answer is in question form: Would humanity or its tribes have been better off if Stone Age toolmakers had cut back on their use of flint because supplies were becoming

more scarce? Or would Great Britain have been better off if it had cut back on its use of coal starting in 1863 when the great economist Stanley Jevons warned of impending shortages in *The Coal Question*?

(Homestake Mining Co.) and a six-minute clip from the early stages of *Common*

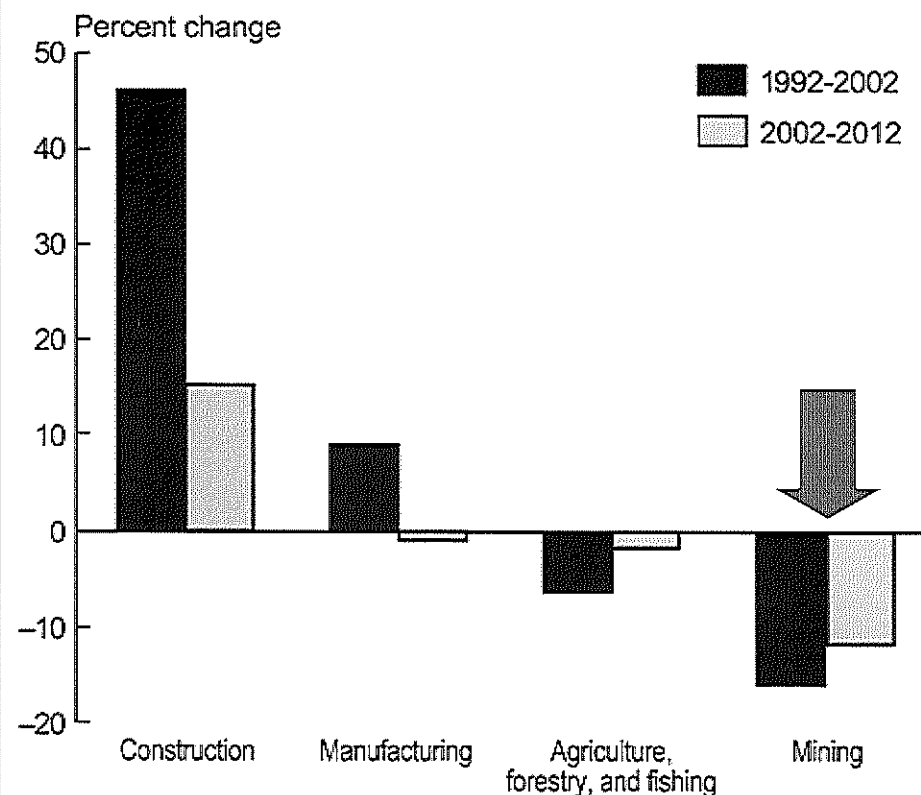




**Table 1. Employment in Mining: Selected Countries, 1985-2000('000)**  
(Source: Mining Journal, London, October 11, 2002)

	1985	1990	1995	2000
Australia	84.0	66.0	56.0	48.0
Argentina	n/a	n/a	11.9	12.4
Bolivia	70.0	73.5	52.5	46.6
Brazil	89.9	88.7	77.1	104.3
Bulgaria	n/a	94.8	62.3	39.0
Canada	77.7	73.6	61.1	53.4 (1)
China	n/a	n/a	6,680.0	4,260.0
Ecuador	n/a	15.0 (2)	26.7	84.5
Fiji	n/a	1.9	1.7	n/a
Germany	166.2	130.3	92.6	52.6
India	754.9	723.6	692.2	599.9
Indonesia	n/a	n/a	22.1	37.7
Japan	57.6	37.2	27.1	16.9
Kenya	4.8	4.2	4.6	5.2
Mauritius	n/a	0.7	1.6	1.4
Mexico	83.0	95.6	67.7	68.0 (1)
New Zealand	n/a	3.4	3.7	3.1
Papua New Guinea	5.9	5.3	6.5	9.1
Philippines	62.9	57.5	23.9	n/a
Poland	n/a	n/a	350.6	216.7
Romania	204.9	221.0	160.2	76.9
South Africa	807.4	778.3	598.1	416.8
Sri Lanka	n/a	18.6	16.9	17.5
Sweden	9.4	6.4	4.7	4.4
Thailand	58.4	21.8	26.7	16.9
Turkey	108.8	99.0	81.1	n/a
Ukraine	n/a	n/a	643.9	427.8
UK (3)	179.6	74.4	23.6	13.1
<b>US</b>	<b>343.8</b>	<b>314.6</b>	<b>261.0</b>	<b>226.6</b>

**Chart 5. Percent change in wage and salary employment, goods-producing industry divisions, 1992-2002 and projected 2002-2012**







**U.S. Department of Labor  
Bureau of Labor Statistics**

*Occupational Outlook Handbook*



# **What to Do – Press the Message On ...**

-  **Mining's role in society, and how done**
-  **Mining Engineering's programs ...  
yeah, explosives engineering, too**
-  **What do students do here? It's fun!**
-  **Opportunities: employment, summer  
work, and scholarships**



# What to Do - Facts

Table 2. Mining's Contribution to GNP for Eight Countries (1998)<sup>(1)</sup>

Country	Mineral Output (million \$) <sup>(2)</sup>	Mining Employment <sup>(3)</sup>	US \$ Generated Per Worker
Australia	16,311	51,200	318,600
United States	56,715	240,000	235,900
Canada	12,843	56,400	227,700
Germany	10,226	68,600	149,100
Brazil	10,060	93,400	107,700
South Africa	17,192	489,100	35,200
India	15,728	636,800	24,700
China	80,208	5,228,000	15,300

(1) Does not include aggregate mining.

(2) World Mineral Production Ranking, Mining Journal, London, 9/7/2002.

(3) Mining and Labor, Mining Journal, London, 10/11/2002.



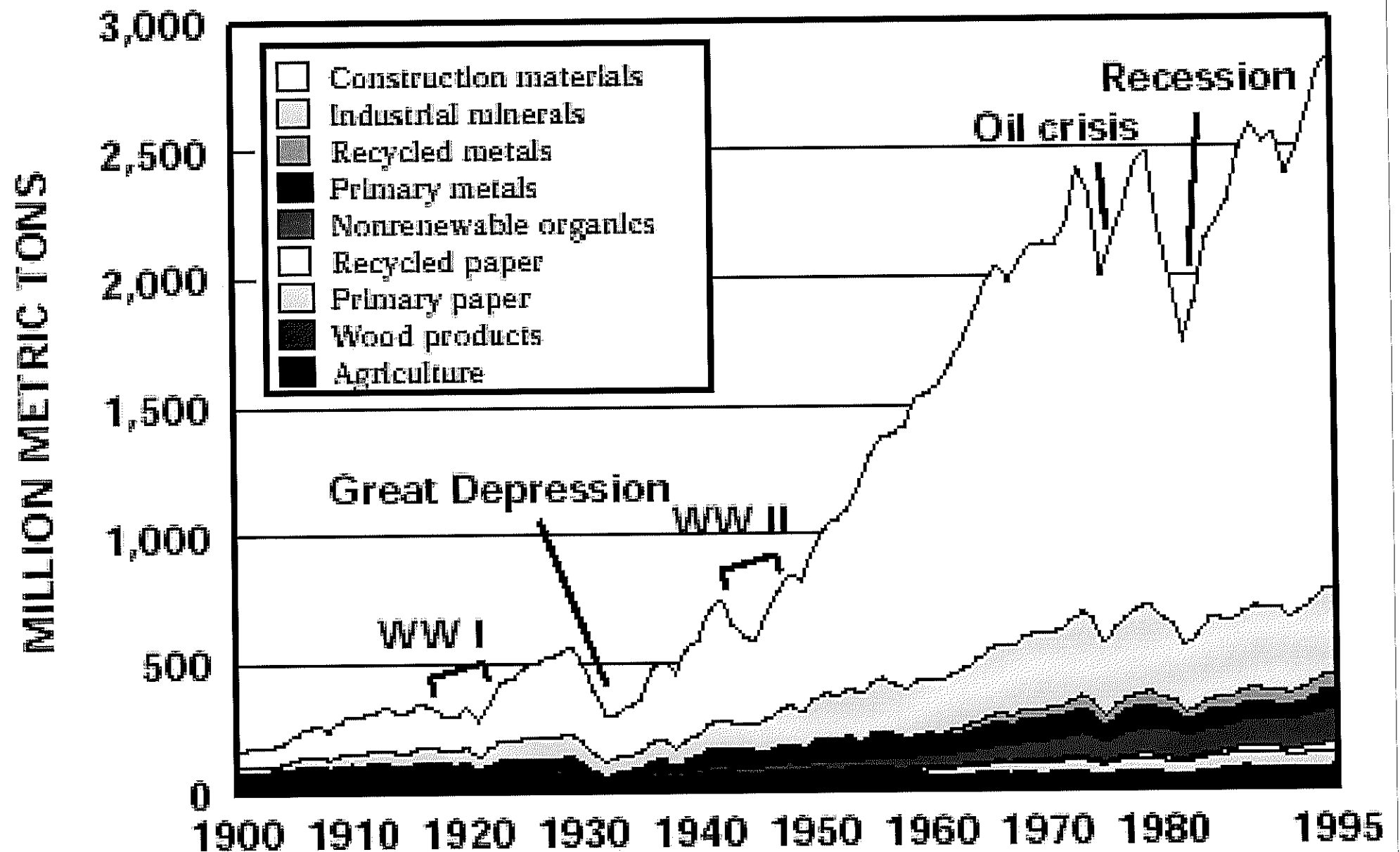


Figure 1: Use of materials in the United States, 1900-1995 (Source: United States Geological Survey, 1998).



## Mining's Role in Sustaining Society Today and in the Future

Jobs are booming in the mining industry. It started two years ago, when the prices for nearly all commodities increased and a large number of 'baby boomers' began retiring. Finding new miners and technical-professional staff is no easy task, and mining companies find themselves in stiff competition for mine engineering graduates. Eleven accredited programs exist in the U.S. now and UMR's program is acknowledged as best or one of the best by all recruiters.

Mining's role in society is to provide a vast amount of mineral and energy resources, as demanded by people. A core question that lies at the heart of sustainability is: *Over time, how much natural resources should be provided to meet human demand but also preserve public health and maintain ecological balance?* The question is not easily answered, is complicated by inequities across the world, and rationalizing trade-offs among peoples and nations is paramount to achieving sustainability for future generations.

Mining engineers plan, design and manage operations and companies that secure raw materials for society. As shown in Figure 1 the consumption of materials has increased dramatically over the past 100 years, and all signs indicate that human demand for materials won't subside.

The well-known goals of sustainability and the trade-offs among them drive the operational and planning processes of the mining industry, and they require holistic design of engineered systems. This is no easy task, and the training of mining engineers requires keen awareness of changing natural conditions and sensitivity to restoration of the disturbed earth to its original state. Operations must be profitable at the same time, and they are, like all industries, heavily regulated.

### The U.S. Mining Industry

Just as the Navy, Air Force, occupational health and safety profession, and other fields specialize strongly, so do mining engineers.

The industry employs around 330,000 workers, including mining engineers, which places it at about the size of the U.S. Navy's work force, and establishes it as an efficient sector.

The following bullets can be cited concerning the mining industry:

- The world's largest one is here in the United States
- It continues to provide 90% of non-food,

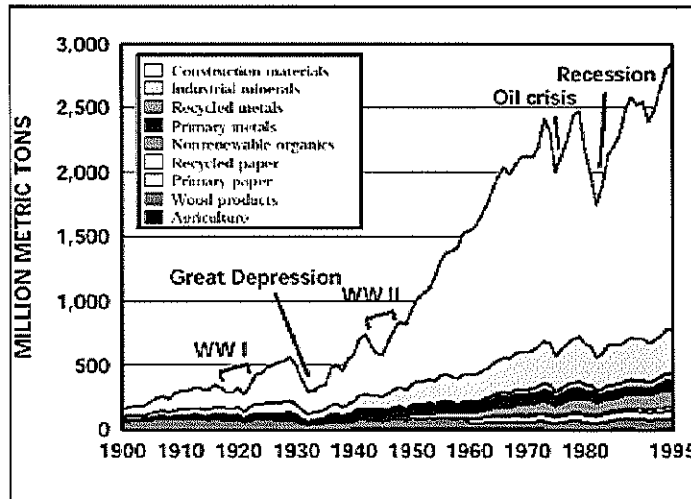


Figure 1: Use of materials in the United States, 1900-1985 (Source: United States Geological Survey, 1998).

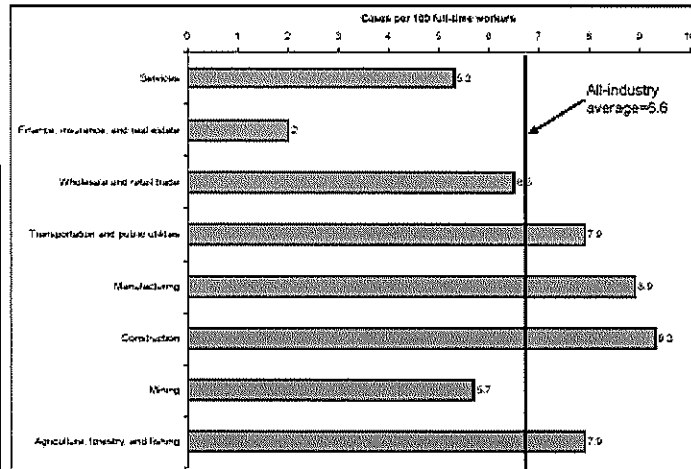


Figure 2: Incidence rates for nonfatal occupational injuries in private industry by major industry division, 1997 (Source: U.S. Department of Labor, 1999).

# What to Do — Important Role in Society

#### non-fuel material inputs for infrastructure, products and services

- As shown in Figure 2, on the right, it ranks as one of the safest industries in the country
- Because of an aging technical work force, it needs engineers and operations managers urgently
- It offers good starting salaries (\$45,000 to \$55,000) for jobs in major cities and rural (there are over 13,900 mines, plants and mills nationwide)
- It provides summer employment for any student who wants it
- It blends field and office activities into an exciting career
- It offers fast tracks in career opportunities.

For more information contact:

R. Larry Grayson  
Chair, Mining Engineering  
Program  
Phone: 341-4753  
Email: graysonl@umr.edu

#### UMR's Mining Engineering Department

Students should also know that UMR's Mining Engineering Department is outstanding, with the following characteristics.

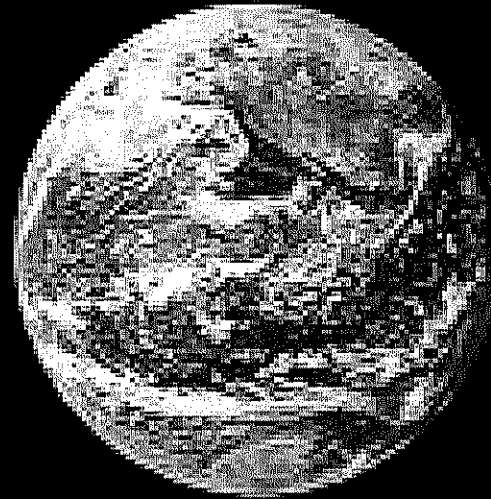
- By reputation, it is likely the best one in the United States, and maybe the world
- It works closely with its students and nurtures their professional and social activities
- It provides generous scholarships from industry and significant monies for student activities
- It has its own Experimental Mine for hands-on learning
- It has a world class faculty with extensive experience in industry and government
- It offers optional specialty areas in explosive engineering, quarry engineering, and coal, with policy-related options pending
- It offers exchange program and permanent employment opportunities in Australia, Chile, and South Africa

The Department works closely with its students every day, 17% of them women, and looks out for opportunities for an exciting career for all students. Of the current 17 to 22 graduates per year, 100% have been placed in jobs for the last eight years, for those who wanted it. They go everywhere in the U.S., including California, Florida, Georgia, North Carolina, and Texas; many stay in Missouri. Today the industry would like to hire at least twice as many graduates per year, if they were available.

While ago a student, seeking more information on mining engineering as a career opportunity, stated that other professions around campus described the mining industry as dying. As you can now see, the demand for raw materials continues to grow. In fact mineral and energy resources will most likely be demanded forever, and so will mining engineers, who plan, design, and manage the complex, high-tech operations and companies that get them.

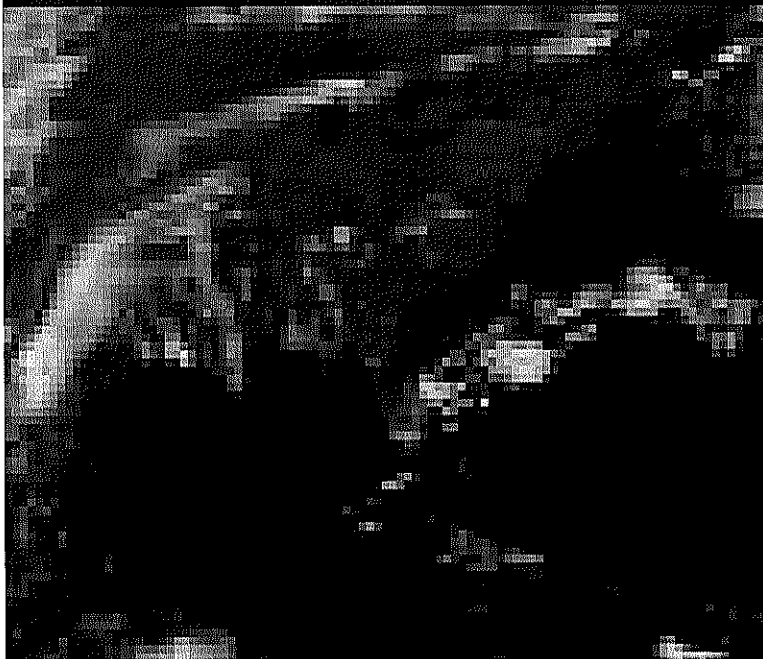


# Earth



Corbis.com

-- and the many  
challenges of human  
demands and  
interactions





# The Role of Mining – Minerals and Energy – in Sustaining Society



... and what its real impact is.



# What is “sustainable development”?

... a notion that there may be limits to growth and that society must be reorganized to protect the interest of future generations ...

Many government organizations, non-government and industry ones have different definitions.



**Over a lifetime, on average an American infant will require (lots of materials here):**

**800 lbs of lead**

**1,500 lbs of copper**

**3,593 lbs of aluminum**

**32,700 lbs of iron**

**26,550 lbs of clays**

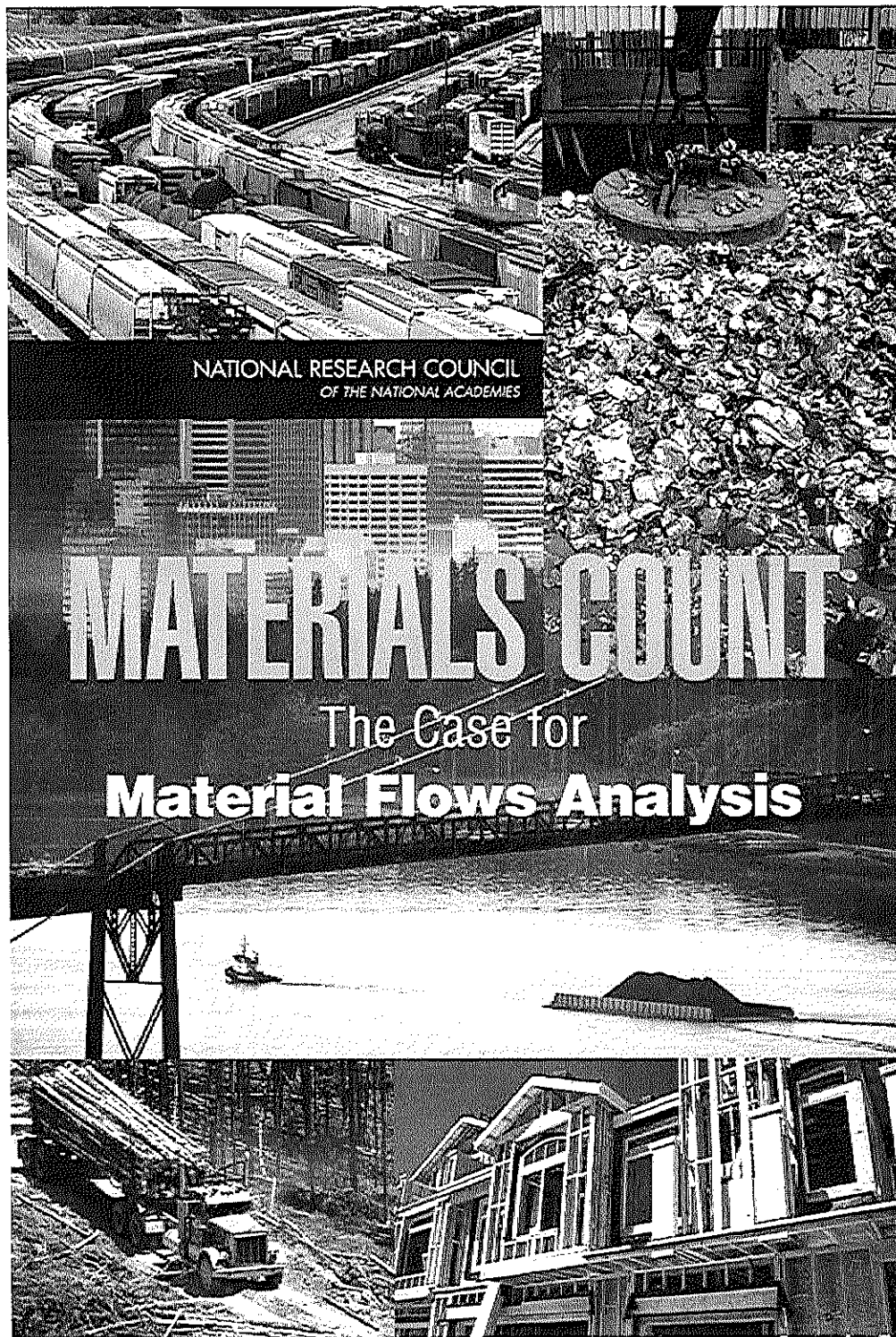
**28,213 lbs of salt**

**1,238,101 lbs of stone, sand, gravel and cement**



Corbis.com

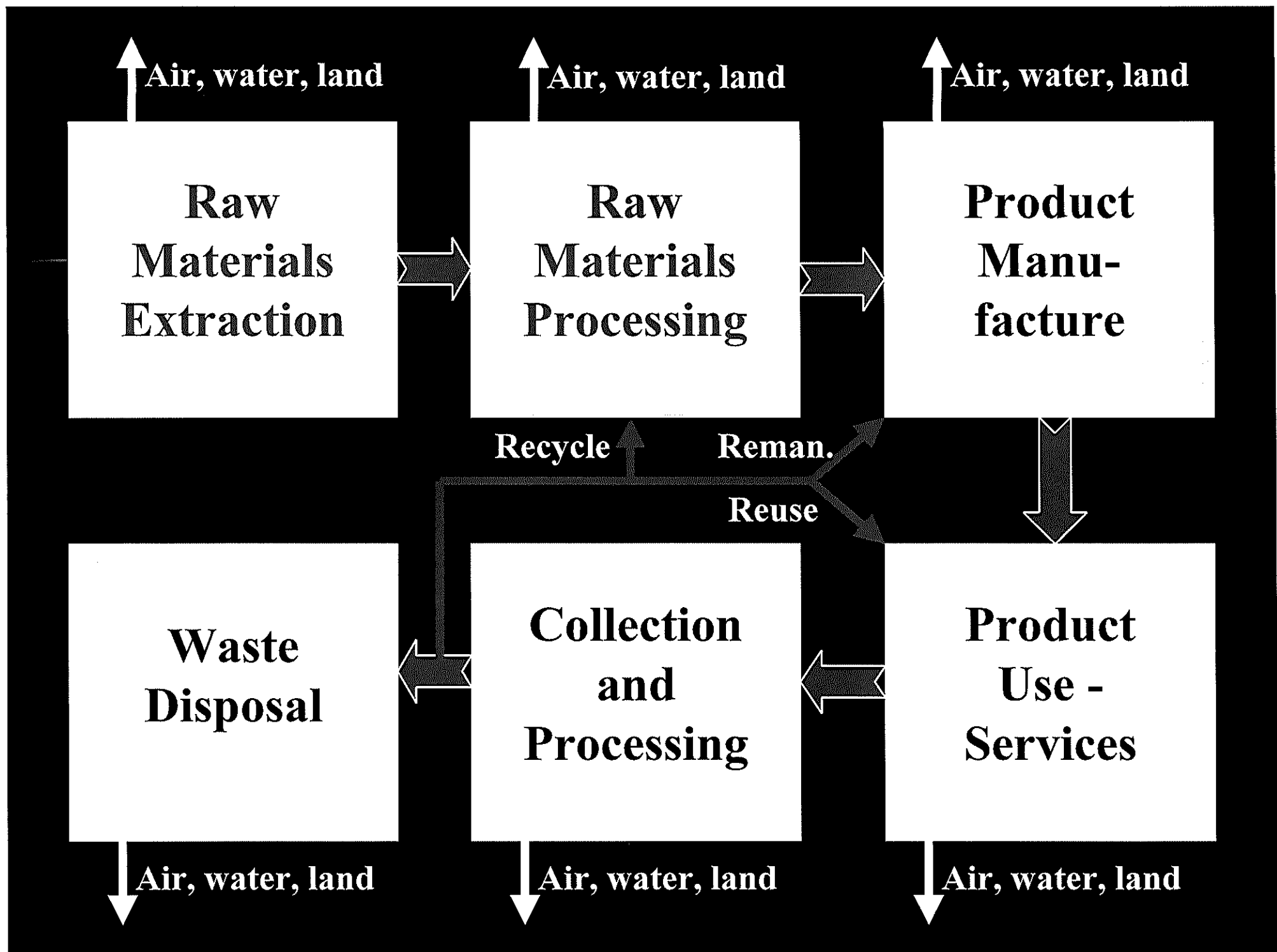




**NRC Committee on  
Material Flows  
Accounting of Natural  
Resources, Products and  
Residuals**

**Committee on Earth  
Resources  
Board on Earth Sciences  
and Resources**







# Material flow analysis – coal in U.S.

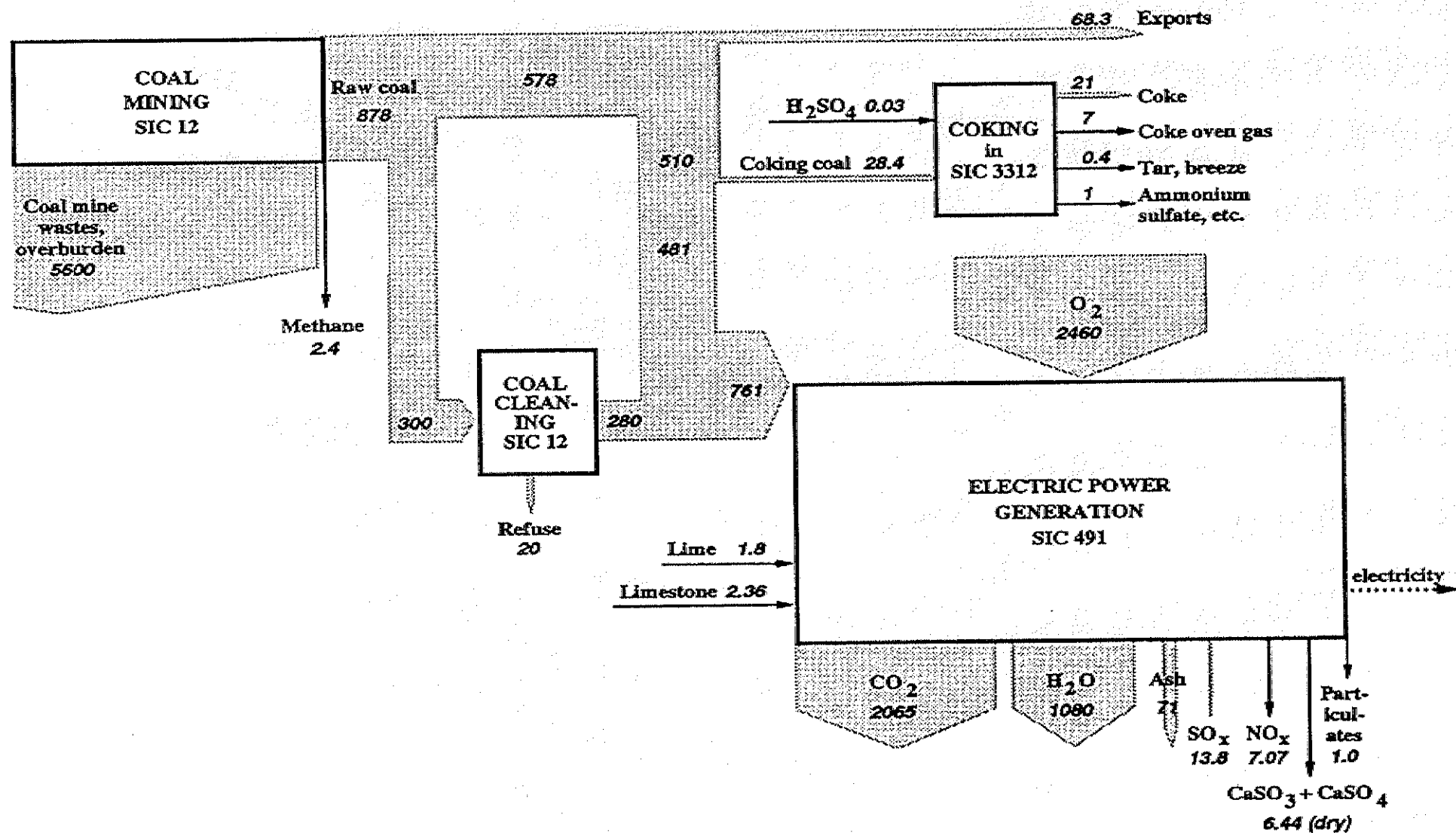


Figure 4.1 US coal system, 1993 (MMT)



# Coal material flow analysis – modified

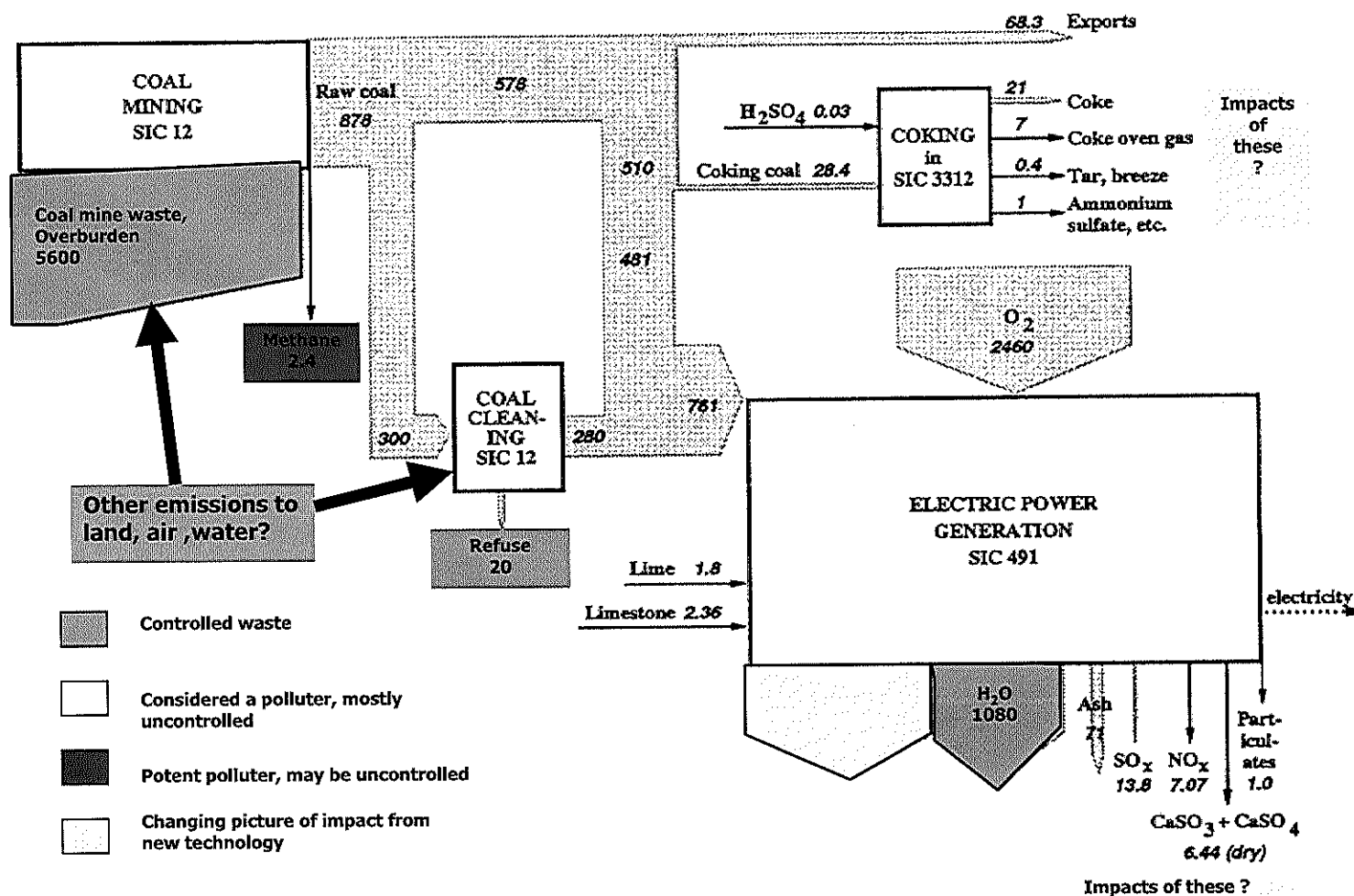
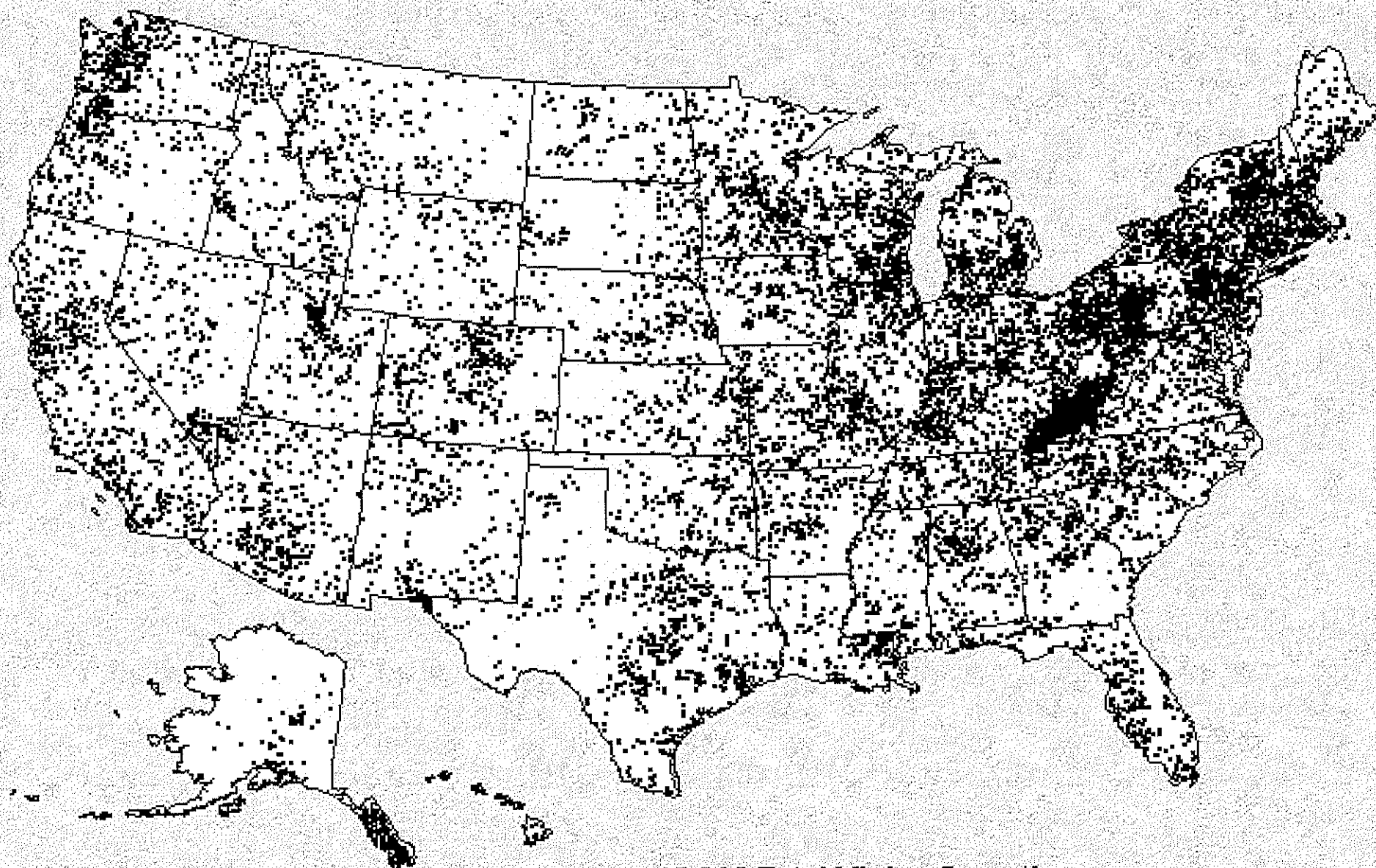


Figure 9. Coal material flows analysis for 1993 (modified flows in MMT).<sup>15</sup>



# Mining Operations



13,902 Total Mining Operations  
(spotted randomly within counties)

**Source: MSHA 1998**



Average benchmark annual salaries at U.S. aggregate and construction material mines and U.S. coal mines (114 mines).

Job Title	Aggregate and Construction Material Mines	Coal Mines
General Manager	\$85,300	\$114,800
Mine Manager	70,300	95,800
Mine Superintendent	56,100	83,300
Plant Foreman	42,900	59,700
Chief Engineer	65,400	80,200
Chief Geologist	54,000	64,700
Purchasing Agent	43,100	55,100
Environmental Coordinator	45,500	67,500

Source: *Aggregate & Construction Materials Mine Salaries, Wages & Benefits: 2001 Survey Results* and *U.S. Coal Mine Salaries, Wages and Benefits: 2001 Survey Results*. Western Mine Engineering, Inc., [www.westernmine.com](http://www.westernmine.com)



# Mining Engineering in school can be fun, too

BY ROBERT GARDNER

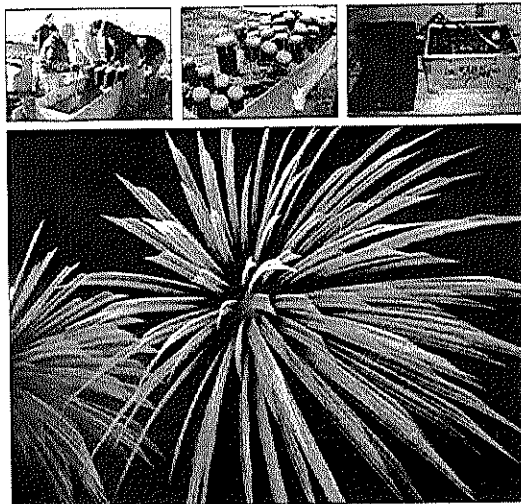
## A CLASS THAT'S A BLAST

**M**INING ENGINEERING professor Paul Worsey is helping ensure future Fourth of July does will be bright and booming. In his Commercial Pyrotechnics Operations course at the University of Missouri-Rolla (UMR), he teaches future pyrotechnicians in all they need to know about fireworks displays. Choreography, storage, safety, liability—even the chemistry governing the explosions—it's all covered. The only prerequisite is a chemistry course and a love of fireworks.

The course is an outgrowth of Worsey's interest in explosives and UMR's mining engineering program. Junior and senior mining engineering students have made up the majority of the class. Computer science, civil engineering, and chemistry majors have taken the course as well. "I let a freshman take it once and he loved it," Worsey recalls. "Afterward, I told him I felt sorry for him because his classes would be all downhill from there." Some take the class to pursue a career in pyrotechnics. Toward that end, Worsey makes everyone take the Pyrotechnic Guild International shooter's certification test. On completing the course, several students have gotten summer jobs with the local company that hosts the course, Premier Pyrotechnics. Company president, Matt Stiff, and manager of the company's Richland, Missouri, operations, Matt Gillette, teach the course with Worsey.

Over three class meetings in the fall, students set up and shoot off thousands of dollars worth of fireworks on company property. "We went out and shot a \$5,000 display and had a party afterward," Worsey says of one meeting last fall. The biggest display is put on during the fourth and final class meeting at the "Christmas in the Sky" event, sponsored by Kaitum City, Missouri, radio

station KUDL. Last Thanksgiving eve, a crew comprising Worsey and most of his students launched over 2,000 shells into the air. One of the few pyrotechnics courses that can be taken for college credit, it draws students from around the country. Chris Kattam came from Queens, New York. Always interested in fireworks, he was looking to get pyrotechnic certification when he discovered the course on the Internet. He enrolled and had

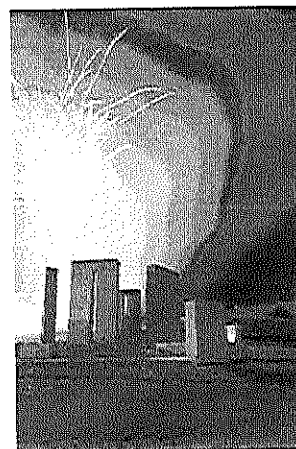


Clockwise from top left: Students loading fireworks mortar tubes into a sandbox; red caps on the tubes seal out moisture and yellow wires connect to a computerized firing system; laptop containing the firing sequence linked to a Fire One Box. During the "Christmas in the Sky" display, the box synchronized the fireworks bursts with music playing on a radio station.

to commute to Missouri for the class. "It was an awesome experience," he says. "An astronomical experience." And a life-changing one. Kattam, a pre-law undergraduate major, was recently accepted into UMR's mining engineering bachelor's program and is looking forward to moving to Missouri.

Robert Gardner is Associate Editor of Pyrom. He can be reached at rgardner@pyrom.com.

## 2005 Summer Explosives Camp



2004 Fireworks on UMR campus

July 17 – July 21  
2005

## Commercial Pyrotechnic Operations

"PGI Shooters Certification"



September 18 - November 24, 2004  
Richland, MO

Presented by  
University of Missouri-Rolla  
Rock Mechanics & Explosives  
Research Center

in conjunction with

Premier Pyrotechnics Inc.



# Mining Engineering in school can be a challenge



*Where will your degree take you?*



# International Intercollegiate Mining Competition ... fun





# Student Chapters and Fund Raisers => Leadership

Society for Mining, Metallurgy and Exploration, Inc.

National Stone, Sand and Gravel Association

International Society of Explosives Engineers

Women in Mining



## ***9<sup>th</sup> Annual Haunted Mine***

October 22, 2004 - 6:00 pm – 11:00 pm

October 23, 2004 – 5:00 pm – 11:30 pm

October 29, 2004 – 6:00 pm – 12:00 am

October 30, 2004 – 5:00 pm – 12:00 am





# University Economics

- Clamor for very limited resources
- Metrics tough to meet
  - 15 to 1 student ratio to faculty FTE
  - \$250K research expenditures/FTE
  - Department size 200 to 300 minimum
- Tuition & Fees fast rising; political limits
- New revenue sources critical



# Show Progress or ... Die

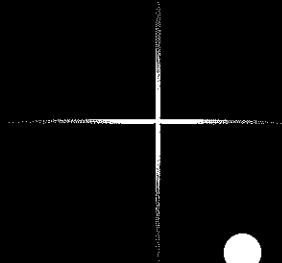
**Table 1. Enrollment Progress**

<i>Year</i>	<i>U/G#</i>	<i>Fr</i>	<i>Eng+</i>	<i>Total U/G</i>	<i>PhD*</i>	<i>MS*</i>	<i>ME*</i>	<i>Total Graduate*</i>	<i>Grand Total</i>
2005^	80		24	104	15	1	17	33	137
2004	60		30^	90	9	2	15	26	116
2003	47		30^	77	5	3	16	24	101
2002	52		18^	70	4	2	14	20	90
2001	59		19^	78	3	4	6	13	91

- Merged with Nuclear Engineering => doubled enrollment
- Tripled grant and contract awards => \$5.2 million FY05
- Tripled PhD students
- Tripled Master of Engineering (ME) program



# However ...

- 
- Dearth of federal research monies dedicated to mineral resources
  - Lack of expertise in faculty, e.g., ventilation expertise dying fast



# Summary of Keys to Recruiting Students into Mining Engineering

- Clearly demonstrate care and concern for students; faculty and staff address needs or problems personally, straightforwardly and quickly; they are our customers
- Build a family, spend some time with them all, building enthusiasm and empowering them toward the common goals; yes, our students are our best recruiters



# Summary of Keys to Recruiting Students into Mining Engineering

- Act immediately on every inquiry, walk-in or electronic, and give priority to them; this includes industry and citizens as well as students
- Explain the discipline's important role in society briefly and appealingly
- Have some fun at times, give options for it



# Summary of Keys to Recruiting Students into Mining Engineering

- Have some student-run and student-oriented functions/activities with leadership roles
  - Haunted Mine
  - Mucking Competition
  - Mine Rescue
  - Mine design competitions
  - Student Awards Banquet
  - Fireworks shows at university events
  - Multiple student chapter options



# Summary of Keys to Recruiting Students into Mining Engineering

- Share everything with industry partners; keep industry coming back, making presentations, and recruiting; visit them regularly; keep students informed of opportunities
- Advertise innovative programs, research, and student activities at every opportunity
- Collaborate across disciplines
- Maintain a strong alumni network, including a job pipeline; it works both ways – you get them new jobs, and they hire your students