STATE OF UTAH
NATURAL RESOURCES & ENERGY
Oil, Gas & Mining

4241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Cleon B. Feight, Division Director

MEMORANDUM
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TO: Board of Oil, Gas and Mining

FROM: D. Wayne Hedberg, Reclamation Hydrologist SLL for

SUBJECT: Supplemental Information to Executive Summary

DATE: December 23, 1982

This memo is provided as a supplement to the attached Executive Summary to inform the Board members that the finalized bonding information will not be available from Paraho Development Corporation for inclusion into this Executive Summary until December 27.

Consequently, this surety deficiency will not be presented to you until the day of the Board Hearing. I hope this will not present any inconvenience or significant problem in your review of this document.

DWH/btb

Board/Charles R. Henderson, Chairman • John L. Bell • E. Steele McIntyre • Edward T. Beck
Robert R. Norman • Margaret R. Bird • Herm Olsen

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MEMORANDUM
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TO: Board of Oil, Gas and Mining

FROM: D. Wayne Hedberg, Reclamation Hydrologist SLL for

SUBJECT: Paraho Development Corporation
Paraho-Ute Shale Oil Facility
ACT/047/003
Uintah County, Utah

DATE: December 23, 1982

The Division of Oil, Gas and Mining has reviewed the Mining and Reclamation Plan (MRP) submitted by Paraho Development Corporation (Paraho) for their proposed Paraho-Ute Shale Oil Facility. It is the Division's opinion that the plan meets the requirements of the Utah Mined Land Reclamation Act.

There are a few remaining concerns identified by the technical staff which are not considered significant to the issuance of tenative approval at this time. These concerns will be resolved prior to issuance of final approval and before commencement of on-site operations.

The operator seeks approval to post an incremental bond to cover surface disturbance and minesite development on a phased approach. The project proposal will not result in full scale commercial development until after an initial 14 month "test" period involving a single retort, accompanying mine, auxiliaries and offsites. Construction of the second and third retorts is not scheduled to begin until the third quarter of 1987 and projected to be completed in the second quarter of 1990. Four phases of development are proposed (A, B, C and D).

The Division seeks the Board's concurrence for issuance of tenative approval and for the amount, form and schedule of reclamation surety to be posted by Paraho Development Corporation.

An Executive Summary is attached for your review and information.

DWH/btb

Attachment

Board/Charles R. Henderson, Chairman • John L. Bell • E. Steele McIntyre • Edward T. Beck
Robert R. Norman • Margaret R. Bird • Herm Olsen

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EXECUTIVE SUMMARY

Paraho Development Corporation
Paraho-Ute Shale Oil Facility
ACT/047/003

Section 32, Township 9 South, Range 25 East
Sections 5, 6 and 7, Township 10 South, Range 25 East
Uintah County, Utah

Background Information:

Paraho Development Corporation (Paraho) has filed a Mining and Reclamation permit application with the Utah State Division of Oil, Gas and Mining (UDOGM) for their proposed Paraho-Ute Commercial Shale Oil Facility (Paraho-Ute Project).

The commercial facility will be comprised of an underground mine, shale preparation facilities, three (3) Paraho surface retorts, processed shale storage and disposal sites, oil upgrading, storage and transportation, gas clean-up and cogeneration of electrical power, auxiliaries and off-site rights-of-way. Upon full scale operation with maximum production, approximately 42,500 barrels per stream day (bpsd) of hydrotreated shale oil could be produced from @ 75,000 tons of mined material.

Paraho desires to permit the overall concept for the entire commercial facility, but will bond for and construct the facilities on a Phased Approach.

In the Phased Approach, a single commercial retort with accompanying mine and all auxiliaries and off-sites, would be constructed and operated for approximately fourteen (14) months before construction commences on the second and third retort modules.

Access to the mine will be via a 45-foot by 45-foot ventilation adit, a 30-foot diameter circular, concrete-lined service shaft and a 14-foot by 16-foot conveyor drift inclined 15 degress to horizontal.

Mining zone is located within the Parachute Creek Member of the Green River Formation and is defined as an interval in the upper part of the Mahogany Zone that is 77 feet thick.

No oil and gas production occurs in immediate vicinity, although well fields are located within 10 miles of the site.

Gilsonite veins occur within and around the project site. Tabor, Little Bonanza, Independant and several additional small veins have been identified and some are being mined in adjacent areas to the northwest of project area.

Depth below the surface to the mine zone averages 500 feet with a maximum depth of 900 feet.

A 13.8 kv (kilovolt) powerline will be utilized as primary distribution system for the mine and its support facilities.

Location:

The Paraho-Ute Commercial Shale Oil Facility will be located in Northeastern Utah, in Uintah County, approximately 40 miles from Vernal, Utah (see Figure 2.1).

Bonanza, Utah, is the closest community, located three miles northwest of the project site.

The tract consists of a 582-acre Utah State Oil Shale Lease, located in Section 32, Township 9 South, Range 25 East, SLBM, and an adjoining 834 acres owned by Skyline Oil Company and under lease to Sohio Shale Oil Company. This adjoining lease is located in Sections 5, 6 and 7, Township 10 South, Range 25 East, SLBM.

Paraho was assigned State Mineral Lease No. 35894 for the 582-acre site and will acquire the 834-acre property from Sohio Shale Oil Company for commercial development. See attached Figure 2.2 for project site boundaries.

Soils and Climatology:

Soils are typlified by lack of profile development. There are Aridisols or Entisols and are considered "young soils."

Soils which occur on the future mine area are of four different series. They occur at an elevation ranging between 4,800 and 5,800 feet. Soil reaction (pH) varies from 8.0 to 8.7, and due to their coarse and sandy loam texture, are rated from well-drained to excessively drained.

Soils are derived from the soft marine shale and sandstone of the Green River and Uintah formations.

An aridic climate prevails with rainfall ranging from six to nine inches per year and average soil temperatures being between 40 and 50° F.

Geology:

The geology of the area involved with the project area is almost exactly the same as it is for the White River Oil Shale Project. The exposed rocks on the surface of the land are those of the Uintah Formation. These sandstones and siltstones were deposited by a meandering stream on top of the Green River Formation. In places, the Uintah Formation is 1,000 feet thick. The Green River Formation contains the oil shales of Utah. It was formed approximately 55 million years ago when an extensive intermontane lake basin made up most of what is now Utah. The various multicolored layers of this formation reflect the variable stages of evolution of the sediments in this lake basin. Basically, the high organic content of the Parachute Creek member is responsible for contributing to the commerical usefulness of the oil shale. This unit has a distinctively rich zone called the Mahogany Marker which is a sequence of especially rich oil shale rock. This is the target zone of the mining operation. It is predominantly a calcium carbonate mudstone, or marlstone containing abundant organic matter. There is a gentle dip (3°) of the beds to the northwest and the thickness of the entire on-site formation may be 1,600 feet.

A distinctive and often studied section of the Green River Formation is a zone known as the Birds Nest Aquifer. It contains many ellipsoidal cavities formed by the leaching out of nahcolite (a soluble sodium-bicarbonate mineral), from a matrix of siltstone and marlstone. It is the principal aquifer which will be encountered in the operation as it lies some 300 feet above the Mahogany Zone. However, due to the incision of the White River through this zone, there is no communication between the area south of the property. This effectively places the cliff area of the property into the category of recharge area and due to the limited exposure very little water is found at this location of the Birds Nest Aquifer.

Another interesting geologic feature of the area which will not be encountered in the mining, is the presence of gilsonite, a tarlike, brittle residue of natural petroleum. It occurs in several long straight northwest-trending jonts and minor faults primarily within the Uintah Formation. It may possibly be formed as a seepage product of the shale oil or lower lying petroleum reserves.

Ecology:

Four vegetative associations are found on the project site: riparian, sagebrush-greasewood; shadscale; and, badland. Important species in the riparian community overstory include big sagebrush, greasewood, rabbitbrush, salt cedar, cottonwoods and willows. The riparian community on the permit area is small in extent, occurring only on the White River flood plain, but is important for wildlife habitat, livestock forage, water supply and erosion control. No riparian habitat will be disturbed by mining activities. The sagebrush-greasewood association occurs in lower-lying areas with relatively deep, well-drained soils. The understory here is sparse, with large areas of bare ground. The prevalent plant community at the site is the shadscale association, occurring on shallow soils and ridgetops. Shadscale, big sage, and black sage are the dominant shrubs, with Indian ricegrass and snakeweed common in the understory. The badlands association is a variant on the sagebrush-greasewood association. It occurs on the steep slopes of the major canyons and breaks. Due to less disturbance by foraging animals, species diversity is greater on this site. The weighted average vegetative cover over the project area is equal to 28 percent. No threatened or endangered species have been found to date on the permit area. It is possible that the Uinta Basin hookless cactus, listed as threatened, and the White River penstemon, being considered for listing as endangered, could occur on-site.

No threatened, endangered or sensitive wildlife species are expected to be affected by project development. The peregrine falcon, bald eagle, whooping crane and bobcat all probably use the project area to some degree. Paraho will continue to monitor yearly for all threatened, endangered or sensitive species which may occur on the project site, until sufficient data have been gathered to determine whether or not any of these species are threatened by

project development. An active golden eagle nest occurs across the White River from the project site. This nest will be minimally impacted by the project and nesting activities should not be affected by project-related human disturbance.

Revegetation procedures will be researched on test plots to be located on a retorted shale test embankment. Test plot parameters will include; fall and spring seeding and transplanting, range of fertilizer application rates, application of water at various rates, applications of various types of mulch, and the effect of a capillary barrier. Yearly reports will be submitted to the Division.

Hydrology:

The project area is primarily drained by dry ephemeral drainages tributary to the White River which bounds the southwestern end of the project site. Surface waters occurring on-site are limited to direct runoff from precipitation events and snowmelt.

A series of retention/evaporation ponds, diversion and collection ditches, embankment benches and a storm sewer system are proposed to handle drainage within the project area. Structures will be sized to handle the 100-year, 24-hour design storm.

All processing facilities will have zero waste water discharge of effluent into the White River.

Water for operations will be withdrawn from the White River initially and from the White River Dam Project upon its completion. A storage reservoir will be constructed within the project area to provide short-term storage of the pumped raw river water in the event the primary supply system should fail temporarily.

Ground water occurs through the region in alluvial deposits along the channel bottoms of the more major stream courses (White River, Hill Creek and Willow Creek). The Birds Nest Aquifer of the Green River Formation is the only aquifer that will be intercepted during shaft excavation. It is located approximately 330 feet above the mining zone. On-site drilling activities to date have intercepted only minimal amounts of ground water in the northwestern section of the project area. The remainder of the drilling on the property has produced dry holes through the Birds Nest zone.

The next aquifer to be encountered is situated approximately 1,300 feet below the mining zone which should preclude any potential impacts from the proposed mine development.

There are no springs or seeps within the project area.

Surface Facilities:

The commerical facility will be comprised of an underground mine (an incline shaft, service shaft and two exhaust shafts), three Paraho surface retorts, an uncrushed raw shale pile, a crushed shale pile, a raw shale reject storage pile, a retorted shale pile, two retort shale bins, a shale fines storage bin, three retention ponds, a water treatment plant, an explosives storage area, an electrical substation, overhead power lines and two access roads.

Mining and Reclamation Plan:

During Operations:

1. Initially, 318 acres will be disturbed (initial bond proposal). At maximum development (Phase C), 571 acres will be disturbed and bonded.

2. All natural (undisturbed) runoff occurring on the project area will be diverted around the disturbed area via diversion channels.

3. Runoff retention ponds will be sized for the 100-year, 24-hour precipitation event. A system of culverts, storm sewers, diversion channels and open ditches will be utilized to route surface runoff to the treatment ponds. These structures will also be sized for the 100-year, 24-hour event.

4. As much topsoil and subsoil as can be reasonably picked up will be saved during site preparation. Two stockpiles will be present on-site. Stockpiles will be protected from erosion with vegetation or other means, if necessary.

5. Initially, water supply will be obtained by pumping from the White River. If and when the White River Dam is completed, the water supply will then be purchased from the State.

6. Sewage and water treatment plants will be built on-site. An evaporation/recycling pond will be constructed to handle the processing and waste waters generated.

7. Any ground water encountered from the Birds Nest Aquifer will be grouted. If any signficiant flow is encountered during mining, it will be used for dust suppression within the mine or pumped to the runoff retention pond for use at the spent shale disposal pile.

8. The ventilation system for the shaft will be constructed for the possibility of a gassy mine.

9. All operational waste will be handled in accordance with permits granted by various Utah Department of Health agencies.

10. Ground and surface waters as well as subsidence will be monitored.

11. Mining and maintenance will be conducted in a safe and orderly manner.

After Operations:

1. All buildings will be disassembled, salvaged or otherwise removed from the site.

2. The building and road foundations will be broken up and the refuse will be recycled, disposed of at a landfill or buried on-site.

3. The processed shale waste piles will be reclaimed using the methods being developed in current and future research efforts.

4. Shafts and adits will be plugged with concrete caps and backfilled to prevent safety hazards.

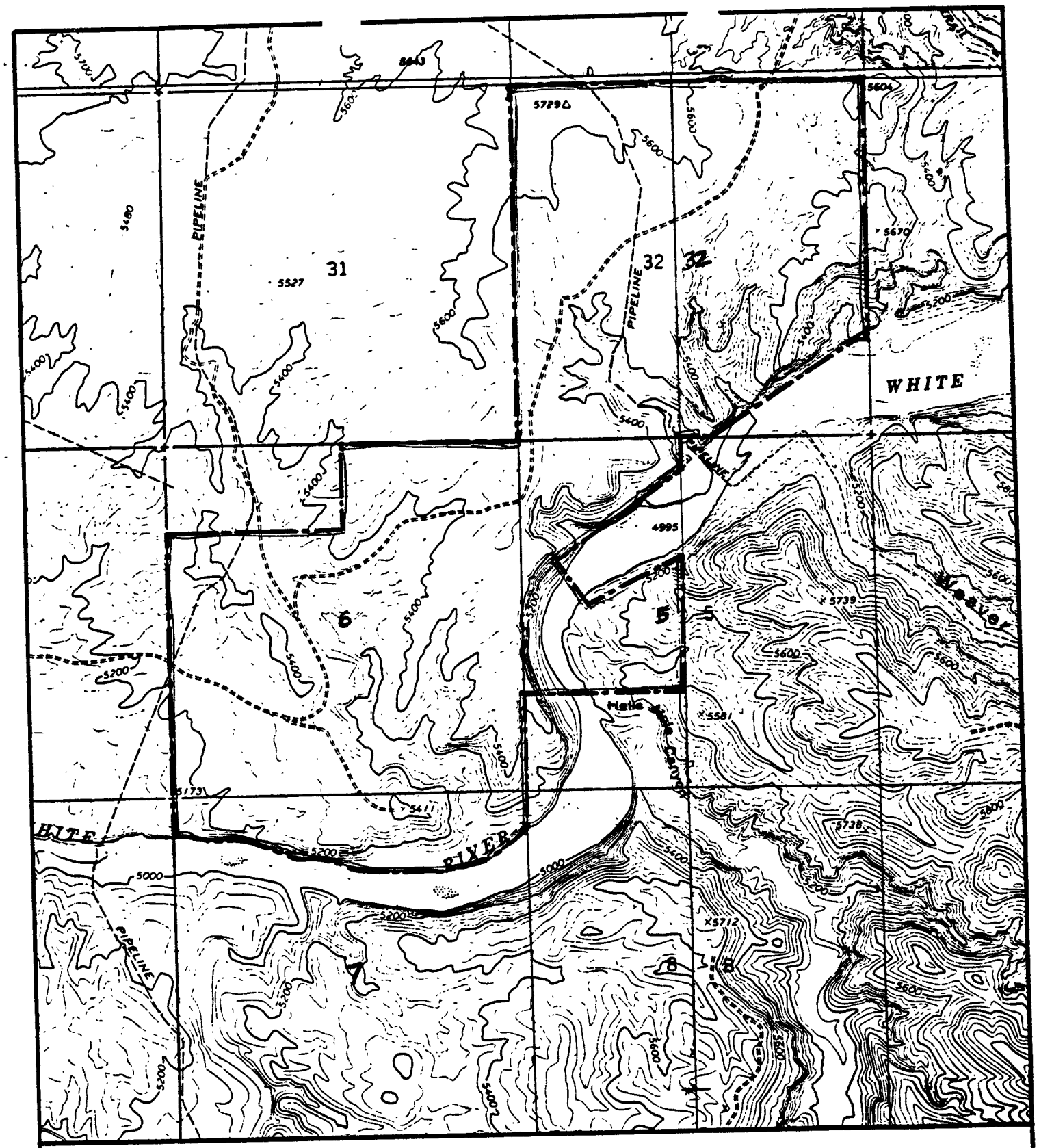
5. It is anticipated that the raw sewer water storage reservoir will be reclaimed at termination of operations. All other impoundments and embankment structures will be recontoured to be self-draining and nonimpounding. Diversion ditches will be leveled and stabilized.

6. The mine areas will be regraded to allow for successful revegetation and attainment of postmining land-use. Regraded areas will be topsoiled and seeded and monitored to ensure revegetation success.

7. Existing improved roads will continue to be used. New roads constructed on the project site will be removed and reclaimed, with the exception of a few short segments.

Surety:

Paraho proposes to obtain approval conditioned upon an incremental updating of the reclamation bond to cover successive phases of site development. A Board decision is sought regarding the feasibility of this approach. The initial bond calculations are included for your appraisal. The Phase A activity will be bonded initially which will include approximately 318 acres of surface disturbance. Prior to further disturbance and development, an updating of the bond will be required by the Division.



LEGEND

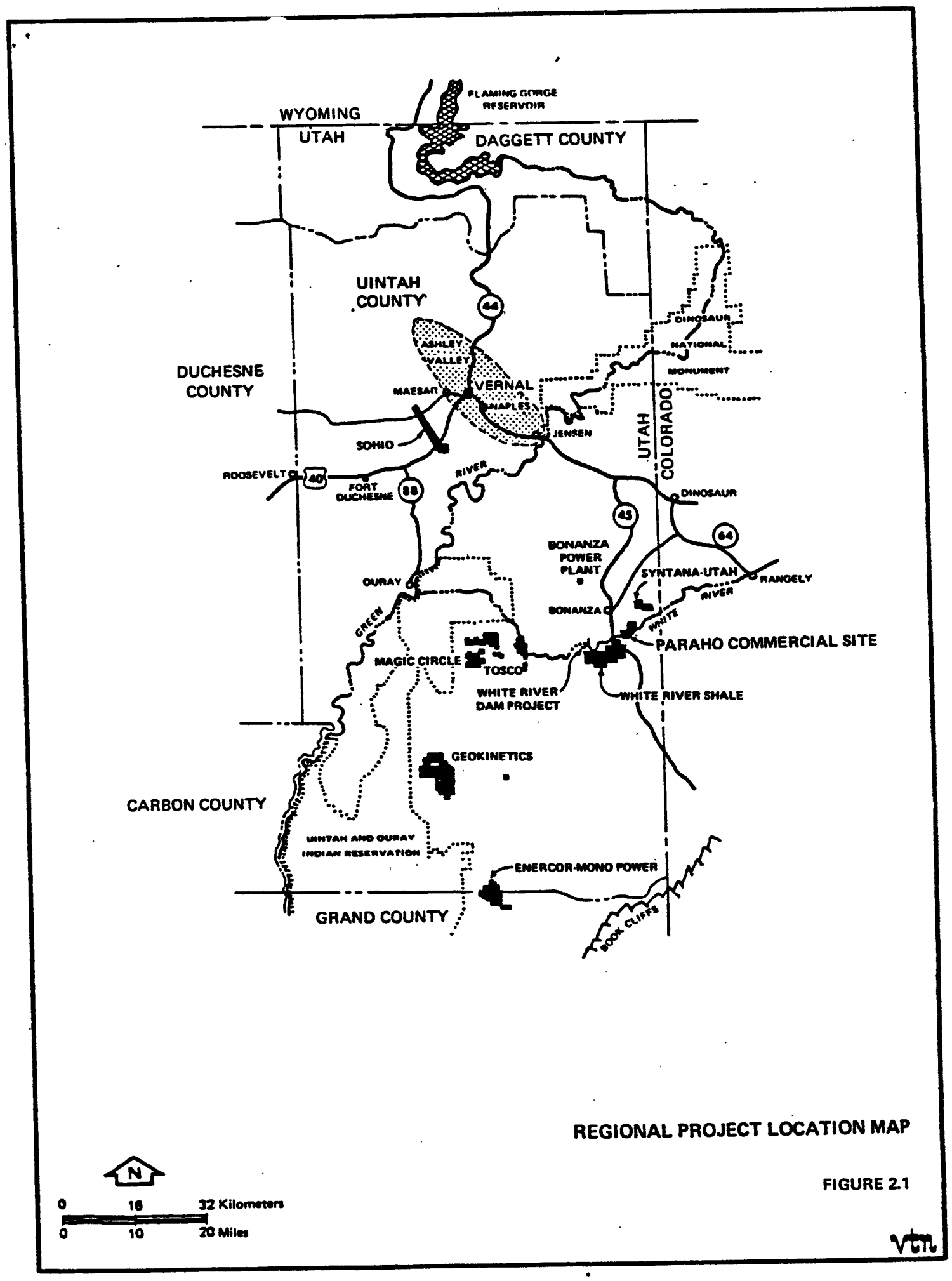
PROJECT SITE BOUNDARY

PARAHO COMMERCIAL SITE AND ENVIRONS

FIGURE 2-2

N

0 ½ 1 mile



REGIONAL PROJECT LOCATION MAP

FIGURE 2.1