SURVEY OF ACTIVE AND
INACTIVE MINES FOR POSSIBLE
USE AS IN SITU TEST FACILITIES

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MASTER

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UNITED STATES MINE SURVEY

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MASTER

In February 1976, the Energy Research and Development Administration (ERDA) announced a greatly expanded waste management program for defense and commercial radioactive waste. In that announcement, ERDA indicated that the Oak Ridge Operations Office (ORO) of ERDA would have lead responsibility for overall coordination of the expanded commercial geologic disposal program and that an Office of Waste Isolation (OWI) would be created within Union Carbide Corporation-Nuclear Division (UCC-ND) with the responsibility for program management of that activity.

The commercial geologic disposal program was named the National Waste Terminal Storage (NWTS) program. It represents the principal programmatic effort of ERDA for ultimate and final disposal of commercial nuclear waste.

The National Waste Terminal Storage (NWTS) program is charged with the design, construction, and operation of Federal Repositories for commercial radioactive waste. The earliest date at which the first repository can begin operation is 1985. Prior to that time, adequate demonstrations of the technology (equipment and methods) and safety must be carried out to justify confidence on several levels (public, local, and state officials, state and Federal regulatory bodies, etc.). That is, the operation of the Initial Phase Repository must be based on proven technology with all aspects related to safety and environmental effects subjected to full scrutiny by the public and elected representatives. The test facility will provide this early-on demonstration and proof-testing capability.

The test facility will use an existing, but probably abandoned, mine. Surface facilities will be constructed, the underground area will be renovated, and experiments will be emplaced in the mine to demonstrate operations and simulate conditions of the ultimate Federal repository.

The engineering and scientific objectives of this effort are: (1) demonstration of waste handling equipment and techniques; (2) determination and/or confirmation of gross effects of radiation and high temperature on formation characteristics; (3) collection of rock mechanics data and information on deformational behavior; and (4) simulation of underground emplacement geometries and arrays for various waste (spent fuel assemblies, high level waste, etc.) types together with providing a test area for retrieval options.

The test facility will also provide experimental facilities for testing new design and safety features; comparing design alternatives; developing solutions to potential interface problems; and developing/demonstrating techniques and instrumentation systems for short-term and long-term monitoring of the underground disposal location and adjacenet areas.

As part of the program described above, UCC-ND's Office of Waste Isolation subcontracted Cobbs Engineering to conduct a survey and to prepare a report containing appropriate data on active and inactive mines for possible use as in situ test facilities.

SUMMARY

This report summarizes a survey of active and inactive mines which might be useful for in situ test experiments. It was performed for Union Carbide Corporation, Nuclear Division, Office of Waste Isolation, under Purchase Order Number 86Y-16514V. The report covers available information gathered from literature, U. S. Bureau of Mines, the Mining Enforcement and Safety Agency, and a limited number of personal contacts with constructors or operators of facilities.

This survey is preliminary in nature and the objective is to develop potential candidate facilities for in situ experiments which warrant further investigation.

Included in this survey are descriptions of 244 facilities, with all the data about each one which was available within the time restraint of the study. These facility descriptions are additionally indexed by depth of mine, nature of the country rock, mineral mined, and type of entry.

A total of 14 inactive mines and 34 active mines has been selected as those most worthy of further investigation for possible service as nuclear waste isolation test facilities.

This investigation, being preliminary and having been performed in a very short time period, must be qualified, and the description of the qualification is presented in the body of this report. Qualifications deal primarily with the hazard of having omitted facilities and having incomplete data in some instances.

Results of this survey indicate sedimentary rock mines of minerals of evaporite origin as a first ranking of preference for in situ testing, followed by other sedimentary rocks and then by mines producing minerals from any type rock where the mine is above the local water table. These are general rules and of course there can be exceptions to them.

APPLICATION OF EXISTING MINES TO NUCLEAR WASTE ISOLATION

Existing mines in the United States present an attractive means of conducting tests which are of high value. The mining of an economic mineral paid for the original creation of the storage space so that the cost of a facility will be limited to the acquisition of the property, preparation for receipt of waste, and physical placement of the waste in the facility.

The possibility also exists for simultaneous use of a mine to continue removing the economic mineral and also to conduct certain tests in the mined out portions.

A simultaneous usage program can have considerable advantage in that the mining program can consider the final use of the facility to develop the mine so that it lends itself to waste isolation. When the mine then is abandoned as a producing mine, either through exhaustion of the minerals or complete mining of the property, the facility then can be devoted exclusively to nuclear waste isolation.

Small scale experimental programs probably can very effectively use active mines for evaluation of various plans and programs of waste isolation because they will offer minimum interference, if any, with the operation of the mine.

An appendix to this study is presented in summary form describing the development of underground storage in the Kansas City area, as a wide secondary use of limestone mines in that vicinity. In some cases underground space will be occupied and in use while additional space is being developed for occupancy and mining of the limestone progressing.

MINES MOST SUITED FOR WASTE ISOLATION

For a general consideration, mines which produce a mineral of relatively low value and are massive in deposition are best suited for waste isolation. Ideal candidate mines probably are those producing salt, potash, limestone, and minerals of hydrothermal origin which are disseminated through the country rock. These mines will, in most cases, use room and pillar mining, leaving adequate pillars for support since the value of the mineral contained in the pillar is less than the support costs if the pillar is removed.

Although these same mines probably will be very dry, it will not always be the case. For example, gypsum is only slightly soluble in water; also, limestone mines may not be completely dry. Most limestone mines, however, originate as a quarry and when the high wall stripping ratio creates an uneconomic situation, the mine will go underground through drifts or adits. These underground limestone mines then are normally above the local

water table and the only water entry into the mines is meteoric water through the portals. The potential problem with limestone mines which originated as quarries can be the lack of adequate cover over the mine to provide the desired degree of protection.

Mines producing the precious metals, which are more commonly found in vein deposits, are not as nearly ideal candidates for tests. The usual mining plan is to follow the vein and very high open stopes with extensive caving following removal of the mineral. Where pillars are left, they often will be robbed to further encourage the caving and after the mining is completed little, if any, stable and usable space remains.

In other instances of vein mining, cut and fill will be practiced, where the opening from which the mineral bearing rock has been removed will be filled with sand or tailings to stabilize the opening and permit further mining. This creates a situation of virtual zero voidage except for haulage and ventilation openings.

Mines which practice block caving or long wall mining cannot be considered as ideal candidates for waste isolation because the only stable openings which remain after the mining are the haulage ways and ventilation drifts. Block caving is a prevalent mining technique where the mineral has high value but is disseminated through the country rock and only a very small percentage of the total rock is the valuable mineral.

QUALIFICATIONS

The purpose of this study is to provide a preliminary survey to indicate the most promising existing underground mines for isolated nuclear waste storage. The study has been limited to a literature search with limited personal contact with facility owners, constructors, and government agencies.

Because of the nature of this survey there exists the probability that some facilities have been omitted, especially those mines which are inactive and have been inactive for a number of years. Also many owners do not report the total volume of material removed from their mine so that in some cases the mine volume is estimated from literature sources which give a range of total removal. In these cases we have arbitrarily selected the midpoint of the range for the mine volume. When all mines are averaged our volumes probably are fairly accurate but they may be as much as 50% in error for a given mine.

Water production is rarely reported for a particular mine as long as special or heroic efforts are not required to prevent the water production from interfering with the removal of the mineral. Notable exceptions to this are mines which produce soluble salts such as rock salt, potash, and trong. The solubility of such minerals requires that all of these mines are virtually water free, while this is not necessarily the case for mines producing other minerals.

GLOSSARY OF MINING TECHNIQUES

- Adit A horizontal or nearly horizontal passage driven from the surface for the working or dewatering of a mine. May also be called a drift entry.
- Cut and Fill A stoping method in which the ore is excavated by successive

 flat or inclined slices, working upward from the level as in Shrinkage stoping. After each slice is removed all broken ore is removed

- and the stope is filled with waste up to within a few feet of the back before the next slice is taken.
- Drift A roadway driven from the surface to the mine workings. A service tunnel underground such as a haulage way or ventilation opening.

 The drift may be either level or inclined.
- Block Caving A method of mining in which a thick body of ore is partially cut off from surrounding blocks by a series of drifts, one above the other, or by boundary shrinkage stopes. It is then undercut by removing a slice of ore or series of slices separated by small pillars underneath the block. The isolated unsupported block of ore breaks and caves under its own weight. The broken ore is drawn off from below and as the caved mass moves downward due to continued drawing of broken ore from below it is broken further by pressure and attrition. The overlying capping caves and follows the broken ore downward.
- Room and Pillar A system of mining in which the distinguishing feature is the winning of approximately 50% or more of the ore in the first working period. The ore is mined in rooms separated by narrow ribs or pillars. The ore remaining in the pillars may be won by subsequent working. The first working in rooms is an advancing method and the winning of the rib (pillar) a retreating method. The rooms are driven parallel with one another and the room faces may be extended parallel, at right angles, or at an angle to the dip. This method is applicable to flat deposits such as coal, iron ore, lead, zinc, etc., that occur in bedded deposits.

Shrink Stope - A method of mining where the ore is mined out in successive flat or inclined slices, working upward from the level. After each slice is blasted down enough broken ore is drawn off to provide a working space between the top of the pile of broken ore and the back of the stope. Usually about 50% of the broken ore will have been drawn off when the stope has been mined to the top. Shrinkage stopes often are excavated by taking slices along the vein (especially in narrow veins) from one end of the ore chute to the other without leaving any pillars for supporting the walls.

Stope - An excavation from which ore has been excavated in a series of steps.

Usually applied to highly inclined or vertical veins. Frequently

used incorrectly as a synonym for room, which is a wide working place
in a flat vein.

MINERAL DEPOSITS MOST SUITED FOR WASTE ISOLATION

In a study of this nature it is appropriate that some discussion be given to the kinds of mineral deposits which present the greatest potential for in situ experimentation. Any in situ experimentation must demonstrate that the waste which may be stored in the facility will be completely isolated from circulating ground waters.

The nature of the occurrence of the economic mineral being mined and the subsequent geologic history of the area reveals the probability of the appearance of circulating ground water within the void created by the mine. The origin of the economic mineral and the mineral itself is indicative

of the probability that a particular mine might be suitable for experimentation in the development of waste isolation practices. There are three denerally accepted classifications for economic minerals: (1) by composition or content, (2) by form, or (3) by probable origin. The classification of the mineral deposit and the geologic history by themselves are first indications of the suitability of a mine for waste isolation. A description of classifications and their relationship to the potential for waste isolation follows.

Classification based on chemical or mineral content emphasizes the ultimate use of the mineral. The general classifications here are (a) metals, (b) non-metals, (c) coal (and related combustibles) and (d) mineral fuels. These classifications indicate suitability for waste isolation in that the organic deposits such as coal and mineral fuels probably are not suitable. A secondary conclusion which might be drawn is in the value of the material being mined. This gives an indication of the efforts which will be taken to achieve, as nearly as possible, 100% recovery. In particular the metalic minerals, either precious minerals or rich metalic ores, are of sufficient value that considerable effort is taken to effect nearly complete recovery.

There are three classifications of mineral deposits based upon form. These are fillings, replacements, and disseminations.

Fillings occur when the economic mineral and its associated waste mineral or minerals (gangue) or both were deposited from solutions in fissures, fractures or faults. Replacements are deposits where the economic mineral and its associated gangue or both were deposited from solutions that simultaneously dissolved away the country rock and layed down the economic mineral and its gangue. There are all gradations between fillings and replacements.

Regardless of the nature of the deposition of the economic mineral and its gangue, if the occurrence is relatively regular it will be termed a vein and if a replacement deposit is highly irregular in form it may be called a chimney or pipe.

The third form, disseminations, consist of minute to large units of the economic mineral, with or without an associated gangue mineral scattered irregularly throughout the country rock. The country rock may be a rather coarsely granular igneous rock, such as granite, a finer grained igneous rock, an unconsolidated gravel or sand, or a consolidated scdiment such as a sandstone, shale, or limestone; a highly compressed and recrystallized quartzite, slate, schist or marble; or a greatly recrystallized igneous rock such as a gneiss.

Gradations between fillings, replacements, and disseminations are common.

The third classification and the one in most common use today is based on the theory of the origin of the deposit. The inferences as to origin in a given case frequently are debatable. Mineral deposits classified by origin are divided into 9 categories.

- A. Magmatic Segregates. These originate by the aggregation of the desired mineral particles or crystals at one or several stages during the cooling and solidifying of molten rock. They are commonly disseminations, locally richer, however, than the main body of such rock. Continuous masses may also be present in varying form and size. Many chromite, ilmenite, and magnetite bodies have this origin.
- B. Pegmatites. These are vein-like or lenticular masses suggesting very coarsely crystalline intrusions of igneous rock in texture and composition, pooling in or near igneous rock, into which they may locally

grade at the margins. They are important sources of many industrial minerals, such as micas, feldspars, beryl, tourmaline, and spodumene.

- C. Contact Metamorphic Deposits. These are at or near the contact between an igneous rock and the surrounding rock and are believed to have been produced by reaction between the two dissimilar rocks or between the vapors, liquids, and heat of the igneous rock and the rock which it cut. Several bodies of iron ore such as the Cornwell, Pa., magnetite deposit have this origin.
- D. Dynamometamorphic Deposits. These result from intense deformation, usually compressive, that caused recrystallization of the deformed rocks. Illustrations are some of the large asbestos deposits, marble and many decorative gneisses used as building stones.
- E. Pneumatolytic (or hypothermal) Fillings and Replacements.

 These are formed by precipitation from very hot vapors or solutions probably originating from molten rocks. Examples are the tin veins of Cornwell, England, and the gold deposits of the Homestake Mine in South Dakota.
- F. Mesothermal, Epithermal, and Telethermal Fillings and Replacements. These are attributed to the action of progressively cooler and more liquid, less gaseous solutions similar to, but cooler than, the hypothermal deposits mentioned in E. They commonly are found near igneous intrusions but may be so far away that the relation of the igneous rocks to the mineralization is in doubt. The three subdivisions listed are based upon inferences as to the temperatures, pressures, and the compositions of the depositing solutions. The three are exemplified by the mother lode gold deposits of California, mesothermal; the greater part of the Arizona porphyry copper deposits, and the Leadville, Colo., lead-zinc-silver deposits and many of

the gold-silver-quartz veins of Nevada and many mercury deposits which are epithermal. Telethermal deposits are exemplified by the deposits of the Mississippi Valley region such as the Tri-State lead and zinc area, the Wisconsin-Illinois-Iowa lead and zinc area and the Elizabeth, Ill., fluorite area.

- G. Sedimentary Deposits. These originate from surface or near-surface processes such as evaporation (for example most deposits of potassium salts); from biochemical extraction and precipitation, usually in enclosed water bodies (as with many iron ore -- probably all of the lake. Superior region); or from physical concentration of solid particles (as with many stream placers yielding gold nuggets). This class also includes many building stones such as limestone and sandstone. Coal is likewise a sedimentary mineral deposit.
- H. Deposits from Laterally or Downward Moving Waters. It has been argued though perhaps today the theory is less generally accepted, that some mineral deposits are the result of solution by cool waters moving downward or sideways which dissolve (from surrounding rocks), transport and finally deposit in openings or as replacements mineral materials which are workable. This concept is characterized as lateral secretion or mobilization and has been used to explain some telethermal deposits such as the Mississippi Valley lead-zinc deposit. The more widely held explanation of such mineral deposits is that they are hypothermal or sedimentary in origin.
- I. Secondary Deposits. Many lean previously unworkable deposits which may have been any of the origins previously described have been converted to economic deposits by the later process of enrichment. It is a semantic question whether this should be viewed as one of the classes of

origin or instead as a later change superimposed on one of the classes previously described and frequently referred to as primary deposits.

Secondary changes include such as processes as oxidation, the effect of oxygen, water, or other near-surface agents on, for example, copper sulphides or silver compounds, converting them to oxides or carbonates. Any component elements, if they are soluble, may be transported to greater depths by descending near-surface waters where the copper or silver is again precipitated as a sulphide through secondary sulphide enrichment. Or the primary deposit may contain such volumes of gangue minerals as to be economically not minable but leaching of these may result in a residual enriched deposit at or near the surface. Thus manganese compounds such as the carbonate may be converted near the surface to a relatively insoluble group of manganese oxides and hydrous oxides referred to as laterites, which accumulate while the surrounding waste material is dissolved away. This process is responsible for many workable deposits of iron, nickel and aluminum, the latter as bauxite.

The origin of a mineral deposit gives an indication of the prospect that a mine or mines within that ore deposit might be suitable for nuclear waste isolation. All types of mineral deposit hold some promise for waste isolation if the mine is above the local water table. This criteria has some hazard if voids exist because meteoric water could possibly enter the waste and carry an undesirable leachate into the lower circulating ground water.

Sedimentary deposits probably offer the greatest immediate potential for waste isolation in that, for the most part, they have enjoyed a relatively quiet existence and the probability of the mining interval being completely dry is the greatest. In areas where severe techtonic movements have occurred this of course will not be the case because faults and fracture systems are apt to develop with the deformation of the sedimentary rocks. Examples which might offer the best possibility for waste isolation are the evaporite minerals of rock salt, potash, and trona, along with limestone and shale. For limestone to be a good candidate for waste isolation it should have enjoyed a steady depositional environment, terminated by the subsequent deposition of a sealing material such as shale and not have been a part of a positive area during its geologic history where the action of ground waters and erosional forces could have developed secondary porosity through solution channels in the limestone.

The magmatic segregates seem to offer a potential for waste isolation, except for the qualifying condition that virtually all igneous rocks develop definite jointing patterns as a result of differential cooling during their period of origin or tension partings from subsequent tectonic movement. These joints or fracture systems quite commonly are avenues of ground water movement and at first examination the probability is high that a mine in such a deposit will be one in which there is moderate to high water inflow.

The pegmatites, being intrusions into other rock, of themselves may not exhibit any jointing or fracturing, but the process by which they intruded country rock probably caused some jointing, fracturing, or faulting in the country rock which would mean that, again, the probability of moderate to high water inflows into a mine in these deposits is high.

Contact metamorphic deposits probably means that severe deformation has occurred in the rock into which the igneous body intruded. The major fracturing and faulting serves, as a means of ground water movement

resulting in moderate to large water inflows into a mine producing minerals from this deposit.

Dynamometamorphic deposits result from intense deformation which probably creates a very well developed void system in the form of joints, fractures, and faults which again serve as ground water movement conduits and improve the probability of moderate to high water inflows into a mine producing such minerals.

Pneumatolytic or hypothermal deposits are formed by the precipitation from solutions into country rock and here the question exists whether the precipitation completely filled all void space or if there is a void still remaining or is of secondary origin within the country rock. The probability is quite high that subsequent deformation if not the initial deposition, left a well developed joint system within the country rock to serve as a means of ground water movement and water inflow into a mine producing a mineral of this origin.

Mesothermal, epithermal and telethermal deposits, again being fillings and/or replacements within existing country rock leaves a serious question as to the integrity of the country rock; whether the deposition completely filled all channels or left some open for ground water movement. In the case of deposits within soluble rocks such as carbonate rocks, there is also the possibility of secondary solution channels being formed which serve as points of water entry into the mine producing minerals of this origin. In the Mississippi Valley region, with the majority of the deposition of the valuable mineral being within a carbonate section, most of the mines are quite wet, probably due as much to the secondary porosity developments subsequent to the deposition of the minerals as to the failure of the minerals to originally (11) completely the channels in which they were precipitated.

MINES FOR IN SITU EXPERIMENTS

INACTIVE

State

Owner Mullins Kentucky

Montana George A. Relyea

New York National Gypsum Co.

Ohio Fenix & Scisson, Inc.

Ohio Pittsburg Plate Glass Co.

Pennsylvania Ammandal Mine

Pennsylvania. Bell Mine

West Winfield Mine Pennsylvania:

Tennessee Signal Mountain Mine

Stephens City Mine Virginia.

Manheim Mine West Virginia

Martinoburg Mine West Virginia

West Virginia Rowlesburg Mine

Wyoming Texasgulf Inc.

MINES SUITABLE FOR NUCLEAR WASTE ISOLATION

ACTIVE

State Owner

Iowa United States Gypsum Co.

Kansas American Salt Co.

Kansas Georgia-Pacific Corp.

Kansas Independent Salt Co.

Kansas Interpace Corp. (Carey Hutchinson)

Kansas Interpace Corp. (Carey Lyons)

Louisiana Cargill Inc.

Louisiana Diamond Crystal Salt Co.

Louisiana International Salt Co.

Louisiana Morton Norwich Products Inc.

Michigan International Salt Co.

Montana United States Gypsum

Nevada J. Irving Crowell Jr. & Son

Nevada Union Carbide Corp.

New Mexico Amax

New Mexico Duval Corporation

New Mexico Kerr-McGee Industries

New Mexico Mississippi Chemical Co.

(Suitable Active Mines, Cont'd.)

Wyoming

State New Mexico	Owner National Potash Co. (Eddy Mine
New Mexico	National Potash Co. (Lea Mine)
New Mexico	Potash Company of America
New York	Cargill, Inc.
New York	International Salt Co.
New York	Morton Norwich Products Inc.
New York	United States Gypsum
Onto	International Salt Co.
Ohio	Morton Norwich Products Inc.
Pennsylvania	National Gypsum Co.
T exas	Morton Norwich Products Inc.
Virginia	National Gypsum
Virginia	United States Gypsum Co.
Wyoming	Allied Chemical Corp.
Wyoming	FMC Corporation
•	

Stauffer Chemical Co.

DEPTH

Feet	<u>State</u>	Owner	Page No.
50-60	Ohio	United States Gypsum Co.	
206	Illinois	Phillips Petroleum Co.	
207	Illinois	Wilbros Terminals Inc.	•
229	Illinois	Gulf Oil Corporation	· · ·
250	Texas	Gulf Oil Corp.	
250	Pennsylvania	Sun Oil Co.	
291	Missouri	Continental Oil Co.	
295	Illinois	Mapco Inc.	
295	Nebraska	Metropolitan Utilities District	•
300	Kentucky	Mullins Mine	
	Pennsylvania	National Gypsum Co.	
	Pennsylvania	West Winfield Mine	
	Tennessee	United States Steel Corp.	
308	Oklahoma	Atlantaic Richfield Co.	. ,
310	Illinois	Tuloma Gas Products	•
320	New Jersey	Exxon Corp.	
325	Illinois	Hydrocarbon Transportation Inc.	
4	Nebraska	Mapco Inc.	
327	Missouri	Wilbros Terminals Co.	
330	Alabama	Tuloma Gas Products	
340	Georgia	Dixie Pipeline Co.	
	Indiana	Continental Oil Co.	•
	Michigan	Georgia-Pacific Corp.	
	Michigan	Grand Rapids Gypsum Co.	

MINERAL MINED

AMORPHOUS SILICA

Illinois

Illinois Minerals Co.

ANTIMONY

Montana

U. S. Antimony Corp.

ASBESTOS

Arizona

Jaquays Asbestos Corp.

BARITE

Arkansas

Dresser Industries

N L Industries

BAUXITE

Arkansas

Reynolds Metals Co.

CHALK

Alabama

Tuloma Gas Products and Atlantic Richfield

CLAY ·

Qhio

Frederick J. Dando Co.

West Virginia

Globe Refractories Inc.

COPPER

Arizona

Continental Oil Co. (Florence)

Continental Oil Co. (Oracle Ridge)

Hecla Mining Co. (Lakeshore)

Magma Copper Co.

New Mexico

Federal Resources Corp.

Utah

Anaconda Co.

FLUORSPAR

Colorado

Ozark-Mahoning

Illinois

Minerval Mines (Deardorff)

Minerval Mines (Gaskins)

Minerval Mines (Victory)

Kentucky

Minerva Mines

Nevada

J. Irving Crowell Jr. & Son

Utah

U. S. Energy Corp.

GARNET

New York

Interpace Corp.

GILSONITE

Utah

American Gilsonite

GNEISS

Georgia

Dixie Pipeline Company

New Jersey

E. I. DuPont DeNemours Co.

Pennsylvania

Sun Oil Co.

South Carolina

Carolina Pipeline Co.

Virginia

Washington Gas Light Co.

GOLD

California

Apco Oil Corp.

Picacho Development Corp.

Montana

Helena Silver Mines, Inc.

Oregon -

Holding Mine & Development Co.

South Dakota

Homestake Mining Co.

GRANITE

Maryland

Baltimore Gas and Electric

GYPSUM

Indiana National Gypsum Co.

United States Gypsum

Iowa United States Gypsum Co.

Kansas Georgia-Pacific Corp.

Michigan Georgia-Pacific Corp.

Grand Rapids Gypsum Co.

Montana United States Gypsum

New York National Gypsum Co.

United States Gypsum

Virginia United States Gypsum Co.

IRON ORE

Michigan Inland Steel Co.

Negaunee Mine Co.

Minnesota Cleveland-Cliffs Iron Co.

Missouri Hanna Mining Co.

Meramec Mining Co.

New York Republic Steel Corp.

Virginia Gossan Mine

Wyoming CF&I Steel Corp.

LIMESTONE

Illinois Continental Oil Co.

Shell Coil Company

Tuloma Gas Products

Indiana Continental Oil Co.

LIMESTONE (Cont'd.)

Kentucky B. F. Goodrich Co.

Mullins Mine

Union Light, Heat, & Power Co.

Missouri Laclede Gas Co.

Nebraska Metropolitan Utilities District

Ohio Cincinnati Gas & Electric Co.

Fenix & Scisson Inc.

Pittsburg Plate Glass Co.

Oklahoma Arkhola Sand & Gravel Co.

Pennsylvania Ammandale Mine

Bell Mine

National Gypsum Co.

West Winfield Mine

Tennessee Signal Mountain Mine

Virginia National Gypsum Co.

Stephens City Mine

West Va. Manheim Mine

Martinsburg Mine

Rowlesburg Mine

LITHIUM

Virginia Foote Mineral Co.

MAGNETITE

New Jersey Halcrest Co. Inc.

North Carolina Greenback Industries Inc.

MERCURY

California Buena Vista Mines, Inc.

New Idria Mining and Chemical Co.

METAMORPHIC

Minnesota

Burmah Oil Co.

MOLYBDENUM

Colorado

Amax ..

OIL SHALE

Colorado

TOSCO (Garfield Co.)

TOSCO (Rio Blanco Co.)

PHOSPHATE ROCK

Montana

Cominco American Inc.

George A. Relyea Phosphate Mine

POTASH

New Mexico

Amax

Duval Corp.

Kerr-McGee Industries

Mississippi Chemical Co.

National Potash Co. (Eddy Mine)

National Potash Co. (Lea Mine)

Potash Co. of America

PRECIOUS METALS

California

Cash Industries Inc.

L & K Development Corp.

Colorado

Coronado Silver Corp.

Montana

Black Pine Mining Co.

Nevada

Apco Oil Corp. (Battle Mountain)

Apco Oil Corp. (Gooseberry Mine)

United States Platinum Catalyst Inc.

New Mexico

Old Ontario Mining Co.

Kansas

American Salt Co.

Independent Salt Co.

Interpace Corp. (Carey Hutchinson)

Interpace Corp. (Carey Lyons)

Louisiana

Cargill Inc.

Diamond Crystal Salt Co.

International Salt Co.

Morton Norwich Products Inc.

Michigan

International Salt Co.

New York

Cargill Inc.

International Salt Co.

Morton Norwich Products Inc.

Ohio

International Salt Co.

Morton Norwich Products Inc.

Texas

Morton Norwich Products, Inc.

SAPPHIRE

Montana

Sapphire Village Inc.

SHALE

Illinois

Gulf Oil Corporation

Hydrocarbon Transportation (Grundy Co.)

Hydrocarbon Transportation Inc. (Will Co.)

Mapco Inc.

Phillips Petroleum Co.

Texas Eastern Transmission Co.

U. S. Industrial Chemicals

Wilbros Terminals Inc.

SHALE (Cont'd.)

Indiana Continental Oil Co. (Hunington Co.)

Continental Oil Co. (Lake Co.)

Texas Eastern Transmission Co. (Gibson Co.)

Texas Eastern Transmission Co. (Jackson Co.)

Iowa Hydrocarbon Transportation Co. (Polk Co.)

Hydrocarbon Transportation Co. (Polk Co.)

Mapco Inc. (Propane)

Mapco Inc. (Petroleum Prod.)

Kentucky Columbia Hydrocarbon Corp.

Missouri Continental Oil Co.

Wilbors Terminals Co.

Nebraska Mapco Inc.

Metropolitan Utilities District

New Jersey Exxon Corp.

Ohio Standard Oil of Ohio (Allen Co.)

Standard Oil of Ohio (Lucas Co.)

Texas Eastern Transmission Co.

Oklanoma Atlantic Richfield Co.

Continental Uil Co.

Sun Oil Co.

Pennsylvania Texas Eastern Transmission Co.

Gulf Oil Corporation

SILVER

Idaho Coeur D'Alene Mines Corp.

Nevada Sunshine Mining Co.

SULFIDE ORES

Arizona

Cyprus Mines Corp.

Magma Copper Co.

Phelps Dodge Corp.

California

Holding Mine & Development Co.

Montecito

Union Carbide Corp.

Colorado

Amax

Asarco Inc.

Camp Bird Colorado Inc.

Day Mines, Inc.

Federal Resources Corp.

Homestake Mining Co.

Idarado Mining Co.

Minerals Engineering Co.

New Jersey Zinc Co.

Resurrection Mining Co.

Rico Argentine Mining Co.

Standard Metals Corp.

U. S. Energy Corp.

Idaho

Asarco Inc. (Coeur Unit)

Asarco Inc. (Galena Unit)

Bunker Hill Co. (Bunker Hill)

Bunker Hill Co. (Crescent)

Clayton Silver Mines

Day Mines, Inc. (Dayrock)

Day Mines, Inc. (Tamarack)

SULFIDE ORES (Cont'd.)

Idaho Hecla Mining Co. (Consolidated)

Hecla Mining Co. (Lucky Friday)

Hecla Mining Co. (Star)

Sunshine Mining Co.

Universal Exploration Inc.

Illinois Allied Chemical Corp. (Minerva)

Allied Chemical Corp. (Minerva-Spivey)

Minerval Mines (Minerva #1)

Ozark-Mahoning Co.

Kentucky Cerro Spar Corp.

Maine Kerramerican Inc.

Michigan White Pine Copper Co.

Missouri Amax

Cominco American Inc.

Ozark Lead Co.

St. Joe Minerals (Brushy Creek)

St. Joe Minerals (Fletcher)

St. Joe Minerals (Indian Creek)

St. Joe Minerals (Viburnum)

Montana Anaconda Co.

Asarco

Nevada Amalgamated Larder Mines Ltd.

Hecla Mining Co.

New Jersey New Jersey Zinc Co.

SULFIDE ORES (Cont'd.)

New Mexico Asarco Inc.

San Pedro Mining Corp.

U. V. Industries (Continental)

U. V. Industries (Hanover)

New York

St. Joe Minerals Co.

Pennsylvania

Bethlehem Steel Co.

Tennessee

Cities Service Co.

Utah

Anaconda Co.

Kennecott Copper Corp.

McFarland & Hullinger

Virginia

Callahan Mining Corp.

New Jersey Zinc Co.

Washington

Bunker Hill Co.

Wisconsin

Ivey Construction Co.

TALC

California

Johns-Manville Products Corp.

Pfizer Inc.

Montana

Pfizer Inc.

New York

Gouverneur Talc Co.

Vermont

Engelhard Minerals & Chemicals Co.

Vermont Talc Inc.

Windsor Minerals (Argonaut)

Windsor Minerals (Frostbite)

Windsor Minerals (Hammondsville)

TRONA

Wyoming

Allied Chemical Corp.

FMC Corporation

Stauffer Chemical Co.

Texasgulf Inc.

TUNGSTEN

Nevada

Tungsten Properties, Ltd.

Union Carbide Corp.

North Carolina

Ranchers Exploration and Development Co.

ZINC

New Mexico

U. V. Industries

Pennsylvania

New Jersey Zinc Co.

Tennessee

Asarco (Coy)

Asarco (Immel)

Asarco (Mascot)

Asarco (New Market)

Asarco (Young)

New Jersey Zinc Co. (Elmwood)

New Jersey Zinc Co. (Jefferson City)

United States Steel Corp.

Washington

Callahan Mining Corp.

• •			
<u>Feet</u>	<u>State</u>	Owner Page	No.
340	New Jersey	E.I. DuPont DeNemours Co.	
	Pennsylvania	Texas Eastern Transmission Co.	
350	Illinois	Continental Oil Co.	
11	Indiana	National Gypsum Co.	
· //	Indiana	United States Gypsum	
• • •	Maryland	Baltimore Gas and Electric	
	Oklahoma	Continental Oil Co.	
	Virginia	Gossan Mine	
360	Pennsylvania	Sun Oil Co.	
361	Illinois	U. S. Industrial Chemicals	
375	Ohio	Cincinnati Gas and Electric Co.	•
380	Kentucky	Columbia Hydrocarbon Corp.	
	Kentucky	Union Light, Heat & Power Co.	
	Oklahoma	Sun Oil Co.	
383	Missouri	Laclede Gas Co.	
385	Kentucky	B. F. Goodrich Co.	
390	Ohio	Texas Eastern Transmission Co.	
400	Illinois	Shell Oil Co.	
	Pennsylvania	Ammandale Mine	
	Pennsylvania	Bell Mine	
	South Carolina	Carolina Pipeline Co.	
	Virginia	Stephens City Mine	
	Virginia	Washington Gas Light Co.	•
	West Virginia	Martinsburg Mine	

Feet	<u>State</u>	Owner Page No.
4 20	Indiana	Texas Eastern Transmission Co.
448	Indiana	Texas Eastern Transmission Co.
455	Indiana	Continental Oil Co.
169	Iowa	Mapco Inc.
476	Nebraska	Metropolitan Utilities District
490	Illinois	Texas Eastern Transmission Co.
494	Ohio	Standard Oil of Ohio
500	Arkansas	Reynolds Metals Co.
	Louisiana	International Salt Co.
	Ohio	Fenix & Scisson, Inc.
510	Minnesota	Burmah Oil Co.
560	Ohio	Standard Oil of Ohio
575	Iowa	Hydrocarbon Transportation Inc.
600	Indiana	Continental Oil Co.
	Kansas	Interpace Corp.
650	Virginia	Uniated States Typsum Co.
	Washington	The Bunker Hill Co.
700	Illinois	Minerval Mines
	Íllinois	Ozark-Mahoning Co.
	Louisiana	Morton Norwich Products, Inc.
	Texas	Morton Norwich Products, Inc.
725	Íowa	Mapco, Inc.
740	Louisiana	Diamond Crystal ŜaÎÎ Co.
830	Kansas	Independent Salt Ĉo:
900	Virginia	National Gypsum

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,	Feet	State	Owner Page No.	
	1,000	Missouri	Amax	
		Tennessee	Signal Mountain Mine	
		West Virginia	Manheim Mine	
		West Virginia	Rowlesburg Mine	
	1,010	Kansas	American Salt Co.	
	1,020	Missouri	Cominco American Inc.	
	Below 1,	000		
		Tennessee	Asarco	
		Tennessee	Cities Service Co.	,
-		Tennessee	New Jersey Zinc Co. (Elmwood Mine)	
		Tennessee	New Jersey Zinc Co. (Jefferson City Mine)	,
•	1,130	New York	International Salt Co.	
	1,180	Michigan	International Salt Co.	•
	1,200	New York	Cargill, Inc.	
	1,250	Missouri	Ozark Lead Co.	
	1,300	Ohio	International Salt Co.	· .
		Ohio	Morton Norwich Products Co.	
	1,385	Iowa	Hydrocarbon Transportation, Inc.	. "
	1,400	Tennessee	Asarco, Inc.	
-		Utah	American Gilsonite	•
•		Wyoming	Allied Chemical Corp.	
		Wyoming	FMC Corporation	•
-		Wyoming	Stauffer Chemical Co.	
		Wyoming	Texasgulf Inc.	• :

Feet	State	Owner	Page No:
1,550	Arizona	Phelps Dodge Corp.	
1,600	New Mexico, Ama	x	
	New Mexico	Duval	
·	New Mexico	Mississippi Chemical Co.	
	New Mexico	National Potash Co. (Eddy Mine)	
	New Mexico	National Potash Co. (Lea Mine)	
	New Mexico	Potash Company of America	
1,650	New Mexico	Kerr-McGee Industries	
1,675	Missouri	Meramec Mining Co.	
1,700	New York	St. Joe Minerals Co.	
1,760	Michigan	White Pine Copper Co.	
1,820	Illinois	Hydrocarbon Transportation	
2,200	Ohio	Pittsburg Plate Glass Co.	
3,100	Idaho	Bunker Hill Co.	
4,428	Idaho	Asarco	
4,650	Idao	Hecla Mining Co.	
5,316	Tđahọ	Asarco	
5,600	Idaho	Bunker Hill Co. (Bunker Hill Mine)	
7,000	Idaho	Sunshine Mining Co.	
Below 9,00	00 .		

Homestake Mining Co.

South Dakota

COUNTRY ROCK TYPE

CHALK

Alabama

Tuloma Gas Products

Crystalline

Arkansas

Dresser Industries

California

Apco Oil Corp.

Buena Vista Mines, Inc.

Cash Industries Inc.

Johns-Manville Products Corp.

Montecito

New Idria Mining and Chemical Co.

Picacho Development Corp.

Pfizer Inc.

Union Carbide Corp.

Colorado

Asarco Inc.

Camp Bird Colorado Inc.

Coronado Silver Corp.

Day Mines Inc.

Federal Resources Corp.

Homestake Mining Co.

Idarado Mining Co.

Minerals Engineering Co.

New Jersey Zinc Co.

Ozark Mahoning

Standard Metals Corp.

U.S. Energy Corp.

CRYSTALLINE, (Cont.)

Idaho

Asarco Inc. (Coeur Unit)

Asarco Inc. (Galena Unit)

Bunker Hill Co. (Bunker Hill)

Bunker Hill Co. (Crescent)

Clayton Silver Mines

Coeur D'Alene Mines Corp.

Day Mines Inc.

Hecla Mining Co. (Lucky Friday)

Hecla Mining Co. (Consolidated Silver)

Sunshine Mining Co.

Universal Exploration Inc.

Montana

Anaconda Co.

Àsarco

Black Pine Mining Co.

Helena Silver Mines Inc.

Pfizer, Inc

Saphire Village Inc.

U.S. Antimony Corp.

Nëvada

Amalgamated Larder Mines Ltd.

Apco Oil Corp. (Battle Mt.)

Apco Oil Corp. (Gooseberry)

J. Irving Crowell Jr. & Son

Hecla Mining Co.

Sunshine Mining Co.

Tungsten Properties Ltd.

United States Platinum Catalyst Inc.

CRYSTALLINE, (Cont.)

New Mexico Asarco

Federal Resources Corp.

San Pedro Mining Corp.

The Old Ontario Mining Co.

U. V. Industries (Continental)

U. V. Industries (Hanover)

U. V. Industries (Princess)

New York Gouverneur Talc Co.

Interpace Corp.

North Carolina Greenback Industries, Inc.

Ranchers Exploration and Development Co.

Oregon Holding Mine & Development Co.

South Dakota Homestake Mining Co.

Utah Anaconda Co. (Carr Fork)

Anaconda Co. (Park City)

Kennecott Copper Corp.

McFarland & Hullinger

U. S. Energy Corp.

Vermont Engelhard Minerals & Chemicals Co.

Vermont Talc Inc.

Windsor Minerals (Argonaut)

Windsor Minerals (Frostbite)

Windsor Minerals (Hammondsville)

Virginia Gossan Mine

CRYSTALLINE GNEISS

Georgia

Dixie Pipeline Co.

New Jersey

E.I. DuPont DeNemours Co.

Pennsylvania

Sun Oil Co.

South Carolina

Carolina Pipeline Co.

Virginia

Washington Gas Light Co.

CRYSTALLINE GRANITE

California

L & K Development Co.

Maryland

Baltimore Gas and Electric

CRYSTALLINE METAMORPHIC

Minnesota

Burmah Oil Co.

New York

St. Joe Minerals Co.

EVAPORITES

Kansas

American Salt Co.

Independent Salt Co.

Interpace Corp. (Carey Hutchinson)

Interpace Corp. (Carey Lyons)

Louisiana

Cargill, Inc.

Diamond Crystal Salt Co.

International Salt Co.

Morton Norwich Products Inc.

Michigan

International Salt Co.

New Mexico

Amax

Duval Corp.

Kerr-McGee Industries

EVAPORITES, (Cont'd.)

New Mexico

Mississippi Chemical Co.

National Potash Co. (Eddy Mine)

National Potash Co. (Lea Mine)

Potash Co. of America

New York

Cargill, Inc.

International Salt Co.

Morton Norwich Products Inc.

Ohio

International Salt Co.

Morton Norwich Products Co.

Texas

Morton Norwich Products Inc.

GRANITE

Colorado

Amax

LIMESTONE

Illinois

Allied Chemical Corp. (Minerva)

Allied Chemical Corp. (Minerva-Spivey)

Continental Oil Co.

Minerval Mines (Deardorff/North Victory)

Minerval Mines (Gaskins)

Minerval Mines (Victory)

Ozark-Mahoning Co.

Shell Oil Co.

Tuloma Gas Products

Indiana

Continental Oil Co.

National Gypsum Co.

United States Gypsum

LIMESTONE (Cont'd.)

Iowa United States Gypsum Co.

Kansas Georgia-Pacific Corp.

Kentucky B. F. Goodrich Co.

Cerro Spar Corp.

Minerva Mines

Mullins Mine

Union Light, Heat & Power Co.

Michigan Georgia-Pacific Corp.

Grand Rapids Gypsum Co.

Missouri Amax

Cominco American Inc.

Laclede Gas Co.

Ozark Lead Co.

St. Joe Minerals (Brushy Creek)

St. Joe Minerals (Fletcher)

St. Joe Minerals (Indian Creek)

St. Joe Minerals (Viburnum)

Nebraska Metropolitan Utilities District

New York National Gypsum Co.

Ohio Cincinnati Gas & Electric Co.

Fenix & Scisson Inc.

Pittsburg Plate Glass Co.

Oklahoma Arkhola Sand & Gravel Co.

LIMESTONE (Cont'd.)

Pennsylvania Am

Ammandale Mine

Bell Mine

National Gypsum Co.

New Jersey Zinc Co.

West Winfield Mine

Tennessee

Asarco (Coy)

Asarco (Immel)

Asarco (Mascot)

Asarco (New Market

Asarco (Young)

Cities Service Co.

New Jersey Zinc Co. (Elmwood)

New Jersey Zinc Co. (Jefferson City)

Signal Mountain Mine

United States Steel Corp.

Virginia

Callahan Mining Corp.

National Gypsum

New Jersey Zinc Co.

Stephens City Mine

United States Gypsum Co.

West Virginia

Manheim Mine

Martinsburg Mine

Rowlesburg Mine

LIMESTONE (Cont'd.)

Washington Bunker Hill Co.

Callahan Mining Corp.

QLL SHALE

Colorado TOSCO (Carfield Co.)

TOSCO (Rio Blanco Co.)

SEDÍMENTARY

Illinois Minerals Co.

Michigan White Pine Copper Co.

Montana Cominco American Inc.

George A. Relyea Phosphate Mine

New York United States Gypsum

Ohio Frederick J. Dando Co.

Pennsylvania Bethlehem Steel Co.

Virginia Foote Mineral Co.

Wyoming Allied Chemical Corp.

CF&I Steel Corp.

Stauffer Chemical Co.

Texasgulf Inc.

SHALE

Illinois Hydrocarbon Transportation (Grundy Co.)

Hydrocarbon Transportation (Will Co.)

Gulf Oil Corp.

Mapco Inc.

Phillips Petroleum Co.

Texas Eastern Transmission Co.

SHALE (Cont'd.)

Illinois U.S. Industrial Chemicals

Wilbros Terminals Inc.

Indiana Continental Oil Co. (Hunington Co.)

Continental Oil Co. (Lake Co.)

Texas Eastern Transmission Co. (Gibson Co.)

Texas Eastern Transmission Co. (Jackson Co.)

Iowa Hydrocarbon Transportation Inc.

Hydrocarbon Transportation Inc.

Mapco Inc.

Mapco Inc.

Kentucky Columbia Hydrocarbon Corp.

Missouri Continental Oil Co.

Wilbros Terminals Co.

Nebraska Mapco Inc.

Metropolitan Utilities District

New Jersey Exxon Corp.

Ohio Standard Oil of Ohio (Allen Co.)

Standard Oil of Ohio (Lucas Co.)

Texas Eastern Transmission Co.

Oklahoma Atlantic Richfield Co.

Continental Oil Co.

Sun Oil Co.

Pennsylvania Texas Eastern Transmission Co.

Gulf Qil Corp.

TYPE OF ENTRY

ADIT

Arizona

Continental Copper

California

Apco Oil Corp.

Holding Mine & Development Co.

L & K Development Corp.

New Idria Mining and Chemical Co.

Pfizer Inc.

Colorado

Day Mines Inc.

Federal Resources Corp.

TOSCO (Garfield Co.)

TOSCO (Rio Blanco Co.)

U. S. Energy Corporation

Idaho

Day Mines Inc. (Dayrock)

Day Mines Inc. (Tamarack)

Illinois

Minerval Mines (Deardorff/North Victory Mine)

Minerval Mines (Victory)

Montana

Black Pine Mining Co.

Cominco American Inc.

United States Gypsum

Nevada

Amalgamated Larder Mines Ltd.

Hecla Mining Co.

Sunshine Mining Co.

Ohio

United States Gypsum Co.

Vermont

Windsor Minerals Inc.

Virginia

Callahan Mining Corp.

Stephens City Mine

ADIT (Cont'd.)

1 Washington Callahan Mining Corp.

Wisconsin Ivey Construction Co.

15 West Virginia Martinsburg Mine

ADIT & SHAFT

1 & 1 Arkansas N L Industries

Colorado Camp Bird Colorado Inc.

Idaho Bunker Hill Company (Bunker Hill)

Bunker Hill Company (Crescent)

Maine Keramerican Inc.

1 & 2 Colorado New Jersey Zinc Co.

New York Interpace Corp.

1 & 3 Arkansas Reynolds Metals Co.

Michigan White Pine Copper Co.

ADIT & TUNNEL

California Montecito

Colorado Amax (Climax)

Amax (Henderson)

Coronado Silver Corp.

DRIFT		
·	California	Johns-Manville Products Corp.
	Oklahoma	Arkhola Sand & Gravel Co.
1	Pennsylvania	West Winfield Mine
2	Pennsylvania West Virginia	Ammandale mine
3	Kentucky	Mullins Mine

West Virginia

Tennessee

Manheim Mine

Signal Mountain Mine

DRIFT & SHAFT

Pennsylvania National Gypsum Co.

INCLINE

l Nevada J. Irving Crowell Jr. & Son

2 Arizona Hecla Mining Co.

INCLINE & SHAFT

Tennessee United States Steel Corp.

~		THE
5	HA	F"I"

Idaho Clayton Silver Mines Interpace Corp. (Carey Hutchinson) Kansas Interpace Corp. (Carey Lyons) Michigan Inland Steel Co. Missouri Amax Nevada Apco Oil Corp. Halcrest Co. Inc. New Jersey New Mexico Kerr-McGee Industries San Pedro Mining Corp. New York St. Joe Minerals Co. Pennsylvania Bell Mine Asarco`Inc. Tennessee New Jersey Zinc Co. Virginia Gossan Mine Arizona Cyprus Mines Corp. Colorado Asarco Inc. Asarco Inc. Idaho Universal Exploration Inc. Allied Chemical Corp. (Minerva) Illinois Allied Chemical Corp. (Minerva-Spivey) Minerval Mines (Gaskins)

Minerval Mines (Minerva #1)

SHAFT (Cont'd.)

2 Iowa

United States Gypsum Co.

Kansas

American Salt Co.

Georgia-Pacific Corp.

Independent Salt Co.

Louisiana

Cargill, Inc.

Diamond Crystal Salt Co.

Morton Norwich Products Inc.

Michigan

International Salt Co.

Georgia-Pacific Corp.

Grand Rapids Gypsum Co.

Missouri

Hanna Mining Co.

Meramec Mining Co.

uzark Lead Co.

St. Joe Minerals (Brushy Creek)

St. Joe Minerals (Fletcher)

Nevada

Apco Oil Corp.

New Mexico

Amax

Asarco Inc.

Duval Corp.

Federal Resources Corp.

National Potash Co. (Eddy)

National Potash Co. (Lea)

U. V. Industries

HAFT (Cont'd.)		.*	
2	New York	Cargill, Inc.	
		Gouverneur Talc Co.	
	·.·	Morton Norwich Products Inc.	
		National Gypsum Co.	
,	Ohio	Fenix & Scisson Inc.	
		Frederick J. Dando Co.	
		International Salt Co.	
		Morton Norwich Products Co.	
		Pittsburg Plate Glass Co.	
:	Pennsylvania	Bethlehem Steel Co.	
	South Dakota	Homestake Mining Co.	
	Tennessee	Asarco (Coy)	
•		Asarco (Immel)	
		Asarco (Young)	
. 1		New Jersey Zinc Co.	
•	Texas	Morton Norwich Products Inc.	
	Vermont	Vermont Talc Inc.	
	Virginia	New Jersey Zinc Co.	
		United States Gypsum Co.	
	Wyoming	CF&I Steel Corp.	
3	+3.3		
. 3.	Idaho	Asarco Inc.	

National Gypsum Co. Indiana

United States Gypsum

Louisiana International Salt Co.

SHAFT (Cont'd.)

SnAr I (Cont a.)	
3	Missouri	Cominco American Inc.
		St. Joe Minerals Corp. (Indian Creek
		St. Joe Minerals Corp. (Viburnum)
· .	New Mexico	Mississippi Chemical Co.
		Potash Company of America
		U. V. Industries
	Utah	Kennecott Copper Corp.
	Wyoming	Allied Chemical Corp.
4	Nevada	Tungsten Properties Ltd.
	Tennessee	Asarco, Inc. (Mascot)
5	Montana	Anaconda Company
	New York	International Salt Co.
		United States Gypsum
	Tennessee	Cities Service Co.
7	Arizona	Magma Copper Co. (San Manuel)
9	Arizona	Magma Copper Co. (Superior)
10	Illinois	Ozark-Mahoning
SHAFT,	CONVENTIONAL	
ì	Illinois	Gulf Oil Corp.
		Mapco Inc.
		Phillips Petroleum Co.

Wilbros Terminals Inc.

SHAFT, CONVENTIONAL (Cont'd.)

1 Oklahoma Atlantic Richfield Co.

2 Texas Gulf Oil Corp.

SHAFT, CONVENTIONAL & DRILLED

1 & 3 Illinois U. S. Industrial Chemicals

SHAFT, DRILLED

1 Alabama Tuloma Gas Products & Atlantic Richfield

Arizona Continental Oil Co.

Georgia Dixie Pipeline Co.

Illinois Continental Oil Co.

Hydrocarbon Transportation

Tuloma Gas Products

Indiana Continental Oil Co. (Hunington Co.)

Continental Oil Co. (Lake Co.)

Continental Oil Co. (Lake Co.)

Texas Eastern Transmission Co.

Iowa Hydrocarbon Transportation Inc.

Mapco Inc.

Kentucky B. F. Goodrich Co.

Union Light, Heat & Power Co.

Maryland Baltimore Gas & Electric

Minnesota Burmah Oil Co.

Missouri Continental Oil Co.

Laclede Gas Co.

Wilbros Terminals Co.

SHAFT, DRILLED (Cont'd.)

1	Nebraska	Metropolitan Utilities District
		Metropolitan Utilities District
	New Jersey	E.I. DuPont DeNemours Co.
•	Ohio	Cincinnati Gas & Electric Co.
•		Standard Oil of Ohio (Allen Co.)
		Standard Oil of Ohio (Lucas Co.)
	Oklahoma	Continental Oil Co.
• .		Sun Oil Co.
	South Carolina	Carolina Pipeline Co.
	Virginia	Washington Gas Light Co.
2	Illinois	Texas Eastern Transmission Co.
	Indiana	Texas Eastern Transmission Co.
·	Iowa	Hydrocarbon Transportation Inc.
		Mapco Inc.
	Kentucky	Columbia Hydrocarbon Corp.
	Nebraska	Mapco Inc.
	Pennsylvania	Texas Eastern Transmission Co.
3	Illinois	Hydrocarbon Transportation Inc.
J	111111015	
	•	Shell Oil Co.
5 .	Ñèw Jersey	Exxon Corp.
	Pennsylvania	Sun Oil Co.
11	Ohio	Texas Eastern Transmission Co.

SHAFT, VERTICAL

California

Union Carbide Corp.

Kentucky

Cerro Spar Corp.

SHAFT & SLOPE

Pennsylvania

New Jersey Zinc Co.

SHAFT & TUNNEL

1 & 1

North Carolina Ranchers Exploration and Development Co.

Washington

Bunker Hill Co.

2 & 1 California Picacho Development Corp.

Idaho

Hecla Mining Co. (Lucky Friday)

5 & 1 Idaho Hecla Mining Co. (Star)

SHAFT, TUNNEL & ADIT

2,1,1 Idaho Sunshine Mining Co.

5,1,1 Nevada United States Platinum Catalyst Inc.

SLOPE

Arkansas

Dresser Industries

New York

Republic Steel Corp.

SLOPE & ADIT

New Jersey

New Jersey Zinc Co.

TUNNEL

Arizona

Jaquays Asbestos Corp.

California

Buena Vista Mines Inc.

Colorado

Homestake Mining Co.

Idarado Mining Co.

TUNNEL (Cont'd.)

Colorado Minerals Engineering Co.

Standard Metals Corp.

Illinois Minerals Co.

Montaña U. S. Antimony Corp.

Oregon Holding Mine & Development Co.

Virginia National Gypsum

STATE: Alabama

COUNTY: Marengo

OWNER: Tuloma Gas Products

and Atlantic Richfield

COUNTRY ROCK TYPE: Chalk

MINERAL MINED: Chalk

DEPTH: 330 feet

VOLUME OF MINE: 785,000 & 1,262,00

PRESENT SERVICE: Propane Storage

cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft,

1 Conventional Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1954

LAST MINING: 1956

GENERAL DESCRIPTION: Room size is 15 ft. wide and 25 ft. high. Pillars are 45 ft. square. There has, from time to time, been some evidence of leakage at the shaft-rock contact in the conventional shaft. Injections of chemical grout have provided temporary solutions.

MINE SUMMARY DATA

STATE: Arizona

OWNER: Phelps Dodge Corp.

Copper Queen

COUNTRY ROCK TYPE:

DEPTH: 1,550 ft.

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING: 1885

GENERAL DESCRIPTION:

COUNTY: Cochise

PRESENT SERVICE: Inactive

MINERAL MINED: Copper, gold, and

silver

VOLUME OF MINE:

WATER PRODUCTION: PI 102

LAST MINING: 1975

ŜTATĒ: Arizona

OWNER: Jaquays Asbestos Corp.

COUNTRY ROCK TYPE:

BEPTH:

ENTRIES (TYPE & NUMBER) Tunnel

MINING PLAN: Room and Pillar

FIRST MINING: 1956

GENERAL DESCRIPTION:

COUNTY: Gila .

PRESENT SERVICE: Active

MINERAL MINED: Asbestos

VOLUME OF MINE: 6,000,000 cu. ft.

WATER PRODUCTION:

LAST MINING: Active

MINE SUMMARY DATA

STATE Arizona

OWNER: Continental Copper

Oracle Ridge Mine

COUNTRY ROCK TYPE:

DËPTH:

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN: Open stoping; Room and Pillar

FIRST MINING: 1974

GENERÁL DESCRIPTION:

COUNTY: Pima

PRESENT SERVICE: Active

MINERAL MINED! Copper

VOLUME OF MINE Developing 1 1978

WATER PRODUCTION:

LAST MINING!

STATE: Arizona

COUNTY: Pinal

OWNER: Continental Oil Co.

Florence Project

PRESENT SERVICE: Pilot Mine

COUNTRY ROCK TYPE:

MINERAL MINED: Copper

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN:

WATER PRODUCTION:

FIRST MINING: 1973

LAST MINING:

GENERAL DESCRIPTION: Developing pilot copper mine.

MINE SUMMARY DATA

STATE: Arizona

DEPTH:

COUNTY: Pinal

OWNER: Hecla Mining Co.

PRESENT SERVICE: Active

Lakeshore Mine

MINERAL MINED: Copper .

COUNTRY ROCK TYPE:

VOLUME OF MINE: 180,000,000 cu. ft

ENTRIES (TYPE & NUMBER) 2 Inclines

MINING PLAN: Block Caving

WATER PRODUCTION:

FIRST MINING: 1976

LAST MINING:

GENERAL DESCRIPTION: Mine developing volume shown will be developed

by end of 1976.

STATE: Arizona

OWNER: Magma Copper Co.

San Manuel Mine

COUNTRY ROCK TYPE:

DEPTH:

ENTRIES (TYPE & NUMBER) 7 Shafts

MINING PLAN: Block Caving

FIRST MINING: 1956

GENERAL DESCRIPTION:

COUNTY: Pinal

PRESENT SERVICE: Active

MINERAL MINED: Copper and

Molybdenum

VOLUME OF MINE: 71,906,000,000 cu.

WATER PRODUCTION:

LAST MINING: Active.

MINE SUMMARY DATA

STATE: Arizona

OWNER: Magma Copper Co.

Superior Mine

COUNTRY ROCK TYPE:

DEPTH:

ENTRIES (TYPE & NUMBER) 9 Shafts

MINING PLAN: Undercut and fill

FIRST MINING: 1910

GENERAL DESCRIPTION:

COUNTY: Pinal

PRESENT SERVICE: Active

MINERAL MINED: Copper

VOLUME OF MINE: 637,000,000 cu. TE

WATER PRODUCTION:

LAST MINING: Active

STATE: Arizona

OWNER: Cyprus Mines Corp.

Bagdad Mine

COUNTRY ROCK TYPE:

DEPTH:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Cut and Fill

FIRST MINING: 1968

GENERAL DESCRIPTION:

COUNTY: Yavapai

PRESENT SERVICE: Active

MINERAL MINED: Copper, zinc,

Molybdenum

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA.

STATE: Arkansas

OWNER: Dresser Industries

Magcobar Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) Slopes

MINING PLAN: Open pit combined with

Room and Pillar Underground

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Hot Springs

PRESENT SERVICE: Shut Down

MINERAL MINED: Barite

VOLUME OF MINE:

WATER PRODUCTION: Moderate

LAST MINING: 1973

STATE: Arkansas

COUNTY: Hot Springs

OWNER: N L Industries

PRESENT SERVICE: Active

Magnet Cove COUNTRY ROCK TYPE:

MINERAL MINED: Barite

VOLUME OF MINE:

DEPTH:

ENTRIES (TYPE & NUMBER) Adit, Incline Shaft

WATER PRODUCTION:

MINING PLAN: Block Caving

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Arkansas

COUNTY: Hot Springs

OWNER: Reynolds Metals Co.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE:

MINERAL MINED : Bauxite

DEPTH: 500 ft.

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) Adits and 3 Shafts

Room and Pillar Underground

MINING PLAN: Open Pit, combined with

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

STATE: California

COUNTY: Imperial

OWNER: Picacho Development Corp.

PRESENT SERVICE: Active

Picacho Mine

MINERAL MINED: Gold

COUNTRY ROCK TYPE: Crystalline

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 2 Shafts, 1 Tunnel

WATER PRODUCTION:

MINING PLAN: Vein Mining

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: California

DEPTH:

COUNTY: Inyo

OWNER: Johns-Manville Products Corp.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Talc

ENTRIES (TYPE & NUMBER) Drift

VOLUME OF MINE: 1,680,000 cu. ft.

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING: 1972

LAST MINING: Active

STATE: California

COUNTY: Inyo "

OWNER: Montecito

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Silver, Scheelite,

Lead, Copper and Zinc

DEPTH:

VOLUME OF MINE: 300,000 cu. fit.

ENTRIES (TYPE & NUMBER) 1 Adit, 1 Tunnel

MINING PLAN: Vein Mining, Open Stope

WATER PRODUCTION:

EIRST MINING:

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: California

COUNTY: Inyo

OWNER: Union Carbide Corp.

PRESENT SERVICE: Active

Bishop

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Tungsten, Molybdenum

and Copper

DEPTH:

VOLUME OF MINE: 22,500,000 cu. ft.

ENTRIES (TYPE & NUMBER) Vertical Shaft

MINING PLAN: Sub Level Caving

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

STATE: California

OWNER: Cash Industries, Inc.

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING: 1976

GENERAL DESCRIPTION:

COUNTY: Lassen

PRESENT SERVICE: Developing

MINERAL MINED: Gold, palladium,

silver and fluorspar

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: California

OWNER: Holding Mine & Development Co.

September Group

COUNTRY ROCK TYPE:

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Adit

MINING PLAN: Vein Mining

FIRST MINING: 1976

GENERAL DESCRIPTION:

COUNTY: Mono

PRESENT SERVICE: Developing

MINERAL MINED: Tungsten, Molybdenum

Gold, Silver

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING: Active

STATE: California

COUNTY: Plumas

OWNER: L & K Development Corp.

PRESENT SERVICE: Inactive

COUNTRY ROCK TYPE: Quartz veins in granite

MINERAL MINED: Gold and Silver

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN: Vein Mining

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: California

COUNTY: San Benito

OWNER: New Idria Mining & Chemical Co.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Mercury

DEPTH:

VOLUME OF MINE: 15,000,000 eu. ft

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION: Underground operation in conjunction with an open pit.

STATE: California

COUNTY: San Bernardino

OWNER: Pfizer Inc.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Talc

DEPTH:

VOLUME OF MINE: 9,000,000 cu. ft.

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN: Caving, Room and Pillar, and Vein

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: California

COUNTY: San Luis Obispo

OWNER: Buena Vista Mines, Inc.

PRESENT SERVICE: Inactive

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Mercury

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) Tunnel

WATER PRODUCTION:

MINING PLAN:

LAST MINING:

FIRST MINING:

STATE: California

COUNTY: Sierra

OWNER: Apco Oil Corp.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Gold

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) Adit

WATER PRODUCTION:

MINING PLAN: Vein Mining

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Colorado

COUNTY: Clear Creek

OWNER: Amax

PRESENT SERVICE: Developing

Henderson Mine COUNTRY ROCK TYPE:

MINERAL MINED: Molybdenum

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) Tunnel and Adit

MINING PLAN: Block Caving

WATER PRODUCTION: Moderate

FIRST MINING: 1976

LAST MINING:

GENERAL DESCRIPTION: The first ore draw will occur in 1976 after the development of a 20-mile-long tunnel and processing complex. The investment has exceeded \$400,000,000.

STATE: Colorado

OWNER: Coronado Silver Corp.

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) Tunnel and Adit

MINING PLAN: Vein Mining

FIRST MINING: 1966

GENERAL DESCRIPTION:

COUNTY: Conejos

PRESENT SERVICE: Active

MINERAL MINED: Gold and Silver

VOLUME OF MINE: 3,000,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Colorado

OWNER: Rico Argentine Mining Co.

COUNTRY ROCK TYPE:

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Dolores

PRESENT SERVICE: Inactive

MINERAL MINED: Silver, Gold, Lead,

Zinc and Copper

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING:

STATE: Colorado

COUNTY: Eagle'

OWNER: New Jersey Zinc Co.

PRESENT SERVICE: Active

Eagle Mine

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Zinc, Copper, Lead

DEPTH:

and Silver

ENTRIÈS (TYPE & NUMBER) 1 Vertical Shaft, 1 Adit, 1 Incline Shaft

VOLUME OF MINE:9,000,000 cu. ft.

MINING PLAN: Room and Pillar, Timbered Stopes

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Colorado

COUNTY: Garfield

OWNER: TOSCO

PRESENT SERVICE: Inactive

COUNTRY ROCK TYPE: Oil Shale

MINERAL MINED: Oil Shale

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 1 Adit

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

STATE: Colorado

OWNER: U.S. Energy Corporation

Keystone Mine
COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Adit

MINING PLAN: Shrinkage Stoping

FIRST MINING: 1974

GENERAL DESCRIPTION:

COUNTY: Gunnison

PRESENT SERVICE: Inactive

MINERAL MINED: Zinc, Lead, Silver,

Copper and Cadmium VOLUME OF MINE: 500,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Colorado

OWNER: Ozark-Mahoning

Northgate Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Jackson

PRESENT SERVICE: Inactive

MINERAL MINED: Fluorspar

VOLUME OF MINE:

WATER PRODUCTION:

STATE: Colorado

COUNTY: Lake

OWNER: Amax

DDECEN

Climax Mine

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Granite

MINERAL MINED: Molybdenum, Tin and Tungsten

DEPTH:

VOLUME OF MINE: 85,478,800,000 cu.

ENTRIES (TYPE & NUMBER) Tunnel and Adit

MINING PLAN: Block Caving

WATER PRODUCTION: Moderate

FIRST MINING: 1916

LAST MINING:

GENERAL DESCRIPTION: The block caving will eventually reach the surface.

MINE SUMMARY DATA

STATE: Colorado

DEPTH:

COUNTY: Lake

OWNER: Asarco Inc.

PRESENT SERVICE: ACTIVE

Leadville Unit

MINERAL MINED: zing: Lead, Stiver

COUNTRY ROCK TYPE: Crystalline

VOLUME OF MINE: 6;005;000 cu: ft:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Panel and Fill

WATER PRODUCTION:

FIRST MINING: 1971

LAST MINING:

STATE: Colorado

OWNER: Day Mines, Inc.

Sherman Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Adit

MINING PLAN: Room and Pillar

FIRST MINING: 1975

GENERAL DESCRIPTION:

COUNTY: Lake

PRESENT SERVICE: Developing

MINERAL MINED: Silver and Lead

VOLUME OF MINE: 652,000 cu. ft.

WATER PRODUCTION:

LAST MINING: Active

MINE SUMMARY DATA

STATE: Colorado

OWNER: Resurrection Mining Co.

Resurrection Mine

COUNTRY ROCK TYPE:

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Lake

PRESENT SERVICE: Active

MINERAL MINED: Zinc and Lead

VOLUME OF MINE 6,100,000 cu. ft.

WATER PRODUCTION:

STATE: Colorado

COUNTY: Mineral

OWNER: Homestake Mining Co.

PRESENT SERVICE: Active

Bulldog Mountain Project COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Silver and Lead

DEPTH:

VOLUME OF MINE: 3,134,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Tunnel

MINING PLAN: Horizontal Cut and Fill

WATER PRODUCTION:

FIRST MINING: 1969

LAST MINING:

GENERAL DESCRIPTION: Little net voidage has occured in this mine because of

the mining plan.

MINE SUMMARY DATA

STATE: Colorado

DEPTH:

COUNTY: Mineral

OWNER: Minerals Engineering Co.

PRESENT SERVICE: Developing

Creede Associates Mine COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: sijver, tead, Coppe

Gold and zinc VOLUME OF MINE: 9,000,000 cu: Et.

ENTRIES (TYPE & NUMBER) 1 Tunnel

MINING PLAN: Open Stoping Shrinkage

WATER PRODUCTION:

FIRST MINING: 1974

LAST MINING:

STATE: Colorado

DEPTH:

COUNTY: Ourav

OWNER: Camp Bird Colorado, Inc.

PRESENT SERVICE: Active

Camp Bird Mine

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Lead, Zinc, Copper and Silver

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) Adit, Vertical Shaft

WATER PRODUCTION:

MINING PLAN: Room and Pillar, Vein

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Colorado

COUNTY: Ouray

OWNER: Federal Resources Corp.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Silver, Lead, Zinc

and Copper

DEPTH:

VOLUME OF MINE: 3,452,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Adit

WATER PRODUCTION:

MINING PLAN: Vein Mining

LAST MINING:

FIRST MINING:

STATE: Colorado

OWNER: Idarado Mining Co.

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Tunnel

MINING PLAN: Vein Mining

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Ouray

PRESENT SERVICE: Active

MINERAL MINED: Zinc, Lead, Copper,

Gold, Silver, Cadmium and Zinc

VOLUME OF MINE: 13,680,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Colorado

OWNER: TOSCO

COUNTRY ROCK TYPE: Oil Shale

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Adit

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Rio Blanco

PRESENT SERVICE: Inactive

MINERAL MINED: Oil Shale

VOLUME OF MINE:

WATER PRODUCTION:

STATE: Colorado

COUNTY: San Juan

OWNER: Standard Metals Corp.

Sunnyside Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Tunnel

MINING PLAN: Vein Mining, Shrink Stope

FIRST MINING:

GENERAL DESCRIPTION:

PRESENT SERVICE: Active

MINERAL MINED: Gold, Lead, Zinc,

Silver, Copper and Cadmium

VOLUME OF MINE: 5,600,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Colorado

OWNER: Amax

Urad Mine

COUNTRY ROCK TYPE:

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY:

PRESENT SERVICE: Closed

MINERAL MINED:

VOLUME OF MINE:

WATER PRODUCTION:

STATE: Georgia

COUNTY: Lamar'

OWNER: Dixie Pipeline Company

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Crystalline Gneiss

MINERAL MINED: Gneiss

DERIH: 340 ft.

VOLUME OF MINE: 182,300,000 cu. f

ENTRIES (TYPE & NUMBER)1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Large Inflow

FIRST MINING: 1963

LAST MINING: 1964

GENERAL DESCRIPTION: Room width is 20 feet, height 30 feet, and pillars 40 feet square. Extensive roof bolting was required to control the roof because of extensive jointing. Extensive grouting was also required to control the water inflow and it still is extensive.

MINE SUMMARY DATA

STATE: Idaho

COUNTY: Custer

OWNER: Clayton Silver Mines

PRESENT SERVICE:

Clayton Mine

MINERAL MINED; Silver, Lead and Zir

COUNTRY ROCK TYPE: Crystalline

DEPTH:

VOLUME OF MINE: 1,500,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Shaft

MINING PLAN: Shrink Stope

WATER PRODUCTION:

FIRST MINING: 1934

LAST MINING:

STATE: Idaho

OWNER: Universal Exploration Inc.

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Vein Mining

FIRST MINING: 1972

GENERAL DESCRIPTION:

COUNTY: Lemhi

PRESENT SERVICE: Developing

MINERAL MINED: Silver and Lead

VOLUME OF MINE: 300,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Idaho

OWNER: Asarco Inc.

Galena Unit

COUNTRY ROCK TYPE: Crystalline

DEPTH: 5,316 ft.

ENTRIES (TYPE & NUMBER) 3 Shafts

MINING PLAN: Cut and Fill

FIRST MINING: 1955

GENERAL DESCRIPTION:

COUNTY: Shoshone

PRESENT SERVICE: Active

MINERAL MINED: Silver and Copper

VOLUME OF MINE: 5,950,000 cu. ft.

WATER PRODUCTION: Moderate

STATE: Idaho

COUNTY: Shoshone

OWNER: Asarco Inc.

PRESENT SERVICE: Developing

Coeur Unit

. Madain dentition Developing

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Silver and Copper

DEPTH: 4,428 ft.

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 2 Shafts

WATER PRODUCTION: Moderate

MINING PLAN: Cut and Fill

LAST MINING:

FIRST MINING: 1965

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Idaho

COUNTY: Shoshone

OWNER: Bunker Hill Company

PRESENT SERVICE: Active

Bunker Hill Mine

MINERAL MINED: Lead, Zing, and Silve

COUNTRY ROCK TYPE: Crystalline

VOLUME OF MINE: 7,680,000 cu. \$4.

DEPTH: 5,600 ft.

ENTRIES (TYPE & NUMBER) 1 Adit, 1 Incline

MINING PLAN: Vein Mining; Square Set,

WATER PRODUCTION: Moderate

Cut and Fill

LAST MINING:

FIRST MINING: 1885

GENERAL DESCRIPTION:

.

STATE: Idaho

OWNER: The Bunker Hill Company

Crescent Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH: 3,100 ft.

ENTRIES (TYPE & NUMBER) 1 Adit, 1 Shaft

MINING PLAN: Vein Mining; Square Set,

Cut and Fill

FIRST MINING: 1952

GENERAL DESCRIPTION:

COUNTY: Shoshone

PRESENT SERVICE: Active

MINERAL MINED: Silver and Copper

VOLUME OF MINE: 960,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Idaho

OWNER: Coeur D'Alene Mines Corp.

Coeur Project

COUNTRY ROCK TYPE: Crystalline

DEPTH: .

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING: 1976

GENERAL DESCRIPTION:

COUNTY: Shoshone

PRESENT SERVICE: Developing

MINERAL MINED: Silver

VOLUME OF MINE:

WATER PRODUCTION:

STATE: Idaho

OWNER: Day Mines, Inc.

Dayrock Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Adit,

1 Vertical Shaft

MINING PLAN: Vein Mining; Cut and Fill

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Idaho

OWNER: Day Mines Inc.

Tamarack Mine

COUNTRY ROCK TYPE:

DEPTH:

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN: Vein Mining

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Shoshone

PRESENT SERVICE: Inactive

MINERAL MINED: Lead, Silver and Zir

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING: 1974

COUNTY: Shoshôhe

PRESENT SERVICE: Developing

MINERAL MINED: Lead, Silver and Zin.

VOLUME OF MINE:

WATER PRODUCTION:

STATE: Idaho

COUNTY: Shoshone

OWNER: Hecla Mining Co.

Consolidated Silver Project

COUNTRY ROCK TYPE: Crystalline

PRESENT SERVICE: Inactive

MINERAL MINED: Silver, Copper,

Antimony, Lead and Gold VOLUME OF MINE: 1,600,000 cu. ft.

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN: 2 Shafts and 1 Tunnel

FIRST MINING:

GENERAL DESCRIPTION:

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Idaho

COUNTY: Shoshone

OWNER: Hecla Mining Co.

Lucky Friday Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH: 4,650 ft.

PRESENT SERVICE: Active

MINERAL MINED: Silver, Lead, Zinc,

Copper, Gold and Cadmium

VOLUME OF MINE: 6,000,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Shafts and 1 Tunnel

MINING PLAN: Vein Mining

WATER PRODUCTION: Moderate (325 gi

FIRST MINING: 1950 LAST MINING:

STATE: Idaho

COUNTY: Shoshone

OWNER: Hecla Mining Co.

Star Unit

COUNTRY ROCK TYPE:

PRESENT SERVICE: Active

MINERAL MINED: Zinc, Lead and Sil-

VOLUME OF MINE: 9,346,000 cu. ft.

DEPTH:

ENTRIES (TYPE & NUMBER) 5 Shafts and 1 Tunnel

MINING PLAN: Vein Mining, Cut and Fill

WATER PRODUCTION:

FIRST MINING: 1940

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Idaho

DEPTH: 7,000 ft.

COUNTY: Shoshone

OWNER: Sunshine Mining Co.

Sunshine Mine

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Silver, Copper,

PRESENT SERVICE: Active

Antimony and Lead

VOLUME OF MINE: 7,100,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Shafts, 1 Tunnel,

and 1 Adit

MINING PLAN: Vein Mining; Cut and Fill

WATER PRODUCTION: Moderate

FIRST MINING: 1884

LAST MINING:

STATE: : Idaho

COUNTY: Washington

OWNER: El Paso Mining & Milling Co.

PRESENT SERVICE: Inactive

Weiser Plant COUNTRY ROCK TYPE:

MINERAL MINED:

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER)

WATER PRODUCTION:

MINING PLAN:

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Illinois

DEPTH:

OWNER: Illinois Minerals Co. PRESENT SERVICE; Active

COUNTRY ROCK TYPE: Sedimentary

ENTRIES (TYPE & NUMBER) 1 Tunnel

MINING PLAN: Room and Pillar

FIRST MINING: 1967

WATER PRODUCTION:

COUNTY: Alexander

MINERAL MINED: Amorphous Silica

VOLUME OF MINE: 1,700,000 cu. ft.

LAST MINING:

STATE: Illinois

COUNTY: Douglas

OWNER: U.S. Industrial Chemicals

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 361 ft.

VOLUME OF MINE: 842,000 and 4,847,

cu. ft.

ENTRIES (TYPE & NUMBER) 1 Conventional Shaft,

3 Drilled Shafts. (Conventional for small cavern, drilled for large cavern)

MINING PLAN: Room and Pillar

WATER PRODUCTION: Very Slight

FIRST MINING: 1954

LAST MINING: 1964

GENERAL DESCRIPTION: Two caverns for the storage of propane were constructed at this site. The first cavern was constructed from the conventional shaft with rooms 25 ft. wide and 20 ft. high. Pillars are 325 ft. long and 45 ft. wide. The second cavern has rooms 20 ft. wide and 22 ft. high with 45 ft. square pillars. The caverns have operated satisfactorily.

MINE SUMMARY DATA

STATE: Illinois

COUNTY: DuPage

OWNER: Wilbros Terminals Inc.

PRESENT SERVICE: Abandoned

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 207 ft.

VOLUME OF MINE: 280,000 cu, ft.

ENTRIES (TYPE & NUMBER) 1 Conventional Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Not 1

FIRST MINING: 1952

LAST MINING: 1953

GENERAL DESCRIPTION: Cavern rooms are 15 ft. wide and 25 ft. high with pillars 45 ft. square. The original design of this cavern provided no satisfactory means of pumping product and required flashing the product to cause it to flow to the surface where it then was recondensed. The small volume coupled with the removal problems led to the filling of the cavern with water and abandonment.

STATE: Illinois

COUNTY: Grundy

OWNER: Hydrocarbon Transportation

PRESENT SERVICE: Ethane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 1,820

VOLUME OF MINE: 842,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1971

LAST MINING: 1971

GENERAL DESCRIPTION: The rooms in this cavern are 12 ft. wide and 12 ft. high with 60 ft. square pillars. Roof control is with grouted roof bolts, mesh and straps across the roof and down the pillars. The cavern operates satisfactorily.

MINE SUMMARY DATA

STATE: Illinois

COUNTY: Hardin

OWNER: Minerval Mines

PRESENT SERVICE: Active

Deardorff/North Victory Mine

MINERAL MINED: Fluorspar

COUNTRY ROCK TYPE: Limestone

VOLUME OF MINE: 1,700,000 cu. ft.

DEPTH: 700 ft.

ENTRIES (TYPE & NUMBER) Adit
MINING PLAN: Room and Pillar

WATER PRODUCTION: Moderate

FIRST MINING: 1971

LAST MINING:

STATE: Illinois

OWNER: Allied Chemical Corp.

Minerva Mines

COUNTRY ROCK TYPE: Limestone

DEPTH:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1944

GENERAL DESCRIPTION:

COUNTY: Hardin

PRESENT SERVICE: Active

MINERAL MINED: Fluorspar, Zine and

Barite

VOLUME OF MINE:

WATER PRODUCTION: Moderate

LAST MINING:

MINE SUMMARY DATA

STATE: Illinois

OWNER: Allied Chemical Corp.

Minerva Mines-Spivey

COUNTRY ROCK TYPE: Limestone

DEPTH:

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Vein Mining

FIRST MINING: 1975

GENERAL DESCRIPTION:

COUNTY: Hardin

PRESENT SERVICE : Active

MINERAL MINED: Fluorspar, Zine, and

Lead

VOLUME OF MINE: 552,000 cu. ft.

WATER PRODUCTION: Moderate

STATE: Illinois

OWNER: Minerval Mines

Minerva Mine No. 1

COUNTRY ROCK TYPE: Limestone

DEPTH:

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1944

GENERAL DESCRIPTION:

COUNTY: Hardin

PRESENT SERVICE: Active

MINERAL MINED: Fluorspar and Zinc

VOLUME OF MINE: 9,000,000 cu. ft.

WATER PRODUCTION: Moderate

LAST MINING:

MINE SUMMARY DATA

STATE: Illinois

OWNER: Minerval Mines

Victory Mine

COUNTRY ROCK TYPE: Limestone

DEPTH:

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Hardin

PRESENT SERVICE: Inactive

MINERAL MINED: Fluorspar

VOLUME OF MINE:

WATER PRODUCTION: Moderate

STATÉ: Illinois

COUNTY: Hardin

OWNER: Ozark-Mahoning Co.

PRESENT SERVICE: Active

Johnson Works

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Fluorspar, Zinc, and

DEPTH: 700 ft.

VOLUME OF MINE: 9,000,000 cm. ft.

ENTRIES (TYPE & NUMBER) 10 shafts

MINING PLAN: Room and Pillar; Vein

WATER PRODUCTION: Moderate

FIRST MINING: 1937

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Illinois

COUNTY: Kankakee

OWNER: Phillips Petroleum Co.

PRESENT SERVICE: Butane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shalle

DEPTH: 206 ft. VOLUME OF MINE: 1,459,000 cu. tt.

ENTRIES (TYPE & NUMBER) 1 Conventional Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: High

FIRST MINING: 1952

LAST MINING: 1953

GENERAL DESCRIPTION: This was one of the earliest caverns constructed and it has inadequate hydrostatic pressure for propane storage. After 18 years of operation a major breakthrough of water occured, probably associated with a roof fall. The cavern was operated as a refrigerated cavern for a time and then abandoned. The cavern has since been returned to service for butane storage.

STATE: Illinois

COUNTY: Madison

OWNER: Continental Oil Company

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 350 ft.

VOLUME OF MINE: 561,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1961

LAST MINING: 1962

GENERAL DESCRIPTION: Room width is 25 ft. and height 35 ft. Pillars are 40 ft. square. No problems were encountered in the construction of this cavern and it has operated satisfactorily.

MINE SUMMARY DATA

STATE: Illinois

COUNTY: Madison

OWNER: Shell Oil Company

PRESENT SERVICE: Petroleum Product

Storage

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 400 ft.

VOLUME OF MINE: 1,459,000 &

2,917,000 cu. ft.

ENTRIES (TYPE & NUMBER) 3 Drilled Shafts (2 for large cavern, 1 for small caverns)

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1960

LAST MINING: 1961

GENERAL DESCRIPTION: Two caverns were constructed at this site. Rooms are 20 ft. wide and 35 ft. high. Pillars are 40 ft. square. The caverns operate satisfactorily.

STATE: Illinois

COUNTY: Madison

OWNER: Tuloma Gas Products

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 310 ft.

VOLUME OF MINE: 1,346,000 cu. Et.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1961

LAST MINING: 1961

GENERAL DESCRIPTION: Rooms are 35 ft. high and 25 ft. wide with 40 ft. square

pillars. The cavern has operated satisfactorily.

MINE SUMMARY DATA

STATE: Illinois

COUNTY: Peoria

OWNER: Mapco Inc.

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 295 ft.

VOLUME OF MINE: 2,444,000 cus ft.

ENTRIES (TYPE & NUMBER) 1 Conventional Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: NII

FIRST MINING: 1965

LAST MINING: 1965

GENERAL DESCRIPTION: Rooms are 20 ft. wide and 20 ft. high with 45 ft. square pillars. The shale exhibited some air slaking tendencies but no serious construction problems were encountered. The cavern has operated satisfactorily since its completion.

STATE: Illinois

COUNTY: Pope

OWNER: Minerval Mines

Gaskins Mine

COUNTRY ROCK TYPE: Limestone

PRESENT SERVICE: Active

MINERAL MINED:

Fluorspar

DEPTH:

VOLUME OF MINE: 1,700,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Vein Mining

WATER PRODUCTION: Moderate

FIRST MINING: 1969

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Illinois

COUNTY: White

OWNER: Gulf Oil Corporation (Warren Petroleum

PRESENT SERVICE: Propane Storage

Division)

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 229 ft.

VOLUME OF MINE: 280,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Conventional Shaft.

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1952

LAST MINING: 1953

GENERAL DESCRIPTION: Rooms are 15 ft. wide and 20 ft. high with 45 ft. square pillars. This cavern has operated satisfactorily even though it is in an active seismic area. In 1968 a tremor which did considerable damage to oil and gas wells in the area did not adversely affect the cavern.

STATE: Illinois

COUNTY: Will .

OWNER: Hydrocarbon Transportation Inc.

PRESENT SERVICE: Petroleum Product

Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 325 ft.

VOLUME OF MINE: 3 caverns of

1,402,000 cu. ft. each

ENTRIES (TYPE & NUMBER) 3 Drilled Shafts

(one each cavern)

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1966

LAST MINING: 1967

GENERAL DESCRIPTION: Three caverns were mined simultaneously for different products at this site. Rooms are 16 ft. wide and 25 ft. high with 44 ft. square pillars. The shale was subject to air slaking and excess ventilation was provided to control this. The caverns operate to the owner's satisfaction.

MINE SUMMARY DATA

STATE: Illinois

COUNTY: Will

OWNER: Texas Eastern Transmission Co.

PRESENT SERVICE: Petroleum Product

Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 490 ft.

VOLUME OF MINE: 1,122,000 and

645,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Drilled Shafts

(one each cavern)

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1971

LAST MINING: 1972

GENERAL DESCRIPTION: Two caverns were constructed for product storage at this site. Rooms are 18 ft. wide and 25 ft. high with 45 ft. square pillars.

The cavern operation has been satisfactory.

STATE: Indiana

COUNTY: Gibson

OWNER: Texas Eastern Transmission Co.

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 448 ft.

VOLUME OF MINE: 982,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

LAST MINING: 1961

FIRST MINING: 1961

GENERAL DESCRIPTION: Rooms are 22 ft. high and 15 ft. wide. Pillars are 45 ft. square. No construction problems were encountered and the cavern's operation

has been satisfactory.

MINE SUMMARY DATA

STATE: Indiana

COUNTY: Huntington

OWNER: Continental Oil Co.

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 455 ft.

VOLUME OF MINE: 1,222,000

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Slight

FIRST MINING: 1966

LAST MINING: 1966

GENERAL DESCRIPTION: Rooms are 15 ft. wide and 20 ft. high with pillars 45 ft. square. A number of very small water inflows were encountered during mining which totaled about 1 gallon per minute. The cavern operation has been satisfactory.

STATE: Indiana COUNTY: Jackson

OWNER: Texas Eastern Transmission Co. PRESENT SERVICE: Petroleum Product

Storage

COUNTRY ROCK TYPE: Shale MINERAL MINED: Shale

DEPTH: 420 ft. VOLUME OF MINE:1,262,000 cu. ft. a

2,384,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Drilled Shafts

(one each cavern)

MINING PLAN: Room and Pillar WATER PRODUCTION: Very Slight

FIRST MINING: 1975 LAST MINING: 1975

GENERAL DESCRIPTION: These caverns were completed specifically for product

storage and they are operating satisfactorily.

MINE SUMMARY DATA

STATE: Indiana COUNTY: Lake

OWNER: Continental Oil Co. PRESENT SERVICE: None

COUNTRY ROCK TYPE: Limestone MINERAL MINED: Limestone

DCPTN: 340 ft. VOLUME OF MINE: 2,020/000 εμε ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar WATER PRODUCTION: High

FIRST MINING: 1966 LAST MINING: 1967

GENERAL DESCRIPTION: This cavern is in direct communication with the surface water table through joints and solution channels. Extensive efforts to control the water flows and insure the integrity of the cavern led to 4 failures of the cavern to pass an air acceptance test. The cavern was then abandoned. No indications of the jointing and solution channels were found in 6 core holds drilled.

STATE: Indiana

COUNTY: Lake

OWNER: Continental Oil Company

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 600 ft.

VOLUME OF MINE: 2,020,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1969

LAST MINING: 1970

GENERAL DESCRIPTION: This cavern was constructed as a replacement for a previous cavern which failed its acceptance tests. Rooms are 16 ft. wide and 20 ft. high with 45 ft. square pillars. The cavern has operated satisfactorily.

MINE SUMMARY DATA

STATE: Indiana

COUNTY: Martin

OWNER: National Gypsum Co.

PRESENT SERVICE: Active

Shoals Mine

MINERAL MINED: Gypsum

COUNTRY ROCK TYPE: Limestone

VOLUME OF MINE: 22,500,000 cu. ft.

DEPTH: 350 ft.

ENTRIES (TYPE & NUMBER) 3 shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: Slight

FIRST MINING: 1957

LAST MINING:

GENERAL DESCRIPTION: A high volume aquifer is just above this mine and it has been flooded more than once when a wild shot broke into the aquifer.

STATE: Indiana

COUNTY: Martin

OWNER: United States Gypsum

PRESENT SERVICE: Active

Shoals Mine

.

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Gypsum

DEPTH: 350 ft.

VOLUME OF MINE: 9,000,000 cu. (£).

ENTRIES (TYPE & NUMBER) 3 shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: Slight

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION: A high volume aquifer lies just above this mine. The mine has been flooded more than once when wild shots broke into the aquifer.

MINE SUMMARY DATA

STATE: Iowa

DEPTH:

COUNTY: Des Moines

OWNER: United States Gypsum Co.

PRESENT SERVICE: Active

Sperry Mine

MINERAL MINED: Gypsum

COUNTRY ROCK TYPE: Limestone

VOLUME OF MINE: 9,000,000 54. Ft.

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

STATE: Iowa

COUNTY: Johnson

OWNER: Mapco Inc.

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 469 ft.

VOLUME OF MINE: 2,244,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Drilled Shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1963

LAST MINING: 1963

GENERAL DESCRIPTION: Rooms are 20 ft. wide and 25 ft. high with 45 ft. square

pillars. Construction and operation of this cavern has been ideal.

MINE SUMMARY DATA

STATE: Iowa

COUNTY: Johnson

OWNER: Mapco Inc.

PRESENT SERVICE: Petroleum Product

Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 725 ft.

VOLUME OF MINE: 1,234,000

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1966

LAST MINING: 1967

GENERAL DESCRIPTION: This cavern stores a propane-ethane mixture for a petrochemical plant feedstock. Rooms are 25 ft. high and 20 ft. wide with 45 ft. square pillars. Because of the depth and loading the roof fell to a natural arch but this created no problems. The cavern operates satisfactorily.

STATE: Iowa

COUNTY: Polk

OWNER: Hydrocarbon Transportation, Inc.

PRESENT SERVICE: Petroleum Product

Storage

COUNTRY ROCK TYPE: Shale

MINING PLAN: Room and Pillar

MINERAL MINED: Shale

DEPTH: 575 ft.

VOLUME OF MINE: 337,000 and

1,010,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Drilled Shafts

(one for each cavern)

WATER PRODUCTION: Nil

FIRST MINING: 1967

LAST MINING: 1967

GENERAL DESCRIPTION: Two caverns were constructed at this site for the storage of butane and propane. The smaller cavern is for butane. Rooms are 20 ft. wide, 25 ft. high and pillars are 45 ft. square. No construction problems were encountered and operations have been satisfactory.

MINE SUMMARY DATA

STATE: Iowa

COUNTY: Polk

OWNER: Hydrocarbon Transportation Inc.

PRESENT SERVICE: Ethane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 1,385 ft.

VOLUME OF MINE: 561,000 EN: Ft:

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1970

LAST MINING: 1970

GENERAL DESCRIPTION: This was the first ethane storage cavern. The considerable depth is required by the high vapor pressure of ethane. Rooms are 30 ft. high, 15 ft. wide and pillars are 60 ft. square. No problems were encountered during mining nor have there been any during operation.

STATE: Kansas

OWNER: Independent Salt Co.

Kanopolis Mine

COUNTRY ROCK TYPE: Evaporite

DEPTH: 830 ft.

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1913

GENERAL DESCRIPTION:

COUNTY: Ellsworth

PRESENT SERVICE: Active

MINERAL MINED: Salt

VOLUME OF MINE: 9,000,000 cu. ft.

WATER PRODUCTION: Nil

LAST MINING:

MINE SUMMARY DATA

STATE: Kansas

OWNER: Georgia-Pacific Corp.

Blue Rapids Mine

COUNTRY ROCK TYPE: Limestone

DEPTH:

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Marshall

PRESENT SERVICE: Active

MINERAL MINED: Gypsum

VOLUME OF MINE: 9,000,000 cu. ft.

WATER PRODUCTION:

STATE: Kansas

COUNTY: Reno

OWNER: Interpace Corp.

PRESENT SERVICE: Active

Carey Salt Hutchinson Mine COUNTRY ROCK TYPE: Evaporite

MINERAL MINED: Salt

DEPTH: 600 ft.

VOLUME OF MINE: 9,000,000

ENTRIES (TYPE & NUMBER) 1 shaft

WATER PRODUCTION: Nil

MINING PLAN: Room and Pillar

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Kansas

COUNTY: Rice

OWNER: American Salt Co.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Evaporites

MINERAL MINED Salt

DEPTH: 1,010 ft.

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

STATE: Kansas

OWNER: Interpace Corp.

Carey Salt Lyons Mine

COUNTRY ROCK TYPE: Evaporites

DEPTH: 1,000 ft.

ENTRIES (TYPE & NUMBER) 1 shaft

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Rice.

PRESENT SERVICE: Storage

MINERAL MINED: Salt

....

VOLUME OF MINE:

WATER PRODUCTION: Nil

LAST MINING:

MINE SUMMARY DATA

STATE: Kentucky

OWNER: Minerva Mines

Keystone Mine

COUNTRY ROCK TYPE: Limestone

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN: Vein Mining

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Crittenden

PRESENT SERVICE: Active

MINERAL MINED: Fluorspar

VOLUME OF MINE: 1,600,000 cu. ft.

WATER PRODUCTION: Moderate

STATE: Kentucky COUNTY. Fayette

OWNER: Mullins Mine PRESENT SERVICE: Inactive

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 300 ft. VOLUME OF MINE: 31,500,000 cu. ft.

ENTRIES (TYPE & NUMBER) 3 Drifts

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING:

LAST MINING!

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Kentucky

COUNTY: Greenup

OWNER: Columbia Hydrocarbon Corp.

PRESENT SERVICE: Propane Service

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 380 ft.

VOLUME OF MINE: 1,178,000 and

477,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Drilled Shafts

(one each cavern)

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1958

LAST MINING: 1959

GENERAL DESCRIPTION: Two caverns were constructed at this site with room widths of 15 ft and height 25 ft. Pillars are 35 ft. square. These caverns have operated to the owners' satisfaction since completion.

STATE: Kentucky

COUNTY: Kenton

OWNER: Union Light, Heat & Power Co.

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 380 ft.

VOLUME OF MINE: 982,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1960

LAST MINING: 1961

GENERAL DESCRIPTION: This cavern interval is located between the second and third bentonite zones of the Black River Limestone. These bentonites are uniform over hundreds of square miles and provide ideal isolation from vertical fluid movement while the structural strength of the limestone is available for mining. Rooms are 30 ft. wide and 30 ft. high. Pillars are 40 ft. square. This cavern has operated without problems.

MINE SUMMARY DATA

STATE: Kentucky

DEPTH:

COUNTY: Livingston

OWNER: Cerro Spar Corp.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Fluorspar, Zinc and

Lead

.

VOLUME OF MINE: 1,210,000 cu. ft.

ENTRIES (TYPE & NUMBER) Vertical Shaft

MINING PLAN: Shrinkage

WATER PRODUCTION: Moderate

FIRST MINING: 1974

LAST MINING:

STATE: Kentucky

COUNTY: Marshall

OWNER: B. F. Goodrich Company

PRESENT SERVICE: Petroleum Product

Storage

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 385 ft.

VOLUME OF MINE: 1,543,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1962

LAST MINING: 1963

GENERAL DESCRIPTION: Room height is 35 ft. and the width is 25 ft. Pillars are 40 ft. square. No mining problems were encountered during mining or subsequent operation of the cavern.

MINE SUMMARY DATA

STATE: Louisiana

COUNTY: Iberia

OWNER: Diamond Crystal Salt Co.

PRESENT SERVICE: Active

Jefferson Island Mine
COUNTRY ROCK TYPE: Evaporite

MINERAL MINED: Salt

DEPTH: 740 ft.

VOLUME OF MINE: 165,000,000 cu. ft

ENTRIES (TYPE & NUMBER) 2 shafts

WATER PRODUCTION: Nil

MINING PLAN: Room and Pillar

LAST MINING:

FIRST MINING: 1920

STATE: Louisiana

OWNER: International Salt Co.

Avery Island Mine

COUNTRY ROCK TYPE: Evaporite

DEPTH: 500 ft.

ENTRIES (TYPE & NUMBER) 3 shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1867

GENERAL DESCRIPTION:

COUNTY: Iberia

PRESENT SERVICE: Active

MINERAL MINED: Salt

VOLUME OF MINE: 165,000,000 cu. f

WATER PRODUCTION: Nil

LAST MINING:

MINE SUMMARY DATA

STATE: Louisiana

OWNER: Morton Norwich Products Inc.

New Iberia Mine

COUNTRY ROCK TYPE: Evaporite

DEPTH: 700 ft.

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1901

GENERAL DESCRIPTION:

COUNTY: iberia

PRESENT SERVICE: Active

MINERAL MINED: Salt

VOLUME OF MINE: 165,000 cu. ft.

WATER PRODUCTION: Nil

STATE: Louisiana

OWNER: Cargill Inc.

Bell Isle Mine

COUNTRY ROCK TYPE: Evaporite

DEPTH:

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1963

GENERAL DESCRIPTION:

COUNTY: St. Mary

PRESENT SERVICE: Active

MINERAL MINED: Salt

VOLUME OF MINE: 42,600,000 cu. ft.

WATER PRODUCTION: Nil

LAST MINING:

MINE SUMMARY DATA

STATE: Maine

Kerramerican Inc.

Blue Hill Mine

COUNTRY ROCK TYPE:

DERIH:

ENTRIES (TYPE & NUMBER) 1 shaft, 1 adit

MINING PLAN: Open stoping; Room and Pillar

FIRST MINING: 1972

GENERAL DESCRIPTION:

COUNTY: Hançock

PRESENT SERVICE: Developing

MINERAL MINED: Zinc and copper

VOLUME OF MINE: 6,336,888 ch.

WATER PRODUCTION:

STATE: Maryland

COUNTY: Baltimore

OWNER: Baltimore Gas & Electric

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Crystalline Granite

MINERAL MINED: Granite

DEPTH: 350 ft.

VOLUME OF MINE: 842,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Small Inflow

FIRST MINING: 1961

LAST MINING: 1962

GENERAL DESCRIPTION: Rooms are 25 ft. wide and 40 ft. high. Pillars are 40 ft. square. The cavern serves as a peak shaving gas supply.

MINE SUMMARY DATA

STATE: Michigan

COUNTY: Iron

OWNER: Inland Steel Co.

PRESENT SERVICE: Active

Sherwood Mine

MINERAL MINED: Iron Ore

COUNTRY ROCK TYPE:

VOLUME OF MINE: 8,335,000

DEPTH:

ENTRIES (TYPE & NUMBER) 1 shaft

MINING PLAN: Sub Leval Caving

WATER PRODUCTION:

FIRST MINING: 1941

LAST MINING:

STATE: Michigan

COUNTY: Kent'

OWNER: Georgia-Pacific Corp.

PRESENT SERVICE: Active

Grand Rapids Mine

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Gypsum

DEPTH: 340 ft.

VOLUME OF MINE: 9,000,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: Moderate

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION: Numerous small water inflow points exist where solution channels in the overlying limestone communicate with the glacial aquifers near the surface.

MINE SUMMARY DATA

STATE: Michigan

COUNTY: Kent

OWNER: Grand Rapids Gypsum Co.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Gypsum

DEPTH: 340 ft.

VOLUME OF MINE: 1,600,000 gg. ft.

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING: Before 1865

LAST MINING:

Numerous small inflows of water originating in the GENERAL DESERIPTION: surface glacial deposits and flowing through solution channels in the intervening limestone.

STATE: Michigan

COUNTY: Marquette

OWNER: The Negaunee Mine Co.

PRESENT SERVICE: Active

Mather Mine

COUNTRY ROCK TYPE:

MINERAL MINED: Iron Ore

DEPTH:

VOLUME OF MINE: 16,500,000 cu. ft

ENTRIES (TYPE & NUMBER)

WATER PRODUCTION:

MINING PLAN: Block Caving

LAST MINING:

FIRST MINING: 1943

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Michigan

COUNTY: Ontonagon

OWNER: White Pine Copper Co.

PRESENT SERVICE: Inactive

COUNTRY ROCK TYPE: Sedimentary

MINERAL MINED: Copper and Silver

DEPTH: 1,760 ft.

VOLUME OF MINE: 270,000,000 cu. ft

ENTRIES (TYPE & NUMBER) 3 shafts, 1 adit

MINING PLAN: Room and Pillar

WATER PRODUCTION: Moderate

FIRST MINING: 1953

LAST MINING: 1976

GENERAL DESCRIPTION: Mine shut down in 1976 due to depressed copper market.

STATE: Michigan

COUNTY: Wayne

OWNER: International Salt Co.

PRESENT SERVICE: Active

Detroit Mine

MINERAL MINED: Salt

EQUIP Detroit Mine COUNTRY ROCK TYPE: Evaporite

ឯកក្នុក DEPTH: 1,180 ft.

VOLUME OF MINE: 16,500,000

문자유리 ENTRIES (TYPE & NUMBER) 2 shafts

WATER PRODUCTION: Nil

MINING PLAN: Room and Pillar FIRST MINING: 1910

LAST MINING:

유럽 등을 수 GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Minnesota

COUNTY: Itascå

OWNER: Cleveland-Cliffs Iron Co.

PRESENT SERVICE: ACTIVE

COUNTRY ROCK TYPE:

MINERAL MINED: Iron ore

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

WATER PRODUCTION:

FIRST MINING: 1932

LAST MINING:

GENERAL DESCRIPTION: This mine is a combined open pit and underground complex.

TATE: Missouri

COUNTY: Iron.

UWNER: Amax

PRESENT SERVICE: Active

Buick Mine COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Lead and Zinc

DEPTH: 1,000 ft.

VOLUME OF MINE: 49,000,000 cu. ft

ENTRIES (TYPE & NUMBER) 1 shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Moderate

FIRST MINING: 1969

LAST MINING:

GENERAL DESCRIPTION: High volume aguifers exist in the section above the mine and they are in communication with each other. Large rates of water production can be anticipated.

MINE SUMMARY DATA

STATE: Missouri

COUNTY: Iron

OWNER: Cominco American Inc.

Magmont Mine

COUNTRY ROCK TYPE: Limestone

PRESENT SERVICE: Active

MINERAL MINED: Lead, Zinc, Copper

and Silver

VOLUME OF MINE: 16,500,000 cu. ft DEPTH: 1,020 ft.

ENTRIES (TYPE & NUMBER) 3 shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: Moderate

FIRST MINING: 1968

LAST MINING:

GENERAL DESCRIPTION: High volume aquifers are in the sections above this mine and they are in communication with each other. Large water inflows can be expected throughout the life of this mine.

STATE: Missouri

COUNTY: Iron.

OWNER: The Hanna Mining Co.

PRESENT SERVICE: Active

Pilot Knob Mine COUNTRY ROCK TYPE:

MINERAL MINED: Iron Ore

DEPTH:

VOLUME OF MINE: 16,500,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Open Stoping; Room and Pillar

WATER PRODUCTION:

FIRST MINING: 1968

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Missouri

DEPTH:

COUNTY: Iron

OWNER: St. Joe Minerals Co.

PRESENT SERVICE: Active

Viburnum

MINERAL MINED: Lead, Zinc, Copper

COUNTRY ROCK TYPE: Limestone

VOLUME OF MINE: 16,500,000 cu. ft.

ENTRIES (TYPE & NUMBER) 3 shafts

Room and Pillar MINING PLAN:

WATER PRODUCTION: Moderate

FIRST MINING: 1960

LAST MINING:

GENERAL DESCRIPTION: High volume aquifers are present in the sections above this mine and they are in communication with one another. Large water inflows can be expected into this mine during its operating life.

STATE: Missouri

COUNTY: Jasper

OWNER: Wilbros Terminals Co.

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 327 ft.

VOLUME OF MINE: 1,234,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1967

LAST MINING: 1967

GENERAL DESCRIPTION: Rooms are 16 ft. high and 20 ft. wide with 45 ft. square pillars. The mining and operation of this cavern has been ideal.

MINE SUMMARY DATA

STATE: Missouri

COUNTY: Lawrence

OWNER: Continental Oil Co.

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 291 ft.

VOLUME OF MINE: 449,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Slight

FIRST MINING: 1964

LAST MINING: 1964

GENERAL DESCRIPTION: Rooms are 16 ft. wide and 20 ft. high with 45 ft. square pillars. A thin sand lense was encountered in one pump sump which has allowed some water inflow into the cavern during its operation. The cavern operates satisfactorily otherwise.

STATE: Missouri

COUNTY: Reynolds

OWNER: Ozark Lead Co.

Rural Branch Mine

COUNTRY ROCK TYPE: Limestone

PRESENT SERVICE: Active

MINERAL MINED: Lead and Zine

DEPTH: 1,250 ft.

VOLUME OF MINE: 16,500,000 cu. ft

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Open Stoping; Room and Pillar

WATER PRODUCTION: Moderate

FIRST MINING: 1968

LAST MINING:

GENERAL DESCRIPTION: High volume aguifers exist in the sections above this mine and they are in communication with each other. Large water inflows can be expected throughout the life of this mine.

MINE SUMMARY DATA

STATE: Missouri

COUNTY: Reynolds

OWNER: St. Joe Minerals

Brushy Creek Mine

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Lead, Zinc and Copt

DEPTH:

VOLUME OF MINE: 16,500,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: Moderate

FIRST MINING: 1973

LAST MINING:

GENERAL DESCRIPTION: High volume aquifers are present in the sections above this mine and they are in communication with each other. Large water inflows can be expected in this mine throughout its life.

STATE: Missouri

COUNTY: Reynolds

OWNER: St. Joe Minerals Corp.

PRESENT SERVICE: Active

Fletcher Mine

COUNTRY ROCK TYPE: Limestone

MINING PLAN: Room and Pillar

MINERAL MINED: Lead, Zinc, Copper

DEPTH:

VOLUME OF MINE: 16,500,000 cu. ft

ENTRIES (TYPE & NUMBER) 2 shafts

WATER PRODUCTION: Moderate

FIRST MINING: 1967

LAST MINING:

GENERAL DESCRIPTION: High volume aquifers are present in the sections above this mine and they are in communication with each other. Large water inflows can be expected during the life of this mine.

MINE SUMMARY DATA

STATE: Missouri

COUNTY: St. Charles

OWNER: Laclede Gas Co.

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Limestone and Shale

MINERAL MINED: Limestone and Shale

interbedded

DEPTH: 383 ft.

VOLUME OF MINE: 4,404,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1971

LAST MINING: 1972

GENERAL DESCRIPTION: This cavern serves the gas company with peak shaving gas. Cavern rooms are 20 ft. wide and 25 ft. high with 40 ft. square pillars. Some pillar spalling was encountered during mining but construction was completed and operation has been satisfactory.

STATE: Missouri

COUNTY: Washington

OWNER: Meramec Mining Co.

Pea Ridge Mine

COUNTRY ROCK TYPE:

PRESENT SERVICE: Active

MINERAL MINED: Iron Ore

VOLUME OF MINE: 79,860,000 cu. ft.

DEPTH: 1,675 ft.

MINING PLAN: Caving; Room and Pillar

ENTRIES (TYPE & NUMBER) 2 shafts

WATER PRODUCTION: Moderate

FIRST MINING: 1964

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Missouri

DEPTH:

COUNTY: Washington

OWNER: St. Joe Minerals Corp.

Indian Creek Mine

COUNTRY ROCK TYPE: Limestone

PRESENT SERVICE: Active

MINERAL MINED: Lead and Copper

VOLUME OF MINE: 22,500,000 ch. Th.

ENTRIES (TYPE & NUMBER) 3 shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: Moderate

FIRST MINING: 1954

LAST MINING:

GENERAL DESCRIPTION: High volume aquifers are present in the sections above this mine and they are in communication with each other. Large water inflows can be expected during the life of this mine.

STATE: Minnesota

COUNTY: Polk .

OWNER: Burmah Oil Company

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Crystalline Metamorphics

MINERAL MINED: Metamorphic

DEPTH: 510 ft.

VOLUME OF MINE: 1,683,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Large Inflows

FIRST MINING: 1961

LAST MINING: 1962

GENERAL DESCRIPTION: Rooms were 30 ft. wide and high with 40 ft. square pillars. The rock was severely jointed and extensive grouting was required to control the water inflow. The cavern operates satisfactorily.

MINE SUMMARY DATA

STATE: Montana

COUNTY: Beaverhead

OWNER: Pfizer, Inc.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Tale

DEPTH:

VOLUME OF MINE: 1,650,000 cu. ft.

ENTRIES (TYPE & NUMBER)

MINING PLAN: Vein Mining

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

STATE: Montana

OWNER: United States Gypsum

Heath Mine

COUNTRY ROCK TYPE:

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Adit

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Fergus

PRESENT SERVICE: Active

MINERAL MINED: Gypsum

VOLUME OF MINE: 1,650,000

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Montana

OWNER: Black Pine Mining Co.

Black Pine Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN: Room and Pillar

FIRST MINING:

SENERAL DESCRIPTION:

COUNTY: Granite

PRESENT SERVICE: ACEIVE

MINERAL MINED: Silver and Gold

VOLUME OF MINE; 1.468,888 88: #5:

WATER PRODUCTION:

STATE: Montana

OWNER: Helena Silver Mines Inc.

Mary Ingabar Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Jefferson

PRESENT SERVICE: Inactive

MINERAL MINED: Gold

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Montana

OWNER: Saphire Village Inc.

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Judith Basin

PRESENT SERVICE: Active

MINERAL MINED: Saphire

VOLUME OF MINE: 1,650,000 cu. ft.

WATER PRODUCTION:

STATE: Montana

OWNER: Asarco, Inc.

Troy Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

EIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Lincoln

PRESENT SERVICE: Developing

MINERAL MINED: Copper, Silver

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Montana

OWNER: Cominco American Inc.

Brock Mine

COUNTRY ROCK TYPE: Sedimentary

DEPTH:

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN: Room and Pillar

FIRST MINING: 1925

GENERAL DESCRIPTION:

COUNTY: Powell

PRESENT SERVIGE: Active

MINERAL MINED: Phosphate Rock

VOLUME OF MINE: 9,000,000 gu; #:

WATER PRODUCTION:

STATE: Montana

OWNER: George A. Relyea Phosphate Mine

COUNTRY ROCK TYPE: Sedimentary

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Powell

PRESENT SERVICE: Inactive

MINERAL MINED: Phosphate Rock

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Montana

OWNER: U. S. Antimony Corp.

Babbit Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Tunnel

MINING PLAN: Open Stoping

FIRST MINING: 1971

GENERAL DESCRIPTION:

COUNTY: Sanders

PRESENT SERVICE: Developing

MINERAL MINED: Antimony

VOLUME OF MINE: 30,000 cu. ft.

WATER PRODUCTION:

STATE: Montana

COUNTY: Silver Bow

OWNER: The Anaconda Company

PRESENT SERVICE: Active

Butte Mine

PRESENT SERVICE. ACCIVE

ČÕUÑTRY ROCK TYPE: Crystalline

MINERAL MINED: Copper, Silver, Gold

DEPTH:

VOLUME OF MINE: 600,000,000 cu. ft

ENTRIES (TYPE & NUMBER) 5 shafts

MINING PLAN: Open Stoping and Vein Mining

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STÄTE: Nebraska

COUNTY: Douglas

OWNER: Metropolitan Utilities District

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 476 ft.

VOLUME OF MINE: 1,402,000 cu: ft:

FNTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Small inflows

FIRST MINING: 1962

LAST MINING: 1963

GENERAL DESCRIPTION: Rooms are 25 ft. high and 25 ft. wide with 40 ft. square pillars. No construction problems were encountered and operation has been satisfactory.

STATE: Nebraska

COUNTY: Douglas

OWNER: Metropolitan Utilities District

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 295 ft.

VOLUME OF MINE: 842,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1960

LAST MINING: 1960

GENERAL DESCRIPTION: This cavern was marginal from the construction standpoint in that the second bench was taken up with rippers rather than by blasting. Pillar spall increased the cavern width from 12 to 15 ft. Height of the rooms is 25 feet. Final pillar width was 50 ft. The cavern has operated satisfactorily but a second cavern failed during construction because of floor heave.

MINE SUMMARY DATA

STATE: Nebraska

COUNTY: Lancaster

OWNER: Mapco Inc.

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 325 ft.

VOLUME OF MINE: 2,444,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Drilled Shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1963

LAST MINING: 1963

GENERAL DESCRIPTION: Rooms are 20 ft. wide, 25 ft. high, and pillars are 45 ft. square. This cavern's construction and operation has been most satisfactory.

STATE: Nevada

OWNER: Sunshine Mining Co.

Sixteen-to-One Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN: Shrinkage Stope

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Esmeralda

PRESENT SERVICE: Inactive

MINERAL MINED: Silver.

VOLUME OF MINE: -

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Nevada

OWNER: Hecla Mining Co.

Ruby Hill Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Adit

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Eureka

PRESENT SERVICE: Inagtive

MINERAL MINED: Silver, Lead, Zinc

VOLUME OF MINE:

WATER PRODUCTION:

STATE: Nevada

OWNER: Apco Oil Corp.

Battle Mountain Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Vein Mining

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Lander

PRESENT SERVICE: Active

MINERAL MINED: Gold and Silver

VOLUME OF MINE: 165,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Nevada

OWNER: Amalgamated Larder Mines Ltd.

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Adit

MINING PLAN: Room and Pillar

FIRST MINING: 1974

GENERAL DESCRIPTION:

COUNTY: Lincoln

PRESENT SERVICE: Inactive

MINERAL MINED: Lead, Zinc, Silver

VOLUME OF MINE: 13,290,000 cu. ft.

WATER PRODUCTION:

STATE: Nevada

COUNTY: Lincoln

OWNER: Union Carbide Corp.

Tempiute Operations

EQUNTRY ROCK TYPE:

PRESENT SERVICE: Developing

MINERAL MINED: Tungsten

DEBIH:

VOLUME OF MINE: 90,000,000 cu. ft.

ENTRIES (TYPE & NUMBER)

MINING PLAN:

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

Mine operates in conjunction with an open pit. GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Nevada

COUNTY: Nye

OWNER: J. Irving Crowell Jr. and Son

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Crystalline

Fluorspar MINERAL MINED;

DERTH:

VOLUME OF MINE :166, QQP gh. ft.

ENTRIES (TYPE & NUMBER) Incline Shaft

MINING PLAN: Open Stoping; Room and Pillar;

Timbered Stopes.

WATER PRODUCTION:

FIRST MINING:

LAST MINING ;

STATE: Nevada

COUNTY: Pershing

OWNER: Tungsten Properties Ltd.

PRESENT SERVICE: Developing

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Tungsten

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 4 Shafts

MINING PLAN: Open Stoping

WATER PRODUCTION:

FIRST MINING: 1974

LAST MINING:

GENERAL DESCRIPTION: Mine operates in conjunction with an open pit.

MINE SUMMARY DATA

STATE: Nevada

COUNTY: Storey

OWNER: Apco Oil Corp.

Gooseberry Mine

COUNTRY ROCK TYPE: Crystalline

PRESENT SERVICE: Developing

MINERAL MINED: Gold and Silver

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 1 shaft

MINING PLAN:

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

STATE: Nevada

COUNTY: Washoe

OWNER: United States Platinum Catalyst Inc.

PRESENT SERVICE: Developing

Mermac Mines

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Gold, Silver,

Platinum and Palladium

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 5 Shafts, 1 Tunnel, 1 Adit

MINING PLAN: Open Stoping

WATER PRODUCTION:

FIRST MINING: 1974

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Ohio

COUNTY: Lawrence

OWNER: Fenix & Scisson, Inc.

PRESENT SERVICE: Inachiva

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 500 ft.

VOLUME OF MINE: 140,000,000 cu. ft

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: Very slight

FIRST MINING: 1913

LAST MINING: 1970

GENERAL DESCRIPTION: This mine is along the Ohio River and is being considered for a possible crude oil storage point by the FEA. The water entry into the mine appears to be principally down the shafts.

STATE: New Jersey

COUNTY: Gloucester

OWNER: E.I. DuPont deNemours Co.

PRESENT SERVICE: Anhydrous Ammonia

Storage

COUNTRY ROCK TYPE: Crystalline Gneiss

MINERAL MINED: Gneiss

DEPTH: 340 ft.

VOLUME OF MINE: 1,010,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1967

LAST MINING: 1968

GENERAL DESCRIPTION: This cavern stores anhydrous ammonia at low temperature and has a unique elastometric seal of the shaft casing to allow dimensional changes in the casing due to temperature without leakage.

MINE SUMMARY DATA

STATE: New Jersey

COUNTY: Suggex

OWNER: New Jersey Zinc Co.

PRESENT SERVICE: Active

Sterling Hill Mine

MINERAL MINED: Zinc, Iron-manganes

COUNTRY ROCK TYPE:

VOLUME OF MINE: 15,000,000 cu. ft

ENTRIES (TYPE & NUMBER) 1 slope, 1 adit

MINING PLAN: Hydraulic Cut and Fill

WATER PRODUCTION:

FIRST MINING:

DEPTH:

LAST MINING:

GENERAL DESCRIPTION: This mine has operated since before the Revolution.

STATE: New Jersey

COUNTY: Union

OWNER: Exxon Corporation

PRESENT SERVICE: Petroleum Product

Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 320 ft.

VOLUME OF MINE: Five caverns of

ENTRIES (TYPE & NUMBER) 5 Drilled Shafts

842,000; 842,000; 561,000; 701,000; and 842,000 cu. ft.

(one each cavern)

,02,000, and 0.2,000

MINING PLAN: Room and Pillar

WATER PRODUCTION: Large

FIRST MINING: 1957

LAST MINING: 1958

GENERAL DESCRIPTION: Host rock is jointed and there has been some evidence of product exchange between caverns. Rooms 15 ft. wide and 18 ft. high.

Pillars 45 ft. square.

MINE SUMMARY DATA

STATE: New Jersey

COUNTY: Warren

OWNER: Halcrest Co., Inc.

PRESENT SERVICE: Developing

Mt. Hope Iron Mine

MINERAL MINED: Magnetite

COUNTRY ROCK TYPE:

DEPTH:

VOLUME OF MINE:

.

ENTRIES (TYPE & NUMBER) 1 Shaft
MINING PLAN: Sub-level Stoping

WATER PRODUCTION:

FIRST MINING: 1975

LAST MINING!

STATE: New Mexico

OWNER: Amax

COUNTRY ROCK TYPE: Evaporite

DEPTH: 1,600 ft.

ENTRIES (TYPE & NUMBER) 2 shafts

MINING PLAN: Open Stoping

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Eddy

PRESENT SERVICE: Active

MINERAL MINED: Potash

VOLUME OF MINE: 150,000,000 cu. f

WATER PRODUCTION: Nil

LAST MINING:

MINE SUMMARY DATA

STATE: New Mexico

OWNER: Duval Corporation

COUNTRY ROCK TYPE: Evaporite

DEPTH: 1,600 ft.

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1952

GENERAL DESCRIPTION:

COUNTY: Eddy

PRESENT SERVICE: Active

MINERAL MINED: Potash

VOLUME OF MINE: 150,000,000 cu. ft

WATER PRODUCTION: Nil

STATE: New Mexico

COUNTY: Eddy

OWNER: Kerr-McGee Industries

Hobbs Potash Mine

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Evaporite

MINERAL MINED: Potash

BERTH: 1,650 ft.

VOLUME OF MINE: 126,000,000 cu. f

ENTRIES (TYPE & NUMBER) 1 Shaft

WATER PRODUCTION: Nil

MINING PLAN: Room and Pillar

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: New Mexico

COUNTY: Eddy

OWNER: Mississippi Chemical Co.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Evaporite

MINERAL MINED: Potash

DERTH; 1,600 ft.

VOLUME OF MINE: 165,888,888 88: \$

ENTRIES (TYPE & NUMBER) 3 Shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

LAST MINING:

FIRST MINING: 1974

STATE: New Mexico

OWNER: National Potash Co.

Eddy Mine

COUNTRY ROCK TYPE: Evaporite

DEPTH: 1,600

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1965

GENERAL DESCRIPTION:

COUNTY: Eddy 4

PRESENT SERVICE: Active

MINERAL MINED: Potash

VOLUME OF MINE: 150,000,000 cu. f

WATER PRODUCTION: Nil

LAST MINING:

MINE SUMMARY DATA

STATE: New Mexico

OWNER: Potash Company of America

COUNTRY ROCK TYPE: Evaporite

DEPTH: 1,600 ft.

ENTRIES (TYPE & NUMBER) 3 Shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1933

GENERAL DESCRIPTION:

COUNTY: Eddy

PRESENT SERVICE: Active

MINERAL MINED: Potash

VOLUME OF MINE: 30,000,000 cu. ft

WATER PRODUCTION:

STATE: New Mexico

OWNER: Asarco Inc.

Ground Hog Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Open Stoping; Room and Piller;

Sand Fill.

EIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Grant

PRESENT SERVICE: Active

MINERAL MINED: Zinc, Lead, Copper

and Silver

VOLUME OF MINE: 4,350,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: New Mexico

OWNER: The Old Ontario Mining Co.

COUNTRY ROCK TYPE: Crystalline

DEPŢĦ:

ENTRIES (TYPE & NUMBER)

MINING PLAN: Vein Mining

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Grant

PRESENT SERVICE: Active

MINERAL MINED: Gold, Silver

VOLUME OF MINE:

WATER PRODUCTION:

STATE: New Mexico

OWNER: U. V. Industries

Continental Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 3 Shafts

MINING PLAN: Open Stoping

FIRST MINING: 1967

GENERAL DESCRIPTION:

COUNTY: Grant

PRESENT SERVICE: Active

MINERAL MINED: Zinc, Copper

VOLUME OF MINE: 30,000,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: New Mexico

OWNER: U. V. Industries

Hanover Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Grant

PRESENT SERVICE: Developing

MINERAL MINED: Lead and Zinc

VOLUME OF MINE:

WATER PRODUCTION:

STATE: New Mexico

ÖWNER: U. V. Industries

Princess Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Grant

PRESENT SERVICE: Inactive

MINERAL MINED: Zin

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: New Mexico

OWNER: Federal Resources Corp.

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Vein Mining

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Hidalgo

PRESENT SERVICE: IHattive

MINERAL MINED! Copper

VOLUME OF MINE: 146/000 bu. ft.

WATER PRODUCTÎON:

STATE: New Mexico

OWNER: National Potash Co.

Lea Mine

COUNTRY ROCK TYPE: Evaporite

DEPTH: 1,600 ft.

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1957

GENERAL DESCRIPTION:

COUNTY: Lea

PRESENT SERVICE: Active

MINERAL MINED: Potash

VOLUME OF MINE: 150,000,000 cu. ft.

WATER PRODUCTION: Nil

LAST MINING:

MINE SUMMARY DATA

STATE: New Mexico

OWNER: San Pedro Mining Corp.

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Shaft

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Valencia

PRESENT SERVICE: Active

MINERAL MINED: Copper, Gold, Silve

VOLUME OF MINE:

WATER PRODUCTION:

STATE: New York

COUNTY: Erie

OWNER: National Gypsum Co.

PRESENT SERVICE: Inactive

Oakfield Mine

MINERAL MINED:

Gypsum

COUNTRY ROCK TYPE: Limestone

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DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 2 Shafts

WATER PRODUCTION:

MINING PLAN: Room and Pillar

LAST MINING:

FIRST MINING: 1927

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: New York

COUNTY: Essex

OWNER: Interpace Corp. Willsboro Mine

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED; Garnet, Wollastonite

VOLUME OF MINE; 1,650,000 cu ft.

ENTRIES (TYPE & NUMBER) 2 Shafts, 1 Adit

MINING PLAN: Open Stoping

WATER PRODUCTION:

FIRST MINING:

DERTH:

LAST MINING:

STATE: New York

COUNTY: Essex.

OWNER: Republic Steel Corp.

PRESENT SERVICE: Inactive

Adirondack Ore Mine

MINERAL MINED: Iron ore

COUNTRY ROCK TYPE:

VOLUME OF MINE:

DEPTH:

ENTRIES (TYPE & NUMBER) 1 Slope

WATER PRODUCTION:

MINING PLAN: Long Hole Blasting

LAST MINING: 1971

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: New York

COUNTY: Genesee

OWNER: United States Gypsum

PRESENT SERVICE: Active

Oakfield Mine

MINERAL MINED: Gypsum

COUNTRY ROCK TYPE: Sedimentary

ENTRIES (TYPE & NUMBER) 5 Shafts

VOLUME OF MINE: 9,000,000 cu. ft.

WATER PRODUCTION:

MINING PLAN: Room and Pillar

LAST MINING:

FIRST MINING:

DEPTH:

STATE: New York

OWNER: International Salt Co.

Retsof Mine

COUNTRY ROCK TYPE: Evaporite

DÉPŤĤ: 1,130 ft.

ENTRIES (TYPE & NUMBER) 5 Shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1885

GENERAL DESCRIPTION:

COUNTY: Livingston

PRESENT SERVICE: Active

MINERAL MINED: Salt

VOLUME OF MINE: 150,000;000 60. f

WATER PRODUCTION: Nil

LAST MINING:

MINE SUMMARY DATA

STATE: New York

OWNER: Gouverneur Talc Co.

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1947

GENERAL DESCRIPTION:

COUNTY: St. Lawrence

PRESENT SERVIĈË: Active

MINERAL MINED: Talc

VOLUME OF MINE: 9,000,000 80: ft.

WATER PRODUCTION:

STATE: New York

OWNER: St. Joe Minerals Co.

Edwards Mine

COUNTRY ROCK TYPE: Metamorphic

DEPTH: 1,700 ft.

ENTRIES (TYPE & NUMBER) 1 Shaft

MINING PLAN: Vein Mining

FIRST MINING: 1915

GENERAL DESCRIPTION:

COUNTY: St. Lawrence

PRESENT SERVICE: Active

MINERAL MINED: Zinc and Lead

VOLUME OF MINE: 3,490,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: New York

OWNER: Cargill Inc.

Cayuqa Mine

COUNTRY ROCK TYPE: Evaporites

DEPTH: 1,200 ft.

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1920

GENERAL DESCRIPTION:

COUNTY: Tompkins

PRESENT SERVICE: Active

MINERAL MINED: Salt

VOLUME OF MINE: 30,000,000 cu. ft.

WATER PRODUCTION: Nil

STATE: New York

OWNER: Morton Norwich Products, Inc.

Seneca Lake Mine

COUNTRY ROCK TYPE: Evaporite

DEPTH:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

FIRST MINING: 1971

GENERAL DESCRIPTION:

COUNTY: Yates

PRESENT SERVICE: Active

MINERAL MINED: Salt

VOLUME OF MINE: 165,000,000 cu. f

WATER PRODUCTION: Nil

LAST MINING:

MINE SUMMARY DATA

STATE: North Carolina

OWNER: Greenback Industries, Inc.

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Avery

PRESENT SERVICE: Active

MINERAL MINED: Magnetite

VOLUME OF MINE: 9,000,000 64: ft.

WATER PRODUCTION:

STATE: North Carolina

COUNTY: Vance

OWNER: Ranchers Exploration and Development Co.

PRESENT SERVICE: Inactive

Ranchers Tungsten Queen Mine

MINERAL MINED: Tungsten

COUNTRY ROCK TYPE: Crystalline

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 1 Shaft, 1 Tunnel

MINING PLAN: Vein Mining

WATER PRODUCTION:

FIRST MINING: 1970

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Ohio

COUNTY: Allen

OWNER: Standard Oil of Ohio

PRESENT SERVICE: Petroleum Product

Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 494 ft.

VOLUME OF MINE: 8,020 and 2,384,0

cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

1 Conventional Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1955

LAST MINING: 1970

GENERAL DESCRIPTION: Two caverns were constructed at this site and each cavern was partitioned into two parts for the storage of two products. The connecting drift in each case was sealed with two bulkheads with the space between being filled with a liquid under pressure of its hydrostatic head. The smaller cavern has the conventional shaft and it has exhibited some leakage. Both caverns have exhibited exchange of product. Rooms are 16 ft. wide and 20 ft. high. Pillars are 45 ft. square. The shale is water sensitive.

STATE: Ohio

COUNTY: Butler

OWNER: Texas Eastern Transmission Co.

PRESENT SERVICE: Petroleum Product

Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 390 ft.

VOLUME OF MINE: Varies from 337,000

to 2,384,000 cu. ft.

ENTRIES (TYPE & NUMBER) 11 Drilled Shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1959

LAST MINING: 1974

GENERAL DESCRIPTION: Nine caverns have been mined at this site over a period of 15 years. Rooms are 16 ft. wide and 20 ft. high. Pillars are 35 ft. square. These caverns have operated satisfactorily with no evidence of product migration between caverns even though there are pressure differences approaching 100 psi and cavern boundaries within 100 ft. of each other.

MINE SUMMARY DATA

STATE: Ohio

COUNTY: Cuyahoga

OWNER: International Salt Co.

PRESENT SERVICE: Active

Cleveland Mine

MINERAL MINED Salt

COUNTRY ROCK TYPE: Evaporite

VOLUME OF MINE: 165,000,000 cu. f.

pepta: 1,300 ft.

.

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION: NET

FIRST MINING: 1961

LAST MINING:

STATE: Ohio

COUNTY: Hamilton

OWNER: Cincinnati Gas & Electric Co.

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 375 ft.

VOLUME OF MINE: 1,122,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1962

LAST MINING: 1963

GENERAL DESCRIPTION: This cavern is located stratigraphically between the second and third bentonites in the Black River Limestone. Rooms are 25 ft. high and 25 ft. wide. Pillars are 40 ft. square. An oil well of previously unknown existance was encountered during mining. The well was cleaned out and replugged without problem. The cavern operates successfully.

MINE SUMMARY DATA

STATE: Ohio

COUNTY: Jefferson

OWNER: Frederick J. Dando Co.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Sedimentary

MINERAL MINED: Clay

DEPTH:

VOLUME OF MINE: 1,500,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING: 1920

LAST MINING:

STATE: Ohio

COUNTY: Lake

OWNER: Morton Norwich Products Co.

Fairport Harbor Mine

ENTRIES (TYPE & NUMBER) 2 Shafts

COUNTRY ROCK TYPE: Evaporite

MINERAL MINED: Salt

PRESENT SERVICE: Active

DEPTH: 1,300 ft.

VOLUME OF MINE: 165,000,000 cu: f

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nif

FIRST MINING: 1959

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Ohio

COUNTY: Lucas

OWNER: Standard Oil of Ohio

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 560 ft.

VOLUME OF MINE: 982,000 Et. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: NIE

FIRST MINING: 1969

LAST MINING: 1970

GENERAL DESCRIPTION: Rooms are 15 ft. wide and 20 ft. high. Pillars are 45 ft. Shale is water sensitive and subject to air slaking. The cavern has operated satisfactorily.

STATE: Ohio

OWNER: United States Gypsum Co.

Gypsum Mine

COUNTRY ROCK TYPE:

DEPTH: 50 - 60 ft.

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Ottawa

PRESENT SERVICE: Active

MINERAL MINED:

VOLUME OF MINE: 9,000,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Ohio

OWNER: Pittsburg Plate Glass Co.

COUNTRY ROCK TYPE: Limestone

DEPTH: 2,200 ft.

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Summit

PRESENT SERVICE: Inactive

MINERAL MINED: Limestone

VOLUME OF MINE: 26,740,000 cu. ft.

WATER PRODUCTION:

STATE: Oklahoma

COUNTY: Cherokee

OWNER: Arkhola Sand & Gravel Co.

#1 Ft. Gibson Mine

COUNTRY ROCK TYPE: Limestone PRESENT SERVICE: Active

MINERAL MINED: Limestone

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) Drift

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Oklahoma

COUNTY: Kay

OWNER: Continental Oil Co.

PRESENT SERVICE: Propage Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 350 ft.

VOLUME OF MINE: 1,683,000 cu.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Slight,

FIRST MINING: 1961

LAST MINING: 1961

GENERAL DESCRIPTION: Rooms are 15 ft. wide and 20 ft. high with 50 ft. square pillars. The Pennsylvanian section in which this cavern is mined has rapid changes in lithology, both vertically and laterally which created some problems in locating the cavern site. Fortunately, the shale quality was uniform in the mining area and the cavern was completed without problems. The cavern operates satisfactorily.

STATE: Oklahoma

COUNTY: Seminole

OWNER: Atlantic Richfield Company

PRESENT SERVICE: Propane Service

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 308 ft.

VOLUME OF MINE: 617,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Conventional Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1954

LAST MINING: 1954

GENERAL DESCRIPTION: This cavern was one of the first mined and both the construction and operation have been satisfactory. The cavern is only one room 15 ft. wide and 24 ft. high around a pillar 100 ft. square.

MINE SUMMARY DATA

STATE: Oklahoma

COUNTY: Tulsa

OWNER: Sun Oil Company

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Shale

MINERAL MINED: Shale

DEPTH: 380 ft.

VOLUME OF MINE: 1,402,000

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Nil

FIRST MINING: 1966

LAST MINING: 1966

GENERAL DESCRIPTION: Some small natural gas flow was experienced around the cemented casing in the shaft and ventilation holes for this cavern. The gas exhausted itself with time. Rooms are 20 ft. high and 15 ft. wide with 45 ft. square pillars. The cavern operates satisfactorily.

STATE: Oregon

OWNER: Holding Mine & Development Co.

COUNTRY ROCK TYPE: Crystalline

DERTH:

ENTRIES (TYPE & NUMBER) Tunnel

MINING PLAN: Vein Mining

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Douglas

PRESENT SERVICE: Developing

MINERAL MINED: Gold

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Pennsylvania

OWNER: Bethlehem Steel Co.

Grace Mine

COUNTRY ROCK TYPE: Sedimentary

DEPTH:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Block Caving

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Berks

PRESENT SERVICE: Active

MINERAL MINED: Iron ore, Copper

VOLUME OF MINE: 92,540,000 cu: ft.

WATER PRODUCTION:

STATE: Pennsylvania

OWNER: West Winfield Mine

COUNTRY ROCK TYPE: Limestone

DEPTH: 300 ft.

ENTRIES (TYPE & NUMBER) 1 Drift

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION: -

COUNTY: Butler

PRESENT SERVICE: Inactive

MINERAL MINED: Limestone

VOLUME OF MINE: 5,100,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Pennsylvania

OWNER : Bell Mine

COUNTRY ROCK TYPE: Limestone

DEPTH: 400 ft.

ENTRIES (TYPE & NUMBER) 1 Shaft

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Centre

PRESENT SERVICE: Inactive

MINERAL MINED: Limestone

VOLUME OF MINE: 182,000,000 cu. ft.

WATER PRODUCTION:

STATE: Pennsylvania

COUNTY: Centre

OWNER: National Gypsum Co.

Bellefonte Mine

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Limestone MINERAL MINED: Limestone

DEPTH: 300 ft.

VOLUME OF MINE: 9,000,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drift, 1 Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING: 1936

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Pennsylvania

COUNTY: Delaware

OWNER: Sun Oil Co.

PRESENT SERVICE: Petroleum Product

COUNTRY ROCK TYPE: Crystalline Gneiss

Storage MINERAL MINED: Gneiss

DEPTH: 250' & 360'

VOLUME OF MINE:1,402;000; 402;000; 2,444,000; 421,000; 11,220,0

ENTRIES (TYPE & NUMBER) 5 Drilled Shafts (one each cavern)

cu. ft.

MINING PLAN: Room and Pillar

WATER PRODUCTION: Small to large inflow

FIRST MINING: 1958

LAST MINING: 1975

GENERAL DESCRIPTION: Five Caverns constructed for product storage of 1,402,000 and 402,000 cu. ft. at higher elevation and caverns of 2,444,000; 421,000 and 11,220,000 cu. ft. were constructed at the lower depth. Room size is 25 ft. wide and 40 ft. high. Pillars are 40 ft. square.

STATE: Pennsylvania

COUNTY: Lehigh

OWNER: New Jersey Zinc Co.

PRESENT SERVICE: Active

Friedensville Mine

MINERAL MINED: Zinc and Ag Lime

COUNTRY ROCK TYPE: Limestone

DEPTH:

VOLUME OF MINE: 22,500,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Shaft, 1 Slope

MINING PLAN: Room and Pillar; Cut and Fill

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Pennsylvania

COUNTY: Montgomery

OWNER: Ammandale Mine

PRESENT SERVICE: Inactive

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 400 ft.

VOLUME OF MINE: 240,000,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Drifts

WATER PRODUCTION:

MINING PLAN: Room and Pillar

LAST MINING:

FIRST MINING:

STATE: Pennsylvania COUNTY: Westmoreland

OWNER: Texas Eastern Transmission Co. PRESENT SERVICE: Propane Storage

GOUNTRY ROCK TYPE: Shale MINERAL MINED: Shale

DEPTH: 340 ft. VOLUME OF MINE: 561,000 and

1,122,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Drilled Shafts

(one each cavern)

MINING PLAN: Room and Pillar WATER PRODUCTION: Nil

FIRST MINING: 1964 LAST MINING: 1973

GENERAL DESCRIPTION: Two caverns were constructed at this site. The first in 1964, the second in 1973. The shale section deteriorated badly in water and also air slaked. Despite this problem the caverns were successfully completed and have operated to the complete satisfaction of the owner.

MINE SUMMARY DATA

STATE: South Carolina COUNTY: York

OWNER: Carolina Pipeline Co. PRESENT SERVICE: Propage Storage

COUNTRY ROCK TYPE: Crystalline Gneiss MINERAL MINED: Gneiss

DEPTH: 400 ft. VOLUME OF MINE: 1,600,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar WATER PRODUCTION: Slight

FIRST MINING: 1974 LAST MINING: 1975

GENERAL DESCRIPTION: This cavern is unusual for a cavern in crystalline rocks because very little jointing was found. This resulted in little grouting

with a small residual water inflow.

STATE: South Dakota

COUNTY: Lawrence

OWNER: Homestake Mining Co.

Black Hills Operation

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Gold

WATER PRODUCTION:

PRESENT SERVICE: Active

DEPTH: Multilevel, lowest below 9,000 ft.

VOLUME OF MINE: 44,200,000 cu. ft

Moderate

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Cut and Fill; Timbered Stopes;

Shrinkage Stopes

FIRST MINING: 1876

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATÉ: Tennessee

OWNER: Asarco Inc.

Immel Mine

COUNTRY ROCK TYPE: Limestone

DEPTH: 1,660 ft.

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar; Open Stoping

FIRST MINING: 1968

GENERAL DESCRIPTION:

COUNTY: Granger

PRESENT SERVICE: Active

MINERAL MINED: Zinc

VOLUME OF MINE:

WATER PRODUCTION: Moderate

STATE: Tennessee

COUNTY: Jefferson

OWNER:

Asarco

PRESENT SERVICE: Developing

OWNER.

Coy Mine

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Zinc

DEPTH: 1,000 ft.

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar; Open Stoping

WATER PRODUCTION: Moderate

FIRST MINING: 1970

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Tennessee

COUNTY: Jefferson

OWNER: Asarco, Inc.

New Market Mine

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Zinc; Ag Lime

DEPTH: 1,400 ft.

VOLUME OF MINE: 22,500,000 04. Ît.

ENTRIES (TYPE & NUMBER) 1 Shaft

MINING PLAN: Room and Pillar; Shrinkage Stoping

WATER PRODUCTION:

FIRST MINING: 1963

LAST MINING:

STATE: Tennessee

COUNTY: Jefferson

OWNER: Asarco Inc.

Young Mine

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Zinc

DEPTH: 925 ft.

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Room and Pillar; Open Stoping

WATER PRODUCTION: Moderate

FIRST MINING: 1955

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Tennessee

COUNTY: Jefferson

OWNER: New Jersey Zinc Co. Jefferson City Mine PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Limestone MINERAL MINED: Zinc, Ag Lime

DEPTH: Below 1,000 ft.

VOLUME OF MINE: 22,500,000 cu. ft

ENTRIES (TYPE & NUMBER) 1 Shaft

WATER PRODUCTION:

MINING PLAN: Room and Pillar

LAST MINING:

FIRST MINING:

STATE: Tennessee

COUNTY: Jefferson

OWNER: United States Steel Corp.

PRESENT SERVICE: Active

Zinc Mine

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Zinc

DEPTH: 300 ft.

VOLUME OF MINE: 9,000,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Incline and 2 Shafts

MINING PLAN:

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Tennessee

COUNTY: Knox

OWNER: Asarco, Inc.

PRESENT SERVICE: Active

Mascot Mine COUNTRY ROCK TYPE: Limestone

MINERAL MINED:

DEPTH: Below 1,000 ft.

VOLUME OF MINE: 25,500,000 SH. FF

ENTRIES (TYPE & NUMBER) 4 Shafts

MINING PLAN: Open Stoping; Room and Pillar

WATER PRODUCTION:

FIRST MINING:

LAST MINING;

STATE: Tennessee

COUNTY: Maury

OWNER: Signal Mountain Mine

PRESENT SERVICE: Inactive

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 1,000 ft.

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) 4 Drifts

WATER PRODUCTION:

MINING PLAN: Room and Pillar

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Tennessee

COUNTY: Polk

OWNER: Cities Service Co.
Copperhill Mine

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Limestone

ENTRIES (TYPE & NUMBER) 5 Shafts

MINERAL MINED: Zinc, Copper, Iron

DEPTH: Below 1,000 ft.

VOLUME OF MINE: 48,000,000 cu. ft

MINING PLAN: Open Stoping

WATER PRODUCTION:

FIRST MINING: 1899

LAST MINING:

STATE: Tennessee

COUNTY: Smith

OWNER: New Jersey Zinc Co.

Elmwood Mine

COUNTRY ROCK TYPE: Limestone

PRESENT SERVICE: Developing

MINERAL MINED: Zinc and Ag Lime

VOLUME OF MINE:

DEPTH: Below 1,000 ft.

ENTRIES (TYPE & NUMBER) 2 Shafts

Open Stoping MINING PLAN:

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Texas

OWNER: Gulf Oil Corporation

(Warren Petroleum Division)

COUNTRY ROCK TYPE: Shale

DEPTH: 250 ft.

COUNTY: Stephens

PRESENT SERVICE: Low Pressure

Natural Gas

112,000 and 168,000 cu. ft.

MINERAL MINED: Shale

VOLUME OF MINE;

ENTRIES (TYPE & NUMBER) 2 Conventional Shafts

(one each cavern)

MINING PLAN: Room and Pillar

WATER PRODUCTION: Small Inflow

FIRST MINING: 1950

LAST MINING: 1952

GENERAL DESCRIPTION: These caverns were the first constructed. The caverns leaked through the joint system in the shale and were converted to low pressure gas holders and have performed satisfactorily.

STATE: Texas

COUNTY: Van Zandt

OWNER: Morton Norwich Products, Inc.

PRESENT SERVICE: Active

Grand Saline Mine

MINERAL MINED: Salt

COUNTRY ROCK TYPE: Evaporite

DEPTH: 700 ft.

VOLUME OF MINE: 9,000,000 cu. ft

ENTRIES (TYPE & NUMBER) 2 Shafts

WATER PRODUCTION: Nil

MINING PLAN: Room and Pillar

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Utah

COUNTY: Juab

OWNER: U. S. Energy Corp.

PRESENT SERVICE: Inactive

Fluroine Queen Mine

MINERAL MINED: Fluorspar

COUNTRY ROCK TYPE: Crystalline

VOLUME OF MINE: 325,000 cu. ft.

DEPTH:

WATER PRODUCTION:

MINING PLAN: Open Stoping

ENTRIES (TYPE & NUMBER)

LAST MINING:

FIRST MINING:

STATE: Utah

OWNER: The Anaconda Co.

Park City Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING: 1975

GENERAL DESCRIPTION:

COUNTY: Summit

PRESENT SERVICE: Developing

MINERAL MINED: Zinc, Lead, Silver

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Utah

OWNER: The Anaconda Co.

Carr Fork Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Tooele

PRESENT SERVICE: Developing

MINERAL MINED: Copper

VOLUME OF MINE:

WATER PRODUCTION:

STATE: Utah

COUNTY: Tooele

OWNER: McFarland & Hullinger

PRESENT SERVICE: Active

Ophir Mine

COUNTRY ROCK TYPE: Crystalline

and Zinc

MINERAL MINED: Silver, Gold, Lead,

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER)

WATER PRODUCTION:

MINING PLAN:

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Utah

COUNTY: Uintah

OWNER: American Gilsonite

Bonanza Mine

COUNTRY ROCK TYPE:

DEPTH: 1,400 ft.

MINERAL MINED: Gilsonite

PRESENT SERVICE: Active

ENTRIES (TYPE & NUMBER)

VOLUME OF MINE: 9,000,000 cu. ft.

MINING PLAN: Block Caving

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

STATE: Utah

COUNTY: Utah.

OWNER: Kennecott Copper Corp.

PRESENT SERVICE: Active

Tintic Mine

TRESERVICE. ACCIVE

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Lead, Zinc, Silver, and Cadmium

DEPTH:

VOLUME OF MINE: 10,650,000 cu. ft

ENTRIES (TYPE & NUMBER) 3 Shafts

MINING PLAN: Caving; Square Set; Cut and Fill

WATER PRODUCTION:

FIRST MINING: 1966

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Vermont

COUNTY: Lamoilie

OWNER: Engelhard Minerals & Chemicals Co.

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Tale

DEPTH:

VOLUME OF MINE: 9,000;000 all: ft:

ENTRIES (TYPE & NUMBER)

MINING PLAN: Open Stoping

WATER PRODUCTION:

FIRST MINING: 1925

LAST MINING

STATE: Vermont

OWNER: Vermont Talc Inc.

COUNTRY ROCK TYPE: Crystalline

DÉPTH:

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Open Stoping

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Windham

PRESENT SERVICE: Active

MINERAL MINED: Talc

VOLUME OF MINE: 780,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Vermont

OWNER: Windsor Minerals

Argonaut Mine

COUNTRY ROCK TYPE: Crystalline

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING: 1973

GENERAL DESCRIPTION:

COUNTY: Windsor

PRESENT SERVICE: Developing

MINERAL MINFD: Talc

VOLUME OF MINE:

WATER PRODUCTION:

STATE: Vermont

COUNTY: Windsor

OWNER: Windsor Minerals Inc.

Frostbite Mine

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Talc

PRESENT SERVICE: Active

DEPTH:

VOLUME OF MINE: 1,650,000 cu. ft.

ENTRIES (TYPE & NUMBER)

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Vermont

COUNTY: Windsor

OWNER: Windsor Minerals Inc.

Hammondsville Mine

PRESENT SERVICE: Active

COUNTRY ROCK TYPE: Crystalline

MINERAL MINED: Talc

DEPTH:

VOLUME OF MINE: 1,650,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Adit

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING: 1954

LAST MINING:

STATE: Virginia

COUNTY: Fairfax

OWNER: Washington Gas Light Co.

PRESENT SERVICE: Propane Storage

COUNTRY ROCK TYPE: Crystalline Gneiss

MINERAL MINED: Gneiss

DEPTH: 400 ft.

VOLUME OF MINE: 1,683,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Drilled Shaft

MINING PLAN: Room and Pillar

WATER PRODUCTION: Large Inflow

FIRST MINING: 1961

LAST MINING: 1962

GENERAL DESCRIPTION: The water inflow into this cavern exceeded the rate of recharge and some leakage was discovered from the vapor space of the cavern. A water injection program coupled with an operating pressure reduction has stabilized the cavern's hydrostatic pressure. A vacuum aspiration program is removing residual gas from the soil and the leakage appears to have been stopped.

MINE SUMMARY DATA

STATE: Virginia

COUNTY: Giles

OWNER: National Gypsum

PRESENT SERVICE: Active

Kimballton Mine
COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEPTH: 900 ft.

VOLUME OF MINE: 22,500,000 cu. ft.

ENTRIES (TYPE & NUMBER) Tunnel

MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING: 1946

LAST MINING:

STATE: Virginia

OWNER: Callahan Mining Corp.

COUNTRY ROCK TYPE: Limestone

DEPTH:

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN: Vein Mining

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Louisa

PRESENT SERVICE: Developing

MINERAL MINED: Zinc and Copper

VOLUME OF MINE:

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Virginia

OWNER: Gossan Mine

COUNTRY ROCK TYPE: Crystalline

DEPIH: 350 ft.

ENTRIES (TYPE & NUMBER) 1 Shaft

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Montgoméry

PRESENT SERVICE: Inactive

MINERAL MINED: Îron orê

VOLUME OF MINE: 1,400;000 81. 12.

WATER PRODUCTION:

STATE: Virginia

OWNER: Foote Mineral Co.

COUNTRY ROCK TYPE: Sedimentary

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Scott

PRESENT SERVICE: Inactive

MINERAL MINED: Lithium

VOLUME OF MINE: 22,500,000 cu. ft

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Virginia

OWNER: Stephens City Mine

COUNTRY ROCK TYPE: Limestone

DEPIH: 400 ft.

ENTRIES (TYPE & NUMBER) 1 Adit

MINING PLAN: Room and Pillar

FIRST MINING:

CENERAL DESCRIPTION:

COUNTY: Shenandoah

PRESENT SERVICE: Inactive

MINERAL MINED: Limestone

VOLUME OF MINE: 7,750,000 cu. ft.

WATER PRODUCTION:

STATE: Virginia

OWNER: United States Gypsum Co.

Plasterco Mine

COUNTRY ROCK TYPE: Limestone

DEPTH: 650 ft.

ENTRIES (TYPE & NUMBER) 2 Shafts

MINING PLAN: Open Stoping

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Washington

PRESENT SERVICE: Active

MINERAL MINED: Gypsum

VOLUME OF MINE: 9,000,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Virginia

OWNER: New Jersey Zinc Co.

Austinville Mine

COUNTRY ROCK TYPE: Limestone

DEPTH:

ENTRIES (TYPE & NUMBER). 2 Shafts

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Wythe

PRESENT SERVICE: Active

MINERAL MINED: Zinc, Lead, Ag Lime

VOLUME OF MINE: 22,500,000 cu. ft

WATER PRODUCTION:

STATE: Washington

COUNTY: Pend Oreille

OWNER: The Bunker Hill Co.

PRESENT SERVICE: Active

Pend Oreille Mine

MINERAL MINED: Lead and Zinc

COUNTRY ROCK TYPE: Limestone

MINING PLAN: Room and Pillar

DEPTH: 650 ft.

VOLUME OF MINE: 9,193,000 cu. ft.

ENTRIES (TYPE & NUMBER) 1 Shaft, 1 Tunnel

WATER PRODUCTION: Moderate

FIRST MINING:

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Washington

COUNTY: Stevens

OWNER: Callahan Mining Corp.

PRESENT SERVICE: Inactive, Develop

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Zinc

DEPTH:

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER) Adit

MINING PLAN:

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

STATE: West Virginia

COUNTY: Berkeley

OWNER: Martinsburg Mine

PRESENT . SERVICE:

COUNTRY ROCK TYPE: Limestone

MINERAL MINED: Limestone

DEРТН: 400 ft.

VOLUME OF MINE: 225,000,000 cu. ft.

ENTRIES (TYPE & NUMBER) 15 Adits

WATER PRODUCTION:

MINING PLAN: Room and Pillar

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: West Virginia

OWNER: Glove Refractories, Inc.

COUNTRY ROCK TYPE:

DEPTH:

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Hancock

PRESENT SERVICE: Active

MINERAL MINED: Clay

VOLUME OF MINE: 9,000;000 cg. ft.

WATER PRODUCTION:

STATE: West Virginia

OWNER: Rowlesburg Mine

COUNTRY ROCK TYPE: Limestone

DEPTH: 1,000 ft.

ENTRIES (TYPE & NUMBER) 2 Drifts

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Harrison

PRESENT SERVICE: Inactive

MINERAL MINED: Limestone

VOLUME OF MINE: 910,000 cu. ft.

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA-

STATE: West Virginia

OWNER: Manhime Mine

COUNTRY ROCK TYPE: Limestone

DEPTHY 1,000 ft.

ENTRIES (TYPE & NUMBER) 7 Drifts

MINING PLAN: Room and Pillar

FIRST MINING:

GENERAL DESCRIPTION:

COUNTY: Harrison

PRESENT SERVICE: Inactive

MINERAL MINED: Limestone

VOLUME OF MINE: 44,200,000 cu. ft.

WATER PRODUCTION:

STATE: Wisconsin

COUNTY: Iowa.

OWNER: Ivey Construction Co.

PRESENT SERVICE: Inactive

Graysville Mine

MINERAL MINED: Lead, Zinc, Copper

COUNTRY ROCK TYPE:

VOLUME OF MINE:

DEPTH:

ENTRIES (TYPE & NUMBER) Adit MINING PLAN: Room and Pillar

WATER PRODUCTION:

FIRST MINING: 1967

LAST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Wyoming

COUNTY: Platte

OWNER: CF&I Steel Corp.

PRESENT SERVICE: Active

Sunrise Mine

MINERAL MINED: Iron Ore

DEPTH:

VOLUME OF MINE: 45,000,000 cu. ft.

ENTRIES (TYPE & NUMBER) 2 Shafts

COUNTRY ROCK TYPE: Sedimentary

MINING PLAN: Block Caving

WATER PRODUCTION:

FIRST MINING:

LAST MINING:

STATE: Wyoming

OWNER: Allied Chemical Corp.

Green River Mine

COUNTRY ROCK TYPE: Sedimentary

DEPTH: 1,400

ENTRIES (TYPE & NUMBER) 3 Shafts

MINING PLAN: Room and Pillar; Longwall

FIRST MINING: 1968

GENERAL DESCRIPTION:

COUNTY: Sweetwater

PRESENT SERVICE: Active

MINERAL MINED: Trona

VOLUME OF MINE: 70,800,000 cu. f

WATER PRODUCTION:

LAST MINING:

MINE SUMMARY DATA

STATE: Wyoming

OWNER: FMC Corporation

Green River Mine

COUNTRY ROCK TYPE:

DEPTH: 1,400 ft.

ENTRIES (TYPE & NUMBER)

MINING PLAN:

FIRST MINING: 1948

GENERAL DESCRIPTION:

COUNTY: Sweetwater

PRESENT SERVICE: Active

MINERAL MINED: Trona

VOLUME OF MINE: 165,000,000 cu. f

WATER PRODUCTION:

STATE: Wyoming COUNTY: Sweetwater

OWNER: Stauffer Chemical Co.

PRESENT SERVICE: Active

Big Island Mine

COUNTRY ROCK TYPE: Sedimentary MINERAL MINED: Trona

DEPTH: 1,400 ft.

VOLUME OF MINE: 165,000,000 cu. f

ENTRIES (TYPE & NUMBER)

WATER PRODUCTION:

MINING PLAN:

LAST MINING:

FIRST MINING:

GENERAL DESCRIPTION:

MINE SUMMARY DATA

STATE: Wyoming

COUNTY: Sweetwater

OWNER: Texasgulf Inc.

PRESENT SERVICE: Inactive

To Soda Ash Mine COUNTRY ROCK TYPE: Sedimentary

MINERAL MINED:

DEPTH: 1,400 ft.

VOLUME OF MINE:

ENTRIES (TYPE & NUMBER)

WATER PRODUCTION:

MINING PLAN: Room and Pillar

FIRST MINING: 1976

LAST MINING: