



SURVEY NOTES

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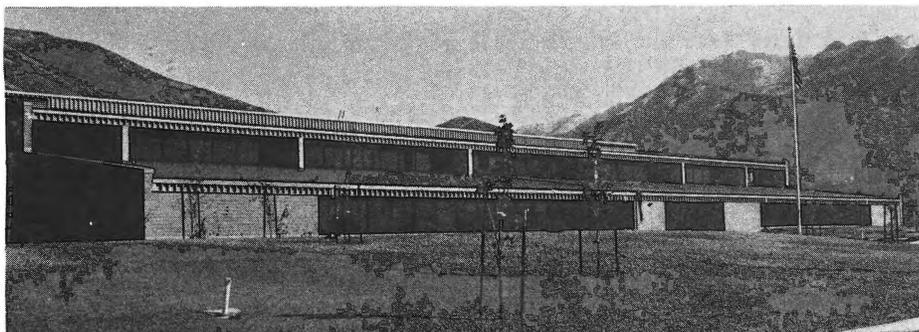
GEOTHERMAL TEST WELL YIELDS 1000 G. P. M.

UGMS has successfully completed a geothermal test hole drilling program at the Utah State Prison facility in Draper. The objective of the drilling program included confirming the presence of a geothermal resource on state owned lands, and providing holes suitable for adequate reservoir testing. These objectives were accomplished by: 1) deepening an existing hole referred to as SF-1 (See Survey Notes August 1978), and 2) drilling a new test hole referred to as USP/TH-1.

SF-1 was deepened from an initial depth of 280 feet to 505 feet in an effort to evaluate the characteristics of the quartzite bedrock encountered at 270 feet. Drilling began on October 8 and was completed October 9. The material encountered during drilling was predominantly fractured quartzite of the Oquirrh Formation. After drilling was completed, water began to flow from the hole. A maximum flow rate of approximately 300 G.P.M has been measured. The maximum recorded temperature of the flow was approximately 80°C.

USP/TH-1 was drilled approximately 500 feet east of SF-1. After installing 280 feet of surface casing to the top of the fractured quartzite reservoir, the hole continued to a total depth of 1,005 feet. Drilling rates in excess of 2 feet/min. and the continuous loss of water during drilling were indications of a highly fractured reservoir. After the well was completed, the well began to flow 80°C water at approximately 1000 GPM. The hole was completed with a 6-inch slotted liner to prevent the hole from collapsing.

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NEW U. S. BUREAU OF MINES BUILDING DEDICATED

On October 17 a new building to house the U. S. Bureau of Mines, Salt Lake City Research Center was dedicated. The building is located in Research Park just south of Fort Douglas and a short distance from the University of Utah campus.

William A. McKinney, Research Director of the Salt Lake City Research Center was host for the dedication ceremony which was followed by lunch and a tour of the new facility for those in attendance. Speaking at the dedication were Joan M. Davenport, Assistant Secretary of Interior for Energy and Minerals, Lindsay D. Norman, Director U. S. Bureau of Mines, Scott M. Matheson, Governor, Senator Jake Garn, Congressman Dan Marriott, staff representatives for Senator Hatch and Congressman McKay, who were unable to attend and James J. Brophy, Vice-President of the University of Utah. The invocation was presented by Stephen D. Hill, the National Anthem sung by David V. Behunin, and the benediction given by William I. Nissen. All three are employees of the Salt Lake City Research Center.

October 17 was a very special day for the U. S. Bureau of Mines because it also marked the 70th anniversary of the Bureau which was split off from the U. S. Geological Survey in 1910. Not long after the Bureau was formed, the joint U. S. Bureau of Mines Intermountain Experiment Station—Utah Engineering Experiment Station was established under a cooperative agreement with the University of Utah. The Salt Lake Experiment Station buildings on the University campus which have just been vacated by the Bureau were occupied late in 1939 and dedicated in May, 1940.

Ten years ago the Salt Lake Experiment Station was renamed the Salt Lake City Metallurgy Research Center in recognition of the primary function of

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GEOTHERMAL TEST WELL YIELDS 1000 G. P. M.

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The preliminary results of the drilling program are considered encouraging. Artesian flow testing and a possible pump test are being considered to define the hydraulic characteristics of the reservoir.

The test drilling program was a portion of a resource assessment effort being conducted by UGMS in cooperation with Terra Tek, Inc. of Salt Lake City under a DOE/DGE cost share program. The objective of the project is to use the geothermal water to heat the minimum security facility of the Utah State Prison. The project is coordinated for the State by the Utah Energy office. The drilling contractor for the test program was Billings Drilling Company of Salt Lake City, Utah.

METHANE DETERMINATION IN UTAH COAL FIELDS

Since 1975, the Survey, utilizing the U. S. Bureau of Mines "Direct Method" for the determination of gas content of coal, has been collecting all available coal cores from Utah coal fields for the purpose of evaluating the methane content. Most of the cores are donated from private and government drilling programs. After the evaluation, the donors are supplied with methane data as well as proximate/ultimate analyses, and sulfur forms. A relatively un-broken 1,000 gram piece of coal core is all that is required for evaluation, but it must be collected at the drill hole as soon as possible after reaching the surface.

To date the Survey has collected 289 coal core samples as follows:

Alton Field - 3 coal cores
Henry Mountains Field - 1
Book Cliffs Field - 113
Kaiparowits Plateau Field - 12
Sego Field - 33
Emery Field - 60
Wasatch Plateau Field - 67

No data have been collected in 14 of Utah's 21 coal fields.

Enough data have been collected to infer, but not completely delineate, an area of gassy coals in the Book Cliffs Field where 113 coal core samples have been evaluated and 3 active mines and 1 inactive mine have been sampled and mapped.

Data from the Emery Field and Wasatch Plateau Field are presently being evaluated and constitute most of the recent collections. The initial coal core samples up to 164 have been evaluated and are described in UGMS Special Studies 49.

UTAH EMPLOYMENT IN THE MINING INDUSTRY

The average number of people employed in the mining industry in Utah in 1979 was 17,694, or 3.2% of the total non-agricultural work force of 548,419. The total employed by the metal industry was 8,962 up 5.6% from 1978; coal mining employed 4,225 up 3.1% from 1978, oil and gas employed 3,551, up 13.8% and mining and quarrying of non metallics employed 956, up 7.1%.

FARMINGTON BAY STUDY

A two year program is currently underway to study the Farmington Bay environment. Physical parameters such as the quantity and quality of the inflow and outflow, salinity and the nutrient load of the bay are being measured to provide data through which a computer model will be generated. This working model of Farmington Bay will then be used to forecast the impact of a change in any parameter on the total bay environment. The importance of this project stems from the proximity of Farmington Bay to the Wasatch Front population centers and the many questions that have been raised concerning the quality of its water.

This cooperative investigation with Dr. Marvin Maxell of the Utah Department of Environmental Health as project director, is utilizing personnel from the Department of Environmental Health, Utah Department of Water Resources, Davis County Health Department, Utah State University Water Research Laboratory and UGMS to advise and to gather the needed information for the project.



Project members studying outflow patterns from Farmington Bay Waterfowl Management Area into Farmington Bay.

NEW U. S. BUREAU OF MINES BUILDING DEDICATED

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the facility. Today in its new quarters, this facility has become the Salt Lake City Research Center because the former separation of Bureau functions into separate mining and metallurgical facilities has been abandoned and mining research may be conducted at Salt Lake City in the future although the principal emphasis will probably remain on metallurgy. The new building was constructed below estimate at a cost of approximately \$10.6 million including furnishings and equipment. It contains a total area of 71,000 square feet. Behind the building is an array of solar panels which will provide hot water for space heating. A heat pump system has been installed for air conditioning during the summer months.

Research which is presently being conducted includes development of a technique to extract tungsten from the brines of Searles Lake in California; development of methods to recover non-magnetic material produced by automobile shredders; development of a citrate process for removing sulfur dioxide from stack emissions; cultivation of plant species capable of growing on mine waste piles; methods for extracting cobalt from the complex ores of the Blackbird region in Idaho; and a substantial number of other tests and experiments to increase efficiency in preparing, treating and using mineral substances.

MINERAL INDUSTRY BRIEFS

Cement

Martin Marietta Cement Company broke ground for its new plant near Leamington in Juab County in the spring. The plant will cost about 85 million dollars and will have a 650,000 ton per year capacity, roughly equal to the present annual consumption of cement in Utah. The mine is expected to open in March, 1982. Martin Marietta is opening a division in Salt Lake City.

The Beehive Chemical Company also plans to build a cement plant on 80 acres of land near the Keigley Quarry in Utah County.

Magnesium

AMAX, Inc., has agreed to purchase NL Industries, Utah Magnesium Division, with facilities on Great Salt Lake for \$60 million. AMAX plans to increase the capacity of the plant from the present 28,000 tons of magnesium to 45,000 tons per year. This would make AMAX the second largest producer of magnesium in the world (Dow Chemical is first). The plant now employs 700 workers.

Uranium

Energy Fuels Nuclear held an open house at its new White Mesa Uranium Mill, six miles south of Blanding, San Juan County, Utah. The mill started production in May and is designed to process 2,000 tons of uranium ore per day.

Mountain States Resources has acquired 7,131 acres, including the North Cane Prospect and six state mineral leases. These are adjacent to its Cane and Sinbad properties in Emery County on which positive results have been reported from recent exploration for uranium.

Exxon has received approval from the BLM to drill for uranium within the Fifty Mile Mountain Wilderness inventory unit in the Kaiparowits Plateau. Exxon is planning to drill 20 holes, and will build dirt roads for access to the drill sites.

Falcon Enterprises, Inc., has expanded its holdings in the Wah Wah Mountains in Beaver County in southwest Utah. It has acquired a 25% interest in 3380 acres and a 75% interest in 663 acres of leases. Discoveries of uranium and molybdenum have encouraged extensive evaluation by several companies.

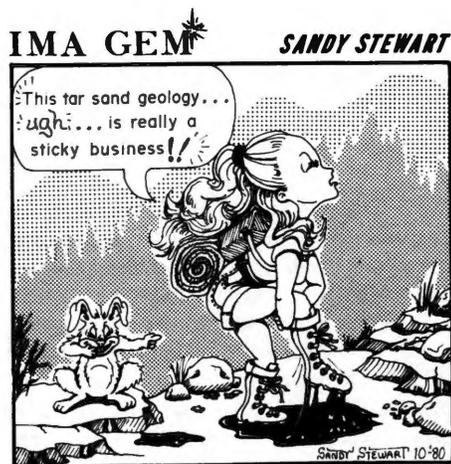
WHITE RIVER DAM ENDANGERED

The proposed White River Dam, to be built in eastern Uintah County, was designed to provide water for, among other uses, tar sand and oil shale development. But it has been alleged that three endangered species of fish live in the muddy waters of the White River and that construction of the dam may destroy their habitat. The three fish are the hump-backed chub, the Colorado squaw fish, and the bony-tailed sucker.

Several companies experimenting with oil shale production techniques in the area are concerned lest the construction of the dam be blocked by the Endangered Species Act. The White River Shale Project will need 27,000 acre feet of water a year when it reaches full production of 100,000 barrels of oil a day and other firms will need equivalent amounts of water.

Studies for the dam have been underway for at least five years by the Utah Division of Water Resources. Construction drawings are to be completed in the spring of 1981 and authority has been given to the division to negotiate with owners of private lands to complete division ownership of the reservoir area.

Two reports written by two staff geologists of UGMS in 1976 and 1980, point up difficulties in the geologic setting of the dam site and reservoir. The proposed dam, 2500 feet long and 130 feet high, will be anchored in relatively incompetent, jointed Uinta Formation sediments. The extensive joint system of the area may permit leakage of water from the proposed reservoir into mine workings beneath, downdip from, and adjacent to the reservoir floor. Both problems are being addressed in design and construction of the dam and planning for mining.





DIGGIN'S



UPDATED EDITION OF THRUST BELT MAP

The Wyoming Geological Survey has produced an updated edition of its comprehensive map titled: "Tectonic Map of the Overthrust Belt, Western Wyoming, Southeastern Idaho and North-eastern Utah". Outlines of oil and gas fields and locations of drilling wells are shown as of July 1, 1980.

The map is available for \$3.50 postpaid from the Wyoming Geological Survey, P. O. Box 3008, University Station, Laramie, Wyoming, 82071; also over the counter from WGS and the Wyoming Oil and Gas Commission in Casper.

COAL EXPLORATION DRILLING

During the 1979 and 1980 drilling seasons, the Survey has managed and conducted an exploration drilling program in cooperation with the U. S. Geological Survey to evaluate coal reserves of the Lower Blackhawk Formation. The Blackhawk Formation was drilled in the North Horn Mountains, East Mountain, and Muddy Creek areas to develop quantity, quality and minability data. Twenty-eight exploration holes were drilled in the Muddy Creek area and eighteen in the North Horn/East Mountain area. Ten of the drill holes were cored for coal quality, trace elements, roof rock, and floor rock data. A total of 59,905 feet were drilled and evidence of an abundant reserve established. An open-file report on the North Horn/East Mountain area will be available at the Survey in the near future and the same type report will be available for the Muddy Creek area in early 1981.

WAGES RISE FROM 1978

The average monthly wage for metal miners in 1979 was \$1,780; for coal miners, \$1,790; for petroleum workers, \$1,576, and for non metallics \$1,366. The over all average wage was \$1719 per month, up 5.6% from 1978.

UP&L SEEKS SYN FUEL GRANT

Utah Power and Light Company has applied for a \$4 million grant from the DOE to study a coal heating process that might produce economic amounts of synthetic petroleum as well as fuel for its power plants. This process, called pyrolysis, consists of heating the coal to drive off gases that can be condensed into crude oil. The residual char can then be used as boiler fuel for the power plants. One ton of coal will produce about one barrel of oil and half a ton of char. The process was developed by the Germans to produce aviation gasoline during World War II.

CHINESE DELEGATION VISITS UGMS

A group of eight Chinese scientists forming the Chinese Delegation of Comprehensive Utilization on Salt Lake visited UGMS for several hours, October 28. Their interest lies in potash production from brines. Drs. Doelling and Gwynn discussed with them the production of potash by evaporation in Utah. The visitors displayed a keen interest in this type of operation.

The Chinese had visited Searles Lake and the Great Salt Lake Minerals and Chemical Corporation operation and were on their way to Texas Gulf and Chemical Company at Moab before leaving Utah. They will proceed to Jordan to see the Arab Potash Company installation under construction on the Dead Sea before returning home. Their trip was arranged by the United Nations and the State Scientific and Technological Commission of the People's Republic of China and was under the guidance of Jacobs Engineering Group, Inc., of Pasadena, California.

LAKE POWELL FILLS: IT TOOK 17 YEARS

Seventeen years, three months and nine days after the gates of the newly completed Glen Canyon Dam were closed, Lake Powell has filled for the first time.

NO RIGHT OF ACCESS

Private land owners within a National Forest do not have a statutory right of access, according to U. S. Attorney General Civiletti, in an opinion requested by the U. S. Department of Agriculture. USDA can deny access under the Wilderness Act, but a land exchange as indemnity must be offered, according to the opinion.

MX SHOTS

According to the BLM, there are between 30,000 and 40,000 mining claims located in the area of the proposed MX System. These claims contain many strategic minerals needed by the United States. The Utah Mining Association is telling Congress that provision must be made to make it possible to extract these minerals should the MX System be built. The UMA is also pointing out that amendments to the Clean Air Act to exclude dust from MX construction projects could also result in termination of any mineral development in the area.

At the Utah Mining Association meeting held in St. George in October, Air Force officials told the members that the Air Force will avoid choosing areas with high mineral potential in locating sites for MX silos in southwest Utah and eastern Nevada. If necessary, some silo sites will be deactivated if minerals are found at those sites after the silos are built. The Utah Mining Association passed a resolution to support the MX missile system.

The Air Force has filed requests for unappropriated water in the 29 Utah and Nevada valleys being considered for the MX Missile Program. In Utah, these valleys are identified as the Snake, Pine, Tule, Fish Springs Flat, Wah Wah, Whirlwind, Dugway and Sevier valleys in Beaver, Tooele, Juab and Millard counties. According to the Air Force, the selection is not final.

METAL CRISIS NEXT?

We are dependent on foreign sources not only for fuels but for many of our strategic metals. Speakers at the American Mining Congress, (AMC) held in San Francisco this September, warned that over-regulation and lack of a national mineral policy by our government is resulting in declining production of many critical minerals. In addition, lack of available capital investment, high costs of meeting environmental regulations, and uncertainties about availability of land for exploration and mining all discourage the development of our own resources. It was pointed out that Federal agencies currently control about 760 million acres, about one third of the land area in the United States. Much of this land, including areas of high mineral potential, has been withdrawn from mineral exploration. The Bureau of Land Management is now reviewing the withdrawn areas, but the process is expected to take up to ten years.

Consequently, it costs less today to import a large percentage of our metals from other countries, many of which are politically and economically unstable.

It was a very similar situation which led to our energy crisis: it was cheaper to import oil than to develop our resources at home. J. Allen Overton, Jr., president of the American Mining Congress, pointed out in his opening speech at the AMC that new investment money is now going into the development of mineral fuels and synfuels rather than the search and development of sources of critical metals. Our frantic efforts to reduce our over-dependence on foreign oil are increasing our over-dependence on foreign metals.

Of course, ores for some metals are not found in the United States, or are found only in limited, scattered, or low grade deposits. In 1979 we imported 100% of our needs for cesium, columbium, corundum, rutile, scandium, strontium and 96% of our tantalum. We imported 93% of our alumina from Jamaica, Guinea and Surinam; 90% of our chromium from South Africa, the Philippines, U.S.S.R. and Turkey; 90% of our cobalt from Zaire, Belgium-Luxemburg, Zambia and Finland; 77% of our nickel from Canada, Norway, New Caledonia and the Dominican Republic; 89% of our

platinum from South Africa, U.S.S.R. and the United Kingdom and 81% of our tin from Malaysia, Thailand, Indonesia and Bolivia.

While Utah does not produce any of the above minerals, at least some of the following strategic metals are found in our state:

Aluminum

Utah has large quantities of alunite in Piute and Beaver counties which could be used as a source of aluminum.

Beryllium

The largest known deposit in the world is at Spor Mountain. The percentage of our needs that is imported is withheld.

Copper

Besides Bingham Canyon, the largest single copper mine in the world, Utah has many smaller deposits and ranks second in production of copper in the U.S. Our reserves are large, but will be increasingly costly to recover. In 1979, the United States imported 20% of its copper from Canada, Chile, Zambia and Peru.

Gold

Utah ranks second in production of gold in the United States. It has many deposits, once considered uneconomic, that are now being studied as the rising price of gold makes them more attractive. In 1979 the United States imported 60% of its gold from Canada and the U.S.S.R.

Iron

Utah has several deposits containing more than 10 million tons of iron in the Iron Springs District and a number of smaller deposits. Total reserves are estimated to be about 500 million tons containing 55% iron. In 1979 the U. S. imported 28% of its iron ore from Canada, Venezuela, Brazil and Liberia. Foreign ore costs less and is of better grade.

Manganese

Utah has many relatively small manganese deposits, at present uneconomic. Manganese reserves are on the order of 10,000 tons of 40% manganese oxide ore, and millions of tons of manganese carbonate ore which contains base and precious metals. In 1979, the U. S. imported 98% of its manganese from Gabon, Brazil, Australia and the Republic of South Africa.

Mercury

Utah has very limited mercury resources; several mines have produced a total of less than 4000 flasks. In 1979 the U. S. imported 62% of its mercury from Algeria, Spain, Italy and Canada.

Titanium

Utah has known reserves of about one million tons of black sandstones containing 18% TiO_2 , but deposits are small and recovery difficult. The percentage of imported titanium is withheld.

Tungsten

Most of the tungsten in Utah occurs in small and low grade deposits containing less than 1% WO_4 . These are produced only when prices are high. In 1979 the U. S. imported 59% of its tungsten from Canada, Bolivia and Korea.

Vanadium

Vanadium is primarily recovered as a co-product of uranium; it is also found in phosphatic shales, but recovery is considered uneconomic at present. There are perhaps several thousand tons of vanadium in the uraniumiferous sandstones and tens of thousands of tons in the shales. In 1979, the U. S. imported 25% of its vanadium from South Africa, Chile and the U.S.S.R.

Zinc and Silver

Utah has three districts that contain reserves of at least half a million tons of zinc or 25 million ounces of silver. Production has slowed because of high costs, low prices and pollution-problems with smelters. In 1979 the U. S. imported 62% of its zinc and 45% of its silver. The

zinc comes from Canada, Honduras, Mexico, Spain and Germany: silver from Canada, Mexico, Peru and the United Kingdom.

All of these metals are critical to our industrial system. They are essential to the aerospace industry, to the development of fuel-efficient automobiles and for the equipment necessary to produce synfuels. It will take a great deal of money to find and develop new resources within our country or perhaps in the oceans (for example manganese nodules along the mid-oceanic rifts), should our supplies from other countries be cut off.

COAL

United States Fuel Company has opened a new mine at the Hiawatha coal property in Carbon County. It is known as the King No. 6. The firm plans to begin work on a new 100-car train loading system, and is spending \$600,000 to upgrade its present coal preparation plant. It is also considering building a second (and 60% larger) plant by 1985. Environmental impact studies are underway for a fourth mine near Mohrland in 1985. The four mines (the new mine and the King No. 4, King No. 5 and King No. 6) together could produce 3.3 million tons of coal annually.

Getty Oil Company has agreed to purchase UNC Plateau Mining Company's Star Point coal mine in Carbon County for \$60 million. The mine has resources of 60 million tons on 5,200 acres. The mine produced 850,000 tons of coal in 1979.

In July, 1980, Plateau Mining Company sent the first shipment of Utah coal to Japan from its operation in Carbon County, to be used for steam power generation. Governor Matheson says Japan will begin purchasing more than 200,000 tons per year of Utah coal within the next three years. Japanese purchases could grow to 81 million tons by 1995 if facilities for transportation and loading are available.

Soldier Creek Coal Company, a subsidiary of Portland Cement has also shipped 30,000 tons of coal to Japan from its mine in east Carbon County. It hopes to sell 250,000 or more tons to Japan in the next ten months.

UGMS — — WHAT'S THAT?

There has long been a confusion in the public's mind between the UGMS (Utah Geological and Mineral Survey) and the USGS (United States Geological Survey). We get mail and deliveries intended for the USGS, and they get ours.

But the issue was brought into focus by the half-inch high headlines of an otherwise very complimentary article in the Salt Lake Tribune this summer, that described the new UGMS publication, "Great Salt Lake, a Scientific, Historical and Economic Overview". The headlines read: "U. S. Geological Survey Publishes Book on Utah's Great Salt Lake". The USGS sales office forwarded purchase requests to the UGMS sales office.

Well, who are we? We are Utah's Geological and Mineral Survey, and we are located in Research Park, southeast of the University of Utah and north of the Sunnyside Post Office and the new U. S. Bureau of Mines Research Center.

What do we do?

We have an Economics Section that maps, describes, and studies minerals and inventories occurrences in Utah, including coal, uranium, gold, silver, copper, lead and zinc and other minerals, stone quarries, limestone quarries, and sand and gravel pits. We do research to encourage the commercial development of many minerals in the state.

We have an Engineering Section that studies problems relating to geologic hazards in the state, including landslides, floods, faults, soil subsidence, and helps builders plan safe locations for public and private construction.

We have a Research Section that is doing geothermal mapping and research, particularly of the warm water springs in Utah that may be used for heating buildings and growing crops year around in greenhouses. This section also monitors the temperature, salinity, currents, and chemical composition of Great Salt Lake, and is making an inventory of the warm-water wells along the Wasatch Front.

We have an Environmental Section that is mapping the soils, water resource geologic structure and other environmental aspects of the Wasatch Front.

We have a Petroleum Section that keeps track of the oil and gas wells drilled in Utah, and the development of the oil shale and tar sands areas of the state. This section also has a library of cores from the wells drilled in the state.

We have a library, open to the public, with the available literature relating to the geology of Utah. We have an Editorial Office that prepares reports and bulletins for publication, and an Illustrations Office that prepares the maps and diagrams for these publications. The Information Office assembles and publishes statistics relating to the mineral industry of Utah, and tries to answer questions the public may ask regarding the geology of the state.

The USGS is our federal counterpart, far bigger and better endowed, but a compatible working partner.

DID YOU KNOW THAT . . .

10.1% of every barrel of crude oil goes to make cosmetics, detergents, paint, drugs, tires, nylon, rayon and plastics?

STAFF CHANGES

Ben Everitt, Geologist, has left after three years and transferred to Utah Division of Water Resources.

Mike Everts, Economic Geologist, has taken a job with American Resources Management Corporation in Denver.

Doris Watkins, secretary, had a baby girl and has retired to motherhood. Her position has been filled by Annona Youngdell who came to us from Utah State Employees Credit Union.

Bruce Plott a Computer Specialist, has transferred from the Department of Systems Planning and Computing to UGMS. He will be establishing a Geographic Information System for Utah.

SIGHTS ON PUBLIC FACILITY SITES

No. 3

by Bruce N. Kaliser

PLAY BALL ON SUITABLE TERRAIN

Parks and recreation sites vary considerably in their type and concentration of facilities. Such diverse facilities as tennis courts, reservoirs, marinas, golf courses, campsites, air strips, visitor's centers and a railroad right-of-way may comprise parts of a park system. Many parks are confronted with the need to provide their own water and wastewater facilities. The diversity of park types spells for diversity of terrain types and geologic considerations. Difficult sites must address a spectrum of geologic hazards such as rock fall, severe erosion or groundwater pollution. Listed below are a sampling of recent concerns in parks in Utah.

- Rock burst hazard to motorists in a scenic drive tunnel.
- Rock fall hazard to boaters along canyon walls bordering a reservoir.
- Moving rock abutments of a bridge spanning a reservoir.
- Landsliding of a scenic railroad right-of-way in a number of locations.
- Fluid waste disposal in a high water table environment bordering a reservoir.
- Severe erosion potential by wave action along shore of reservoir.
- Prospects for acquiring culinary water at remote park location in arid desert environment.
- Availability of earth and rock fill material locally on park land to accomplish construction of lagoons.
- Definition of flood zone for siting of camp sites.
- Location of relatively low erosion susceptibility area for use by off-road vehicles.

- Availability of culinary water from a deep unexplored bedrock aquifer beneath the park.

In a sensitive watershed, it may be necessary to give particular attention to the terrain suitability for disposal of human and animal wastes. Over limestone karst type terrain, for example, horse trails perhaps should be quite limited, particularly if active sink holes are in abundance.

Parking areas are normally significant in park facilities and the question of proper drainage from them is an important one. Surface streams must not be contaminated. A possibility may exist for subsurface methods of drainage, provided, of course, that aquifers are unaffected.

To open up motorists' access to remote portions of a park, new roads are essential and these may entail difficult terrain where slope stability considerations are paramount. Sources of material for road base must be found and preferably should come from sites nearby that are not highly visible.

Rangers residences may be a requisite type of facility at many parks. These are sited as one would site any single family dwelling. At Utah parks, factors of shallow bedrock, culinary water sources, absence of adverse foundation conditions and suitable soil for waste disposal are normal considerations.

At many highly visited parks prodigious amounts of solid waste are generated and a nonpolluting sanitary landfill operation must be sited.

The public generally regards a park environment as a safe one, therefore, the risk from geologic hazards must be reduced, particularly when one considers the question of liability. The threat of rock fall onto a campground or flash flooding of a picnic grove must not go ignored by park planners and administrators. Where a water faucet is present, the public assumes that the water quality is unquestionably safe for drinking. Many times the water source is a spring or a shallow alluvial aquifer. A hydrogeologic knowledge of these water sources and proper siting of other park facilities will

ensure that the aquifers are immune from pollutants.

In general, parks offer plenty of opportunity for employment of the geological sciences to address environmental and engineering concerns. UGMS has assisted county parks departments as well as the Utah Division of Parks and Recreation and the National Park Service in the physical planning for park facilities. Perhaps the most useful stage of UGMS involvement is most often in master plan preparation, where potential problems are identified at the earliest opportunity. UGMS can later assist with the siting of specific facilities at specific sites.

COPPER - GOLD - SILVER ACTIVITY

Anaconda has purchased a 1,280 acre metalliferous lease from Falcon Enterprises, located in the Dugway Valley just east of Topaz Mountain. Anaconda has drilled at least 4 deep holes in the area and found mineralization in at least one of the 4000 foot tests.

* * *

Toledo Mining Company has begun a mining feasibility study of its 35-square mile Milford copper property in Beaver County, with an initial study budget of \$400,000. The property was earlier estimated to contain ore bodies of 82.4 million tons containing copper, molybdenum, gold, silver and tungsten.

* * *

The Tintic District appears to be coming back to life. Kennecott Corporation is planning to expand its underground exploration at one of its mines in Utah County and is proposing to install additional equipment at its mill to enable it to produce gold and silver as well as lead and zinc.

* * *

The Sunshine Mining Company in June took a 120-day option to lease the underground mining rights on 1,386 acres in the Tintic Mining District, owned by Chief Consolidated Mining Company. This property includes the Burgin lead-zinc-silver mine, closed two years ago by Kennecott because of water and heat problems. The option gives Sunshine the right to lease the property for 50 years. Sunshine says that recent exploratory drilling has located attractive areas where the water might not be a problem.

The Tintic Mountain Mining Corporation reports that it has found commercial grade lead, silver and gold mineralization on its patented claims in Juab County.

* * *

Ranchers Exploration and Development Corporation reports that its pilot mining program at the Escalante silver mine in southwest Utah (Iron County), is on schedule. The company is designing a 500-ton-per-day processing plant for the property. Estimated reserves are 1.8 million tons of ore.

* * *

Anaconda Company's Carr Fork Mine, near Tooele, Tooele County, is back in production after being closed down for nearly three months. The shutdown was caused when a loaded bucket of copper ore plunged down the production shaft; no one was hurt. Lost production is estimated at about 10 million pounds of copper worth \$10 million on today's market. Replacement of equipment and other costs came to more than \$2.5 million. The Carr Fork mine and mill is located on the west side of the Oquirrh Mountains.

* * *

Noranda Mining Inc. and New Park Resources, Inc., of New Orleans, have agreed in principle to form a joint venture to reopen the Mayflower mine near Park City. If the mine can be successfully rehabilitated, plans call for mining and milling about 120,000 tons of ore per year. The mine operated for about 40

years, from 1932 to 1972, producing head feed ore containing .5 oz of gold and 5 oz of silver per ton. It will require about \$20 million to dewater and rebuild the mine.

Noranda expects to start production and concentration this fall at the Ontario mine in Park City. It reports that only about one half of the mines lead, zinc and silver have been recovered in the past 100 years of operation.

* * *

Energy Development Inc., has purchased a 50% interest in the Katy Edna gold claims near Hanksville in Garfield County. The 240 acre property, with a 50-year history of gold production, is being operated by Dennis Ekker.

NEW UGMS PUBLICATIONS

Circular 68 – *Utah Mineral Industry Activity Review 1979* by Martha Smith, October 1980, 22 pages \$1.00 over the counter and \$1.75 by mail.

Map 56 – *Fairview Lakes Quadrangle Utah*, by G. G. Oberhansley, July 1980, \$3.00 over the counter \$3.75 by mail.

Miscellaneous publication - *The Mississippian and Pennsylvanian (Carboniferous) systems in the United States - Utah*, by John E. Welsh and Harold J. Bissell. \$1.50.

(Utah residents add 5% sales tax).

GREAT SALT LAKE LEVEL

DATE	BOAT HARBOR (South Arm)	SALINE (North Arm)
August 1	4199.80	4198.25
August 15	4199.40	4198.05
Sept. 1	4199.30	4197.95
Sept. 15	4199.20	4197.85
October 1	4199.10	4197.80
October 15	4199.00	4197.70

The lake declined steadily through the summer from a high of 4200.45 on June 15. The October 15, 1980 low of 4199.00 is 1.50 feet higher than the October 15, 1979 reading of 4197.50.

UTAH GEOLOGICAL AND MINERAL SURVEY SURVEY NOTES	
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Utah Geological and Mineral Survey	Donald T. McMillan Director
Editor	David E. Scardena
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