



# INDIAN MINERAL RESOURCE HORIZONS

BIA DIVISION OF ENERGY AND MINERAL RESOURCES

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## CHIEF'S MESSAGE

BY RICHARD N. WILSON

Hello from the Division of Energy and Minerals!

Our recent Minerals Conference held here in February has convinced us that we need a more regular way of staying in touch. We need to be able to discuss minerals matters that may not receive wide circulation or may be of such an informal nature that they are not disseminated in writing at all.

The Division has felt for some time the need to strengthen out lines of communication with the field. We hope to keep you up-to-date on our work with mineral assessments in your area and other mineral issues that arise in the field. For instance, few, if any, are aware that projects funded and overseen by this office have discovered over \$1.5 trillion in potential mineral resources on Indian lands. This number represents the estimate of the value if all the minerals in the ground were mined which is rarely the case. Actual minable reserves are much smaller, but the potential economic benefit to the Indian Mineral owner is still immense.

So, we have started our own newsletter in hopes of improving our communications. Given the uncertainties of our funding picture--at this writing there are still no 1993 funds for Minerals Assessments

or Special Projects--this newsletter may be the only way we can stay in touch.

In the editions that follow, we intend to share information that you might not have access to otherwise. We will talk about the state of the oil and gas market, the precious metals business, and solid minerals in general, touching on such subjects as the impacts on Indian lands of the possible repeal of the 1872 Mining Law. We'll also share information about the structure and terms of mineral agreements--their terms and consequences. We will also give you a chance to tell us and the rest in Indian country what is happening in your neck of the woods. Bob Zahradnik of the Southern Ute Minerals Department and Rick Stefanic of the Billings Area Office are our lead off contributors. We will be calling on the rest of you on down the line.

The newsletter will come out twice a year unless the amount of material and the needs of the field call for a more frequent publication. If there are important events--such as court decisions or Acts of Congress that influence our minerals picture, we will release a "special edition".

If you have comments or articles that you wish to see included, please send them. We'll be glad to hear from you.

### INDIAN MINERAL RESOURCE HORIZONS

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Please call with any suggestions or comments

# **SOUTHERN UTE TRIBE LAUNCHES ENERGY COMPANY**

BY  
**BOB ZAHRADNIK, MANAGER,  
RED WILLOW PRODUCTION COMPANY**

The Southern Ute Indian Tribe, long active in energy development, has taken a big step forward in its program to increase tribal involvement in energy development on the reservation. The Tribal Council recently voted to fund Red Willow Production Company, a tribal acquisition and operations company.

Using a combination of \$8 million from a tribal economic development fund and bank financing as required, Red Willow is working to purchase producing wells and leasehold interests throughout the Southern Ute reservation. The Tribe will consider properties located both on fee and tribal land within the boundaries of the reservation. The Tribe plans to own and operate over 70 wells within three years.

The Tribe hopes to achieve a number of goals through this new company. First and foremost, the Tribe expects to generate an attractive rate of return by buying producing gas wells at low prices in the current depressed gas market and operating them over a long period of time. Secondly, the Tribe will improve tribal employment by implementing a training program which will build the skills of tribal employees and move them gradually into positions of increasing responsibility in the company.

A third major objective of the company is to consolidate ownership of older wells. As these older wells have changed hands over the years, the ownership has gradually become broken up and dispersed, and overrides have increased the economic burden which the wells must bear. These factors combine to make it hard to develop and operate older properties. By buying out all the diverse interests, the Tribe will make the properties more viable and extend the productive life of the wells and increase ultimate royalty revenues.

The Tribe is confident that now is an opportune time to buy oil and gas properties. Many major oil companies are reorganizing and are considering selling blocks of wells located on the reservation. Many small independents are fighting cash flow problems and are hard pressed to make payments on existing debt. The result is that many operators are selling, while few buyers are actively pursuing acquisitions. The result is a classic buyer's market. This is an excellent opportunity for the Tribe, which is positioned well to take the long view.

The Southern Ute Indian Tribe has been working steadily since 1976 to improve and expand their capabilities in managing their energy resources. Much of this progress is the result of the good working relationship the Tribe has developed with BIA Minerals. PL 93-638 funding has provided critical support for the studies and database generation which provide the technical foundation for the Tribe's energy management, and the Golden office has provided technical support at each step of the Tribe's development. The next big step, tribal energy operations, will succeed because of the solid foundation on which it is built.

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## **SECOND ANNUAL NATIONWIDE INDIAN MINERALS CONFERENCE A SUCCESS**

The Division sponsored the Second Annual Nationwide meeting in Denver, Colorado, February 4th to 6th, 1992. Many thanks to the numerous individuals who contributed to the conference that featured panel discussions, poster sessions and technical discussions. The feed back from the participants was overwhelmingly positive. Many of the Tribal groups found it interesting to review other Indian Tribes' activities and the economic impact concerning minerals.

Attendance at the meeting included Tribes, private industry and BIA Area Offices and Agency personnel. Other federal agencies (MMS, BLM, USGS and BOM) also participated in this meeting. Total attendance of this meeting was over 275 people.

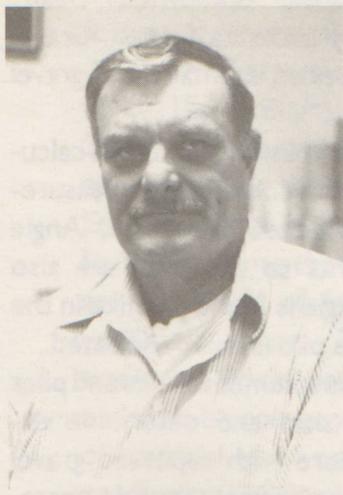
**Did you know? It takes more than 33 elements and minerals to make a computer!** Those vital computer ingredients consist of aluminum, antimony, barite, beryllium, cobalt, columbium, copper, gallium, germanium, gold, indium, iron, lanthanides, lithium, manganese, mercury, mica, quartz crystals, rhenium, selenium, silver, strontium, tantalum, vanadium, yttrium, zinc and zirconium. And, we can't forget the petroleum industry's role in the computer. Many of the components noted above are housed in plastic! (from NWMA Bulletin)

# FOR YOUR INFORMATION

## DECLINE CURVES

BY

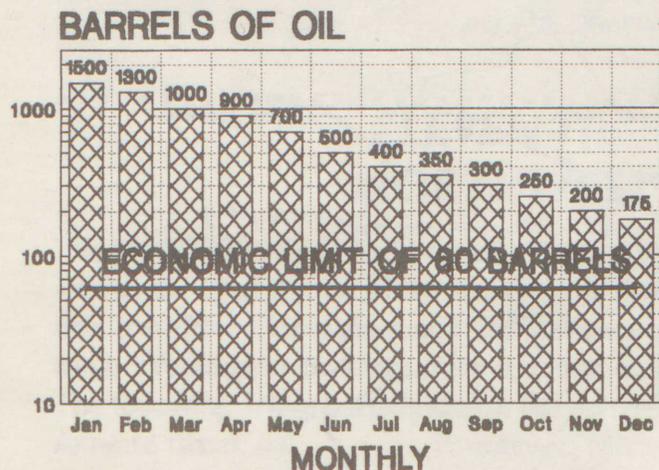
DON MILLER, PETROLEUM ENGINEER  
ENERGY AND MINERAL RESOURCES



The Division of Energy and Mineral Resources is repeatedly asked the definition and purpose of a decline curve. Also, we are asked to identify the value of production decline information to the user. The most important use of information derived from a decline curve is in forecasting future revenues from oil and gas production to use in developing

individual tribal operating budgets. When reviewing the economics of a oil and gas lease the decline curves can be used as a tool to aid determination of a reasonable royalty rate, so that the company can make a profit along with the tribe. If the royalty rate is unreasonable, a company which has future plans to drill in the area can be discouraged. When a company is paying excessive royalty rates to a tribe, the economic limit is increased and the productive well life shortened.

**FIGURE 1 - PRODUCTION DECLINE  
BARRELS OF OIL VS. TIME**



Decline curve analyses are also employed as a device to determine if drainage is occurring between two adjoining leases and used to assess compensatory royalty.

Decline curve analyses should begin with an understanding that the information and method to predict future performance of an oil or gas well is not a complicated procedure. Each point on the graph represents the amount of oil or gas that was produced from the well for that day, month or year. Remember that the vertical axis on the graph represents the production (logarithmic scale) and horizontal axis (arithmetic scale) represents time.

A decline curve gives you the history of the well's past performance. Reviewing this production information gives you a better estimate of future income.

For example, the decline curve in figure 1. is an oil well that is producing from January to December. In January the well was producing 1500 barrels per month and in December the well was down to only producing 175 barrels. If the oil company decides that its economic limit is two barrels per day or 60 barrels per month, and the well produces only 60 barrels per month, this would be the time to plug and abandon the well. The reason for this is that the oil company is paying more revenue out to produce the oil than the well is making.

Each oil company will have a different economic limit according to the following factors: (1) The cost to drill and complete the well, (2) the operating budget of the company, (3) the royalty rate that the company has to pay to the tribe, (4) amount of bonus for the lease.

Decline curve analysis is used to calculate the remaining reserves of an individual well or oil field, so that the oil industry can determine when a well or field has reached its economic limit. The economic limit determination by an oil company is very important, because at that point it must decide whether to: (1) plug and abandon a well or field, (2) sell the property to another company that has lower operating costs, or (3) initiate a secondary recovery project (water flood) to recover additional reserves that otherwise could not be recovered under existing conditions.

# NOTES FROM THE FIELD

## MONITORING GRAVEL PRODUCTION

BY

RICK STEFANIC, AREA GEOLOGIST,  
BILLINGS AREA OFFICE

Production verification for gravel extraction is a problem in the Billings Area. Operations vary from "Mom and Pop" size (10 to 50 cu yd/yr) to the commercial/industrial size which can be hundreds of thousands of cubic yards used during a single project or construction season.

The Billings Area Office in conjunction with the Bureau of Land Management began an attempt to monitor permitted pits identified within the reservations during FY 1991.

Locating a pit site is sometimes simple, but at other times a guide who is familiar with the area, is necessary to keep us from wasting all afternoon stalking an elusive site. Once at a site, a pit is sometimes found. Other sites simply have a few piles of gravel with no real indication of origin.

At existing pits, (Fig. 1) we establish a recoverable point away from where gravel extraction will ensue. From that point, we take direction and distance measurements to a near center point in the existing pit. From the central point, about 12 equi-angle (30° difference) azimuths are ascertained, recording distance consistently either from

the toe of the slope or the surface break on the perimeter at the head of the slump. Using the integrated area from these measurements, multiplied by the height at the point where the compass bearing intersected the perimeter in conjunction with the slope on the sidewalls of the pit, a volume of extracted material is calculated. Somewhat "clean" gravel presents a relatively accurate figure. Gravel that requires washing forces an estimation of gravel content.

Piles (Fig. 2) on site present a different calculation methodology. Azimuth and distance measurements are taken around the base of the pile. Angle and distance measurements to the peak are also taken. Amazingly, a 38° angle is found just like in the textbooks. Volume of the pile is then calculated.

Using these baseline volumes for pits and piles we quarterly revisit the sites and determine extracted volumes to compare with reported gravel production/sales. There has been reasonable correlation but there's room for speculation or theft.

These pits/piles are not secure so if there is a large variation between calculated and reported production, the producer may be in error or someone with a loader/truck may be reaping the rewards of another's toil and mineral resource.

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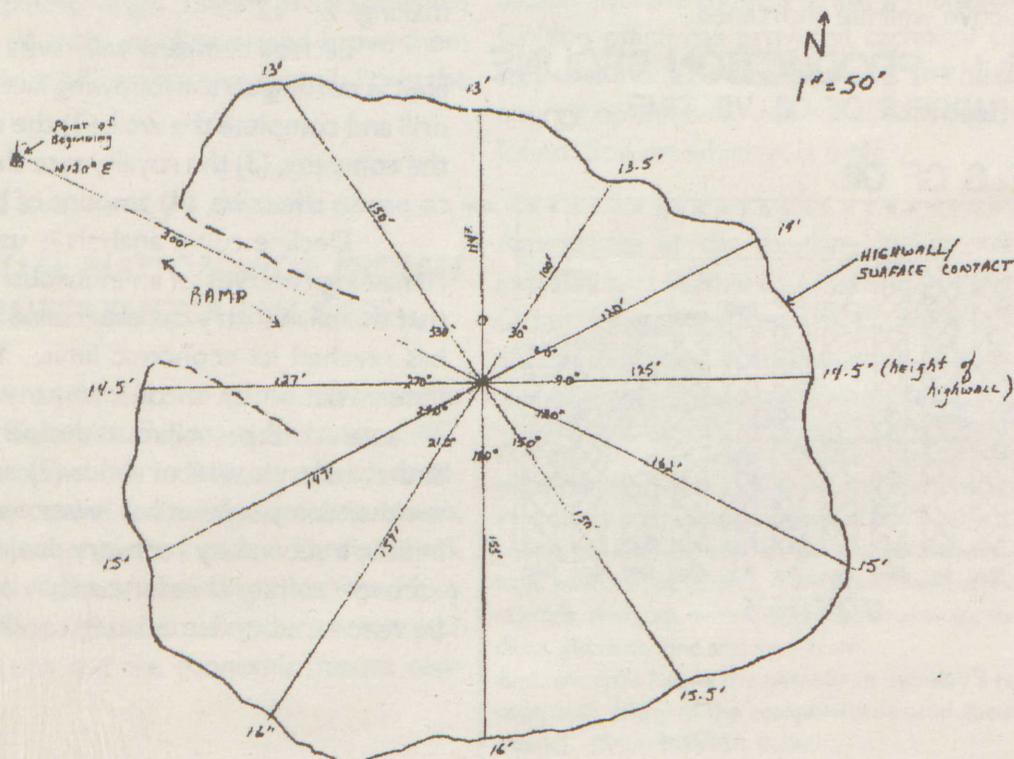


Figure 1 - PIT SCENARIO

(continued from previous page)

We have considered mandatory security measures and Tribal Employment Rights Office (T.E.R.O.) production validators. On Mom & Pop operations where the "production" might be a cubic yard today and 5 cubic yards next month, a security and validators it is not economically justifiable.

A third scenario was "found" during one agency visit. The Tribe(s) had authorized production for a State road job without Bureau of Indian Affairs (BIA) approval. By the time the permit and retroactive Environmental Assessment was done, and the permit had gotten "into the system", piles of gravel 50 feet high and hundreds of feet long greeted the production verification team. The Brunton compass, tape, and stadia rod did not seem ample weapons for the task. In order to be compensated by the State for the volume of material used on the job, a different method of production verification was necessary. Having a truck count by a T.E.R.O. employed person was considered. A second, more exact method was selected. Knowing

the thickness, width and length of roadbed, we back calculated cubic yards of gravel. Where:

$$\text{Length} = 5280 \text{ ft/mi}$$

$$\text{Width} = 28 \text{ ft}$$

$$\text{Thickness} = 1 \text{ ft (8in road base + 4in pavement)}$$

and:

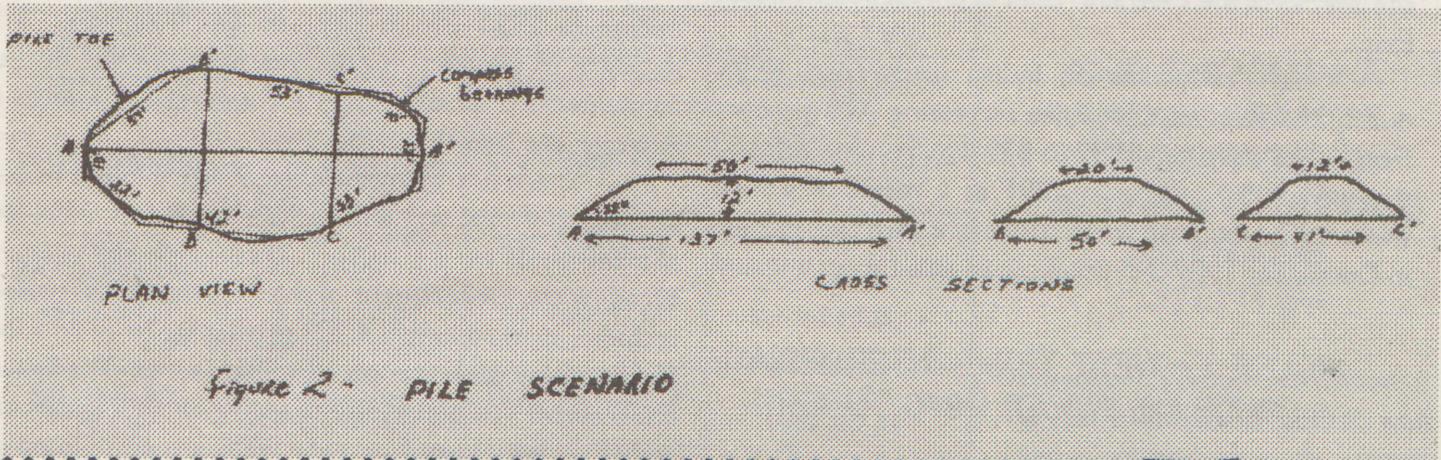
$$\text{Length} \times \text{Width} \times \text{Thickness} = \text{Volume or:}$$

$$5280 \text{ ft/mi} \times 28 \text{ ft} \times 1 \text{ ft} = 147,840 \text{ cu ft/mi.}$$

This volume is then converted to cubic yards per mile,  $147,840 \text{ cu ft/mi} / 27 \text{ cu ft/ cu yd} = 5475.55 \text{ cu yd/mi}$ . So, for every mile or portion thereof, we can expect payment on the proportionate volume.

We hope someday that an entity will desire to open a new pit and we have advance knowledge of it. With drilling or backhoe trench information, we may be able to find "bank" cubic yard volumes before extraction. Knowing the reporting channels & "systems" we are prepared to continue "after the pit has been opened" production verification.

Any methodology that is employed (and works) for your Areas/Agencies would be welcomed regarding this topic.



## ELEVEN TRIBES PARTICIPATE IN THE NORTHWEST MINING CONVENTION

The Division developed and organized a poster session at the 97th Annual Northwest Mining Association (NWMA) Convention and Tradeshow in Spokane, Washington on December 4, 5 and 6, 1991. The following Tribes participated in the convention:

Annette Island, AK	Penobscot, MA
Colorado River, AZ & CA	Red Lake, MN
Colville, WA	Pine Ridge, SD
Flathead, MT	Rocky Boy's MT
Goshute, NV & UT	Torres Martinez, CA
Passamaquoddy, MA	

More than 3900 people attended the convention. More than 1000 booklets "MINERAL FRONTIERS ON INDIAN LANDS" were handed out to mineral industry representatives. Most of the participating Tribes have received formal mineral exploration proposals from the industry. Overall, the mineral industry was delighted to review the Tribal presentations. Plans to attend next year's convention are well underway. Please contact Stephen Manydeeds, at (303) 231-5070 if you wish to participate in next year's convention.

# INDIAN MINERAL INCOME TOPS \$142 MILLION FOR FY 1991

BY  
**PETE AGUILAR, GEOLOGIST**  
ENERGY AND MINERAL RESOURCES

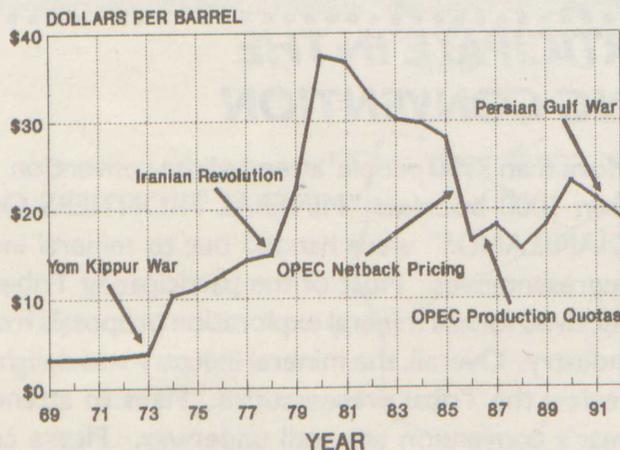


The increase or decrease in energy mineral income has historically been tied to seasonal changes or political events in the Middle East as shown in Figure 1.

Indian oil production fell 1% in 1990; but, oil royalties increased 27.8%, from \$40.8 million in 1989 to \$52.2 million in 1990 and in 1991 dropped to \$44 million reflecting pre-war prices and production. Oil prices surged to a new high since the early 1980's during the last half of the 1990 as a result of unrest in the Middle East.

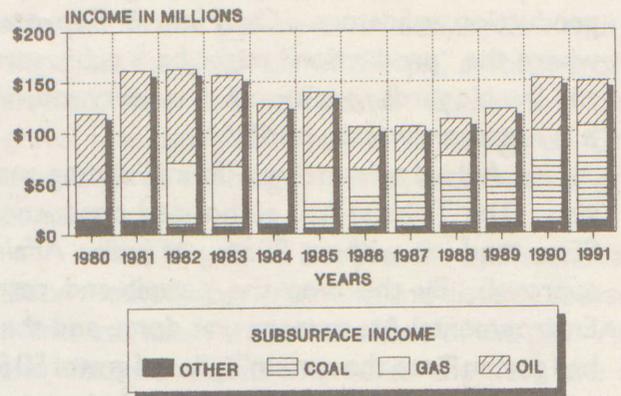
Gas production on Indian lands rose 10.9% during the year with royalties increasing 20.8 percent from \$24.6 million in 1989 to \$29.8 million in 1990 and dropped \$28.4 million in 1991 as a result of a mild winter. The increase was a result of a severe cold snap in December 1989 that accelerated natural gas demand

**FIGURE 1 - WEST TEXAS INTERMEDIATE  
CRUDE OIL PRICES (1970 TO 1991)**



(SOURCE OIL AND GAS JOURNAL ENERGY DATA)

**FIGURE 2 - NATIONWIDE  
INDIAN MINERAL INCOME**



DOES NOT INCLUDE OSAGE INCOME OR INCOME FROM BONUS OR NON-PRODUCING LEASES

and reduced underground storage supplies. Prices rose during the first quarter of 1990 as suppliers increased production to meet peak seasonal heating demand and to replenish underground storage facilities.

Coal production increased 2%; however, royalties jumped 27.5%, from \$47.7 million in 1989 to \$60.8 million in 1990 and in 1991 to \$61.8 million. The majority of the rise in royalties is principally due to adjustments to prior period accounting procedures in Arizona and New Mexico.

There are approximately 7,439 mineral leases, licenses, permits, and applications on Indian tribal and allotted lands on 3.3 million acres which are administered by the Department of the Interior. This number includes approximately 4,200 producing or producible Indian oil and gas leases on 1.6 million acres. The figures cited above are constantly changing as new leases are added or terminated; or new wells are completed or plugged and abandoned.

Mineral revenues directed to Tribal governments and individual Indian mineral owners was \$142.1 million, in FY 1991. Figure 2 shows annual mineral income from 1980 to 1991. Since the Osage Nation manages its own leases and collects its own revenues, the above figures do not include any Osage information.

In summary, royalty revenues other than rents and bonuses from Indian mineral leases from 1920 through 1991 have produced in excess of \$1.2 billion from oil, \$.503 billion from gas, \$.387 billion from coal for a total of approximately \$2.2 billion that have been paid to Indian tribes and individual Indian mineral owners.

# RESOURCES IDENTIFIED THROUGH THE MINERAL ASSESSMENT PROGRAM

## UINTA BASIN SYMPOSIUM AND GUIDEBOOK

MINERAL COMMODITY	RESOURCES	COMMODITY VALUE	VALUE OF RESOURCES IN THE GROUND
COAL	42,500 MILLION SHORT TONS	\$10 PER TON	\$425,000 MILLION
LIGNITE	1,727 MILLION SHORT TONS	\$10 PER TON	\$17,270 MILLION
YTTRIUM	RESOURCE IDENTIFIED ON SINGLE RESERVATION		
BENTONITE	48.44 MILLION SHORT TONS	\$18 PER TON	\$871.92 MILLION
COPPER	1.25 BILLION LBS	\$1.30 PER LB	\$1,625 MILLION
GOLD	44,400 OZ	\$350 PER OZ	\$15.5 MILLION
TIT. MAGNETITE	RESOURCE IDENTIFIED ON SINGLE RESERVATION		
SILVER	276,000 OZ	\$5.55 PER OZ	\$1.5 MILLION
TUNGSTEN	3.4 MILLION LBS	\$56 PER LB	\$190.4 MILLION
PHOSPHATE	743.2 MILLION SHORT TONS	\$19.5 PER TON	\$14,492 MILLION
BIT. SANDSTONE	3.1 MILLION BBL	\$16 PER BBL	\$49.6 MILLION
GYPSUM	2 MILLION SHORT TONS	\$7 PER TON	\$14 MILLION
METHANE GAS	1,005,390 MILLION MCF	\$1.25 PER MCF	\$1,256,737 MILLION
LIMESTONE	77.5 MILLION SHORT TONS	\$10 PER TON	\$775 MILLION
ZEOLITE	RESOURCE IDENTIFIED ON SINGLE RESERVATION		

This table shows the estimated mineral resources by commodity and their value. The "VALUE OF RESOURCES IN THE GROUND" value indicates the estimated total value in the ground at current prices provided that the resources could be 100 percent extracted and marketed at no cost.

The Division together with the Allottees and Ute Development Corp. (UDC) sponsored a conference and guidebook on the Uinta Basin. This was done with the cooperation of the Utah Geological and Mineralogical Survey (UGMS), Utah Geological Association (UGA), Gas Research Institute (GRI), American Petroleum Institute (API), U.S. Geological Survey (USGS), Bureau of Land Management (BLM), and Department of Energy (DOE). The symposium took place May 11, 12 and 13 1992, in Vernal, Utah.



### THE SHOSHONE AND ARAPAHOE TRIBES FOCUS ON THEIR COAL BED METHANE POTENTIAL

Another promotional showing that the Division organized was the Coal bed Methane Forum for the Wind River Indian Reservation. On December 5, 1991, over 70 industry representatives reexamined the Coal bed Methane Resources of the Wind River Indian Reservation. Over 300 copies of the "COAL-BED METHANE POTENTIAL OF THE WIND RIVER INDIAN RESERVATION" booklet have been distributed to private industry.

# 1992 DATES TO REMEMBER

## MAY 1

**REQUESTS FOR MINERAL ASSESSMENT PROPOSALS  
IF TECHNICAL ASSISTANCE IS REQUIRED, PLEASE CONTACT THIS OFFICE.**

## MAY 11, 12, 13

**UINTA BASIN SYMPOSIUM, VERNAL, UTAH.  
FOR ADDITIONAL INFORMATION, PLEASE CONTACT STEPHEN MANYDEEDS AT (303) 231-5070.**

## SEPTEMBER 1

**DIVISION MUST RECEIVE THE COMPLETE MINERAL  
ASSESSMENT PROPOSALS BY THIS DATE.**

## DECEMBER 3, 4, 5

**NORTHWEST MINING CONVENTION, SPOKANE, WASHINGTON  
THOSE TRIBES WISHING TO PARTICIPATE,  
PLEASE CONTACT STEPHEN MANYDEEDS AT (303) 231-5070**

**IF YOU HAVE AN IMPORTANT DATE ( LEASE SALE NOTICE, CONFERENCE,  
DEAD-LINES, ETC) YOU WISH TO HAVE US POST, PLEASE CALL  
MELANIE HUGHES-YAZZIE AT (303) 231-5070.**

**Please send correspondence to:**

**Bureau of Indian Affairs  
Division of Energy and Mineral Resources  
730 Simms, Room 239  
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