
**FIFTH
ANNUAL REPORT**

•
**DEPARTMENT OF
MINERAL RESOURCES**

STATE OF ARIZONA

JULY 1, 1943 TO JUNE 30, 1944

•
J. S. COUPAL, Director
June 1, 1943—May 15, 1944

CHAS H. DUNNING, Director
May 15, 1944—June 30, 1944

OFFICIAL FILE



DEPARTMENT OF MINERAL RESOURCES

Board of Governors:

Charles F. Willis, Phoenix, Arizona, Chairman
(Term expired Jan. 31, 1944)
Loyde C. Edmonson, Globe, Arizona
Weldon C. Humphrey, Patagonia, Arizona, Chairman
(Appointed Mar. 15, 1944)
H. F. Mills, Humboldt, Arizona, Vice Chairman
(Appointed Mar. 15, 1944)
J. E. Layton, Chloride, Arizona
(Appointed Mar. 15, 1944)
Dr. N. H. Morrison, Phoenix, Arizona
(Reappointed Mar. 15, 1944)

Personnel of Department:

J. S. Coupal, Director
(Resigned May 15, 1944)
Chas. H. Dunning, Director
(Appointed May 15, 1944)
W. C. Broadgate, Assistant Director
Earl F. Hastings, Projects Engineer
Lorraine Porter, Office Secretary

Field Engineers:

Elgin B. Holt, Western District, Kingman, Arizona
George A. Ballam, Southern District, Tucson, Arizona
Bahngrell W. Brown, Central District, Prescott, Arizona
Andrew Macfarlane, Eastern District, Globe, Arizona

Offices

Headquarters Office
304 Home Builders Building, Phoenix, Arizona
Telephone— Phoenix 4-7034

Field Offices

Tucson, c/o Chamber of Commerce, Tucson, Arizona
Kingman, c/o Chamber of Commerce, Kingman, Arizona
Prescott, c/o Yavapai Associates, Prescott, Arizona
Globe, c/o Old Dominion Bank Building, Globe, Arizona

In compliance with Chapter 27, Laws of 1939, creating the Department of Mineral Resources, the following report of the activities of the Department from July 1, 1943 to June 30, 1944, is respectfully submitted:

FOREWORD BY CHARLES H. DUNNING, DIRECTOR OF THE
DEPARTMENT SINCE MAY 16, 1944

To Honorable Sidney P. Osborn, Governor
State of Arizona
Phoenix, Arizona

Dear Governor Osborn:

Between the time of my appointment as Director of the Department, May 16, 1944, and the end of the fiscal year, June 30, 1944, much time was necessarily spent in familiarizing myself with the procedure of the office and with the activities and cases pending and in process.

Mr. Coupal, the former Director, was retained at the request of the Board of Governors until July 1 to assist me in becoming acquainted with these matters and to write the annual report, as nearly all the activities of the Department for the year were under his directorship.

It was also my desire to visit as much of the field as possible in a short time, to attend meetings of the A. S. M. O. A. councils and become acquainted with many of the personnel among small mine operators, and obtain first hand information regarding their problems and in what ways the Department could be of most value to them.

Mr. Coupal has covered the past year's activities of the Department in a very thorough manner in his annual report which follows herewith, but a few words regarding plans for the coming year seem pertinent.

The mining business in Arizona is in the throes of basic changes which are difficult to anticipate at this time. We do not know what the post-war situation will be but we can be quite sure that premiums or subsidies will be removed and that there will be a great slump in the demand for those base metals which have heretofore been the backbone of production in Arizona.

The future for gold and silver is an enigma at present. Some of the present high cost of labor and supplies will probably be permanent. If so and if there is no advance in the

price of gold, there will be little incentive for gold mining even after the lifting of the government's restraining order. On the other hand, if the price of gold is advanced as some think it will be and the advance is passed on to the producers, Arizona might well be the scene of something like the gold rushes of old.

The situation regarding non-metallics is interesting and has important commercial possibilities. Arizona abounds in most of these mineral substances which are coming into greater use in the arts and industries and in basic building materials. Remote locations, lack of nearby demand, and lack of knowledge have been drawbacks to their exploitation.

Arizona has now grown in population and in the demand for and use of many such materials, so that it might now be possible to start production, first for local needs, and later in competition with other states. There are thousands of tons of such raw materials, or goods fabricated from such raw materials, imported into Arizona each year, whereas the same materials exist in large quantities and excellent quality within our own borders. This Department expects to devote a great deal of effort to furthering such enterprises.

Other opportunities are becoming evident in the production of those rarer elements that no doubt exist in Arizona but have been passed up by the old time prospector because of lack of knowledge. The Department will assist such persons in the field work, in obtaining identification, and in marketing any of these unusual minerals.

Further opportunities seem apparent in the operation as small marginal mines of some of the base metal deposits with improved metallurgy and facilities. Copper leaching on a moderate capacity basis is one example. There seems no reason why a comparatively small operation cannot be conducted on any of several available deposits amenable to leaching, with the economy and cost per ton obtained by the large mines. Such propositions may require comparatively small outlay and equipment.

During this period it is especially necessary that our contacts and representation in Washington be kept alive and alert. Legislation adverse to Arizona mining could easily be put over and it is a well known fact that the masses of population in the East have no brief to hold for western mining. On the other hand much favorable legislation such as metal stockpiling and the adjustment of mining contracts can be fought for.

Small mine operators will be induced to make more use of the Department, and altogether a busy and constructive period is in the offing, wherein this Department can be of special

DEPARTMENT OF MINERAL RESOURCES

Statement of Expenses
July 1, 1943 to June 30, 1944

Allotment	\$33,000.00
Received from Reconstruction Finance Corp. on loan reviews	520.00
	<u>\$33,520.00</u>

ADMINISTRATIVE

Salaries	\$11,285.92	
Travel	1,400.09	
Printing & Stationery	541.61	
Postage	463.06	
Tei. & Tel.	292.51	
Rent	817.31	
Office Supplies	402.60	
Insurance	35.00	
Miscellaneous	308.50	\$15,546.60

Special Projects		
Salary	\$ 680.00	680.00
Capital Expense	\$ 137.27	137.27

FIELD WORK

Eastern District—Globe		
Salary	\$ 3,062.50	
Travel	1,411.09	\$4,473.59

Southern District—Tucson		
Salary	\$ 3,062.50	
Travel	1,205.29	\$4,267.79

Western District—Kingman		
Salary	\$ 3,062.50	
Travel	1,350.00	\$4,412.50

Central District—Prescott				
Salary	\$ 3,062.50			
Travel	733.76	\$3,796.26	\$16,950.14	\$33,314.01

Returned to General Fund \$ 205.99

value to the mining industry and indirectly to the tax payers of the state.

Herewith follows Mr. Coupal's report for the year.

Respectfully submitted,

Chas. H. Dunning, Director

FIFTH ANNUAL REPORT DEPARTMENT OF MINERAL RESOURCES

By

J. S. Coupal

The mining industry of the country has not only met the heavy requirements for non-ferrous metal production placed upon it by the emergency wartime demands, but, in most instances, has produced sufficient metal to accumulate substantial stockpiles over and above actual requirements.

Estimates by the various federal agencies concerned with war metal and mineral needs during the early part of 1943 indicated a material shortage in copper, lead, zinc, tungsten, molybdenum, etc., and also in a number of the non-metallics. Bonuses and premium prices had been established on many commodities in order to stimulate production and absorb the higher cost of labor, on operating marginal properties.

The industry responded actively to the urge of a step-up in production and, despite the shortage of labor due largely to enlistments and induction of younger men into the service, many idle and potential properties in Arizona came into production.

In some instances Federal aid, through the Mine Loan Division of the Reconstruction Finance Corporation, Metals Reserve Company, Smaller War Plants Corporation, Defense Plant Corporation, or other agencies, supplied the necessary financial assistance. In other instances private financing undertook expansion of former operations and the opening up of new mines.

Restrictions, regulations, priorities and other limitations presented new operating problems, increased costs, delays, and made operations difficult but, despite these deterrents, activity continued and production was stepped up to new high levels.

Revised estimates of requirements by the Army and Navy and the substitution of less critical materials for those more critical metals, together with increased restrictions imposed on civilians of non-essential use of metal, drastically changed the metal situation. By the end of 1943, revised estimates indicated a good balance in most of the common metals, between produc-

tion and the restricted demand and, in many instances, the revisions indicated ample stockpiles of metal on hand or in process of building.

Rumors of cutbacks and stores of ample reserves of metals were heard in the early fall of 1943. Later in the fall molybdenum supplies were stated as greatly in excess of demands, whereas in the spring of 1943 the Department was requested by the War Production Board to urge the opening up of potential molybdenum producers.

The molybdenum situation was followed by a cutback in consideration of applications for advance premiums on lead and zinc on October 27, 1943. On November 9, 1943 War Production Board announced a refusal to accept applications for advance premiums on copper after December 31, 1943. By a notice in January 1944 cancellation of contracts and a cutback in bonus payments of mercury and tungsten was announced. In November 1943, one of the War Production Board Copper Branch officials, at a meeting in Tucson, stated that we had a large supply of copper on hand, and a sales organization was now necessary in order to get rid of it.

These various rumors, followed by definite action in the form of cutbacks on premiums and bonuses have been most disturbing to the mental attitude of producers and of labor employed in mining. They created uneasiness and a feeling of uncertainty in the minds of operators, and an unwillingness to go ahead and increase production, especially if any new privately invested capital was required. Labor felt that the urgent need for them to stay on the job was no longer necessary as a patriotic motive. With a surplus of metal in all lines on hand, they could well afford to ease up.

Since January 1, 1944 Army and Navy officials have stated that production of lead and zinc should be maintained at 1943 levels. More recent figures from the Copper Branch of the War Production Board showed that demands for copper greatly exceed production and that heavy withdrawals were being made from the reserve stockpile.

These drastic changes in policies and statements have added to the confusion and uncertainty in the minds of both labor and producers. The manpower situation in itself indicated that 1943 production cannot be maintained in 1944, and that we shall undoubtedly see a drop in production, particularly in copper.

During the year the Department has made several surveys on manpower and has worked closely with the Selective Service and the War Manpower Commission. Early in June the Depart-

FINANCIAL STATEMENT

The financial statement for the fiscal year, July 1, 1943 to June 30, 1944, shows an appropriation of \$33,000.00 from the state and the receipt of \$520.00 from special work done for the Mine Loan Division of the Reconstruction Finance Corporation, or a total receipt of \$33,520.00.

The actual expenses amounted to \$33,314.01, which allowed the Department to return \$205.99 to the General Fund.

A detailed breakdown of the expenses is attached.

CONCLUSION

The economic value of the work of the Department both to the state and to the war effort cannot be too strongly emphasized. By smoothing out the difficulties and solving the problems of the small mine operators increased production has resulted in the period when such increases were very necessary for war purposes.

New capital looking for mining investment has been aided in locating in Arizona and the tax income of the state has increased, by such efforts, far more than the Department cost.

Federal aid for mining has been received in many instances, not only on mine loans but on mine access roads by department activity. A post-war program is being developed, not only to continue the small mine industry, but to aid in re-employment of returning service men.

The intrinsic value of the Department to the economic future of the state cannot be measured in terms of dollars and cents, but it is conservative to say that its value is many, many fold the amount appropriated.

Respectfully submitted,

J. S. COUPAL.

Phoenix, Arizona
July 15, 1944.

they encountered delays and difficulties in obtaining raw material production and markets.

Changes in policies by government bureaus relating to mining, priorities, bonuses, premiums and the various directives, orders, regulations and other restrictive measures have all worked a hardship on the operators who were doing their utmost to step up production in order to meet the war time demand for metals.

As director, I wish to express the appreciation of the Department of Mineral Resources to the operators, who came to us with their troubles and who, in the rare instances where their problems were not alleviated, showed appreciation and consideration for the efforts put forth to assist them. Those who found a solution, through the department aid, have invariably expressed their appreciation.

The various Washington agencies, as well as the state branches of these agencies, have been of utmost help and have been most considerate in assisting the operators and accepting the cooperation of the Department on behalf of the small mine operators. Their attitude has been highly appreciated by the Department.

To the office staff and field engineers and others called upon to help on special projects I express the sincere thanks and appreciation on my own part personally and for the Board of Governors.

As director and in behalf of the personnel of the office I wish to express my most sincere thanks to the Board of Governors for their guidance and counsel in work we have undertaken.

Special mention should be given to Charles F. Willis, chairman of the Board of Governors since 1939, when the Department was first established, for his unfailing interest and the time and study, to say nothing of the large out-of-pocket expense which he has given to department work. During that five-year period he has never taken a penny of Department or State funds for expenses or anything else even though the law authorized him to do so.

His personal contact for the past thirty odd years with the mining industry and the mine operators in Arizona has been of irreplaceable value to the Department. His national reputation as one of the outstanding men in the economics of mining has made him of inestimable value in the planning of department policies and program. His contacts with federal agencies and his standing as an authority on mining subjects has given weight to the department's standing and has permitted the department to progress rapidly along sound well-defined lines.

ment was asked to make a quick labor survey for the War Production Board. Manpower has been one of our most serious problems in connection with metal production.

Early in October the Department devoted one session to a meeting of the Board of Governors and the Field Engineers regarding a comprehensive study and discussion of post-war planning for the mining industry in Arizona.

The major present effort of the Department will, of course, continue to be the maintenance of present production and the opening up of new properties.

The post-war plan includes three major projects:

1. A new complete study of the gold properties, so as to put the Department in position to render the maximum help toward reopening the gold mines when that can be done.
2. The providing of zinc smelting, reduction and adequate milling facilities in Arizona to commercially utilize the zinc ores opened up during the war period.
3. An intensive study of non-metallics to be found in Arizona and a close cooperation with consumers of these products on the West coast.

Work under each heading is being carried forward in conjunction with the maintenance of present production for immediate war-time needs.

The difficulties in maintaining production under the maze of restrictions, regulations and changes in policy have required a close contact by the Department in the capacity of a liaison agent between Arizona producers and the various war agencies. Much of this work had to be done in Washington.

This called for continuous cooperation with the Mine Loan Division of the Reconstruction Finance Corporation, the Metals Reserve Company, the various non-ferrous metal branches of the War Production Board, the Smaller War Plants Corporation, Army and Navy Munitions Board, Office of Defense Transportation, Office of Price Administration, War Manpower Commission, Selective Service, U. S. Employment Service, U. S. Bureau of Mines, U. S. Geological Survey, and the various subdivisions under many of these agencies, together with the Arizona Bureau of Mines and other state agencies concerned with war-time metal production.

Many of the services rendered the operators have been

personal ones requiring an up-to-the-minute knowledge of the proper procedure to be followed in loan applications, access road requests, special gasoline allotments, buying of cars, trucks, tires, questions of premiums, bonuses, priorities, labor deferments and policies. Individual assistance on these various subjects has greatly aided operators in solving the perplexing problems of maintaining maximum production.

MINE LOANS

Accessibility Loans

The accessibility mine loan program of the Reconstruction Finance Corporation met with enthusiastic approval by the small mine operators in 1942, due to the fact that the government needed additional metal to meet the war needs and private capital for small mine work was more or less in hiding.

As a result, there was an active revival of small mine interest and a general combing over of the small and old mines which had been idle for many years due to low metal prices and the general reluctance of private capital to undertake the necessary preliminary work required to properly investigate such properties.

The Department, fortunately, was well organized, through the information in its files and by the close contact of the office and the field engineers with the small mine operators, to render the service needed in assistance to them in preparation of their applications for loans.

There were 220 applications for accessibility loans submitted during the fiscal year from July 1, 1942 to June 30, 1943, and of these 99 loans were approved, which represented approximately \$500,000 in R. F. C. money spent on this preliminary work. With the start of the program the "cream" of the properties were, naturally, first considered.

It was to be expected that there would be a falling off in number and also in quality of the applications submitted during the second year of the accessibility mine loan applications, due to the rather thorough coverage of the field during the first year. Also, in the early fall of 1943 announcements of ample stockpiles of the more common metals and the later cutback or limitations on prices, premiums and bonuses on many of the metals, naturally dampened the enthusiasm of even the more venturesome small mine developers and there was a drastic drop in applications submitted.

However, during the year from July 1, 1943 to June 30, 1944, 43 applications for accessibility loans were submitted by

engineer to contact such Federal agencies as is necessary to work out problems presented by operators in his district and in general to get a better over-all view of the department work so as to be of more service in the field.

DEPARTMENT PERSONNEL CHANGES

On March 11, 1944, Governor Osborn appointed four members to the Board of Governors. There had been three vacancies on the Board since November 1942, which now have been filled. The fourth vacancy is that which came on January 31, 1944, when the five year term of appointment of Charles F. Willis automatically terminated.

The new members of the Board as appointed are H. F. Mills, manager of the Shattuck Denn-Iron King branch at Humboldt, whose term will be completed in January 1949; J. E. Layton, lessee of the Hercules Badger mine at Chloride, whose term expires in January 1948; Weldon C. Humphrey, president of the Pride of the West mine, Patagonia, his term ending January 1947; and Dr. N. H. Morrison, dentist, Phoenix, who was reappointed and whose term expires January 1946. Loyd C. Edmonson of Globe remains on the Board to complete his term which expires January 1945.

J. S. Coupal, director, tendered his resignation as soon as the announcement of the new Board was made. At the first meeting of the Board on March 21, 1944, the members took no action on this resignation. The resignation of Coupal was not a gesture and, at the meeting of the Board of Governors on May 13, 1944, Coupal informed the Board that he had acquired certain mining interests and contracts effective May 15, 1944 and that, in compliance with the law creating the Department, would after that date be disqualified to continue as director.

At this meeting Chas. H. Dunning, mining engineer, was appointed director and the resignation of J. S. Coupal accepted. The new director was requested by the Board to maintain contact with J. S. Coupal, if agreeable, and to have him assist in a consulting capacity until July 1 in acquainting Mr. Dunning with the department procedure and to complete the annual report. This proposal was mutually agreed upon.

No other changes in the personnel of the Department were made.

APPRECIATION

The Department not only has continued to act as a clearing house for information regarding mining, but has been called upon to act as "trouble-shooters" for the mine operators when

sulphide ores and in oxidized ores. The mid-western zinc deposits have been working at more than full capacity; few new ore bodies have been developed and that section will be almost exhausted by the time the war ends.

New Mexico has opened up large zinc deposits near the Arizona line. Arizona zinc development during the war has been sufficiently encouraging to offer hope for a large future industry. It seems feasible to consider zinc reduction plants for Arizona as there is available a large supply of zinc ores from which to draw and the power question seems to be on the way to being solved.

One of the important post-war projects should be a zinc reduction plant. In order to show that sufficient ore is available to justify such a plant or plants, the survey of zinc producers and potential zinc producers should be given special attention.

Emphasis was stressed that, on the new program, the Department and the field engineers should give particular attention to the business, financial plans and economic viewpoint in their reports and investigations of the properties. Where technical research or intensive geological study should be made, a special report calling such properties and such problems to the attention of the Arizona Bureau of Mines should be prepared.

The new program of the Department will feature studies and surveys of post-war activity in mining so as to be prepared to assist in the inevitable unemployment during the post-war readjustment period.

ENGINEERS SCHEDULES

In the spring of 1944 a change was made in the schedule for the field engineers. Plans were made whereby each engineer would spend one week each month in the Phoenix office. During that time the engineer would have an opportunity to check over the files on mining properties in his district and, where information was lacking in sufficient coverage, to supply what was necessary; and to carry forward a mapping of the location of the various mines for which purpose highway maps 1/2" to the mile have been made available. One master set is available for office use and one set covers the district in which each engineer operates.

There has always been confusion as to the means of the various mining districts in the state and also a vaguely defined limit of boundaries. Many of the districts have several names. It is planned to compile the various names, cross index them and define the boundaries on the maps.

In addition, this week each month in Phoenix will allow the

the Reconstruction Finance Corporation to the Department for review and analysis. Of these 43, only eleven were granted loans. They are as follows:

Mine	Metal	County	Applicant
Boston	Copper	Pinal	Arthur R. Flint
Copper World.....	Copper	Mohave	Dye & Bathrick
Ireland	Lead-silver	Gila	Floyd Brown
Keystone	Copper	Cochise	Norman M. Rehg
Last Chance	Lead-zinc	Graham	John C. Anglin
Lookout	Lead-zinc	Yavapai	G. T. Humphries
New Jersey	Lead-zinc	Mohave	R. A. Thurstin
Papago Chief	Copper	Pima	Sherwood Owens
Plomosa	Lead	Gila	Falcon Mining Co.
St. Louis	Lead-zinc	Pima	C. W. Gabrielson
Woolery	Zinc	Cochise	Charleston Lead Mines Co.

The distribution by counties of accessibility mine loans submitted for review and analysis by the Department, together with those authorized, is set forth in the table below for the past two years.

Counties	Applications			Authorized		
	1942-1943	1943-1944	Total	1942-1943	1943-1944	Total
Yavapai	38	7	45	16	1	17
Pima	30	2	32	13	2	15
Gila	22	9	31	8	2	10
Mohave	21	7	28	13	2	15
Pinal	12	4	16	6	1	7
Santa Cruz	11	2	13	4	—	4
Maricopa	10	2	12	4	—	4
Cochise	10	6	16	5	2	7
Yuma	9	2	11	5	—	5
Graham	5	2	7	2	1	3
Greenlee	2	—	2	—	—	—
Coconino	1	—	1	1	—	1
Grant, New Mex.	2	—	2	2	—	2
Sierra, New Mex.	1	—	1	1	—	1
TOTALS	174	43	217	80	11	91

In addition to the 43 applications received by the Department, a number of them were received and acted upon directly by the Phoenix office of the Reconstruction Finance Corporation Mine Loan Division and, of these, 20 were authorized for loans. The majority of these 20 were on mines applying for loans of \$5,000 and under, but which were accessible and could be examined. The following list covers the mines authorized for such loans.

Mine	Metal	County	Applicant
Antler	Zinc	Mohave	Pete Vukoye
Poverty	Copper	Yavapai	A. C. VanHook
New Strike	Lead-silver	Yavapai	Clyde L. Baker
Bland	Copper-lead	Santa Cruz	A. L. Russell
O'Brien Group	Lead-zinc	Mohave	O. G. O'Brien
Starlight	Lead	Yavapai	Johnson & Quigley
Abril	Lead-zinc	Cochise	Miller & Sim
Fluorine	Fluorspar	Pima	Wm. C. Yell
Lead Dyke	Lead	Maricopa	D. B. Powell, et al.
Esperanza	Lead	Gila	Falcon Mining Co.
Blue Nose	Lead	Santa Cruz	Layman & Jones
Jupiter	Lead-zinc	Mohave	A. S. Lewis
Daily Mine	Copper	Pima	Daily Mines Co.
Juno	Lead-zinc	Mohave	J. H. Beauchamp
Tombstone Ext.	Lead-silver	Cochise	C. and R. L. Brown
Sidewheel	Lead-silver	Cochise	John Ross & Holt
Lorraine	Copper	Pinal	Joseph Kingsley
Sunset	Manganese	Gila	Al Stovall
Sullivan	Copper-silver	Cochise	J. H. Byrd
Boston-Arizona	Lead-zinc	Yavapai	England & Williams

Thus a summary by counties of the total "C" or accessibility mine loans granted during the fiscal year July 1, 1943 to June 30, 1944 is as follows:

County	Total to Date	County	Total to Date
Yavapai	26	Maricopa	4
Pima	19	Cochise	14
Gila	13	Yuma	5
Mohave	21	Graham	4
Pinal	7	Greenlee	—
Santa Cruz	4	Coconino	—
		TOTAL	117

The granting of accessibility mine loans has been continued and, whereas the applications are now given much closer scrutiny than in the earlier stages of the program, any property on which the data submitted shows a sound venture and compliance with requirements for small or "C" loans, in view of the present situation as to stockpiles accumulated, need of the particular metal, and the present premiums, is given full consideration.

Development Loans

The development loans, or class "B", are those loans in excess of \$5,000 and under \$30,000 for development purposes

Under gold production a survey has been started so as to supplement and bring up to date information and data now available in our files on all gold properties in the state. There has been a growing interest in gold mines as a post-war activity. In order to supply information to such inquiries the survey will be divided into four groups: (1) gold properties which have had recent production and in production areas which could be put into quick production; (2) partially developed properties needing equipment and financing or which have metallurgical problems to be solved for economic operation; (3) prospects in potentially productive areas; and (4) placers.

With more complete information on the various groupings of gold properties available the Department will be able to readily assist operators, and capital in quickly resuming gold production after the war and thus furnish employment during the change-over from war to peace time industries and the return of soldiers to civilian life.

A survey is being made of the present operating non-metallic properties to include a study of the markets, buyers, specifications and requirements of the various industries with a view to post-war expansion into civilian commodities. It was pointed out that not only will there be a large demand from the coast industries and for reconstruction work but that a field may be developed for processing various products in Arizona. The development of the perlite industry and the prospects of the new asbestos mill are typical of what may be done along non-metallic lines.

Apart from the present non-metallic producers other undeveloped deposits should be investigated as to economic possibilities. The Arizona Bureau of Mines offers facilities for identification, classification and tests of the non-metallics, including the various clays. If sizeable deposits of suitable material are found studies as to the market or special uses for such materials can be made.

Arizona offers a fertile field for supplying the increased demand to meet the industrial growth on the Coast, which is bound to expand greatly after the war and also the possibility of developing processing and manufacturing plants in the state should be of much interest.

Present producers of non-metallics should be inventoried, together with a study of the west coast market requirements. An up-to-the-minute contact with users of non-metallics as to prices and specifications will be maintained. The whole field should be carefully covered as to current and potential production.

Zinc occurs rather abundantly in Arizona both in complex

the value of being able to obtain Arizona's viewpoint on mining and mining legislation direct from Broadgate, who has become recognized as the representative of the small mine industry of the state in Washington.

Arizona, through the activities of the Department and its Assistant Director in Washington, in this particular emergency, which has been one of economic problems rather than technique, has become recognized as a leader among mining states of the west in getting mining problems answered.

This particular phase of the department work has been of the greatest help, not only to the individual producer, but to the small mining industry of the state and the whole west and should be continued, at least, during the war emergency.

POST-WAR PLANNING

Indications during August and September 1943 pointed to a retrenchment or restriction in government aid for increasing mineral production from high cost and marginal mines on many of the common ores which, in turn, called for an adjustment of program to meet the situation.

In view of such retrenchment a conference of the Board of Governors, together with the field engineers, was called for October 16 and 17 to discuss these program changes and to plan for post-war department activities, which program could be carried along with current war activities.

On October 27, 1943, a release from the Office of War Information, War Production Board, was made public which reviewed the action of the War Production Board in restriction of marginal mineral production and confirmed the indications which prompted the change of program and the discussion of post-war planning.

Government aid will gradually be curtailed and, due to the restrictions now imposed on the small mine industry, it was decided that the major attention of the Department should be directed toward the maintenance of present production and, where possible, the increasing of production of critical and essential minerals from properties now in operation. New proposed operations should be assisted in complying with changes in regulations governing them, but attention to present producing operations should be given a preference in time and effort.

Plans for post-war activities were agreed to center on three major programs: gold production, non-metallic opportunities and development of zinc production and facilities for zinc production.

and are considered by the Phoenix office of the Reconstruction Finance Corporation Mine Loan Division on mining property the workings of which are accessible and can be examined.

In some instances the Department is, or has been, called upon by the Reconstruction Finance Corporation to have its field engineers take check samples in order to provide advance information for the Reconstruction Finance Corporation in making their plans for examination.

In a great many instances the small mine operators, considering making an application for a development loan, request the advice and services of the Department as to the preparation of the application and also a department report on the physical condition of the property to accompany the application. This service has been made use of by the great majority of the development loan applicants.

The following development loans were granted in Arizona from June 30, 1943 to July 1, 1944:

Name of Mine	County	Amount	Applicant
Horseshoe	Graham	\$11,000	J. D. Merrill
Narragansett Bay	Pima	6,000	Fred A. Bennett
Sundance	Yavapai	8,500	Edwin F. Rippey
Lone Jack-Blackfoot	Mohave	12,500	L. H. Syndicate
Astonished Fairview	Gila	10,500	Haddy & Nelson
Bullard	Maricopa	15,000	J. P. Klein
Pine Mountain			
Mercury	Gila	30,000	Midco Reserve
Mountain Copper Corp.	Yavapai	15,000	Pierre Perry
Globe-Transit	Gila	10,000	Gribble & Heron
Williams	Mohave	25,000	Wm. S. Bradbury
Pinetop Mine	Gila	25,000	J. S. Michault
Maudina	Pinal	20,000	E. H. Molson
Bland	Santa Cruz	10,000	A. T. Russell
Mammoth	Cochise	15,000	Wm. A. Hooten
Alto	Santa Cruz	15,000	Long Contact Mg. Co.
Copper World	Mohave	23,000	Dye & Bathrick
Silver Star	Gila	9,500	Floyd Brown
Addie	Yuma	12,000	Brett & Edgerton

The development loan program was started in 1935, and in its early years, was limited to gold, silver and tin. A few loans were made prior to July 1, 1942, but the major number of loans were made after that date.

A compilation of the "B" or development loans from the start to June 30, 1943 showed sixty-four loans, a total of \$831,300

authorized. Most of those were made after our entrance into the World War.

The development, or "B" loans, made from July 1, 1943 to June 30, 1944 showed eighteen additional loans, a total of \$273,000 authorized.

A distribution of the "B" or development loans by counties follows:

County	Prior to June 30, 1943		June 30, 1943 to July 1, 1944		Total	
	No.	Amount	No.	Amount	No.	Amount
Yavapai	19	\$276,800	2	\$ 23,000	21	\$299,800
Mohave	9	158,500	3	50,500	12	209,000
Gila	8	117,500	5	85,000	13	202,500
Pima	8	83,000	1	6,000	9	89,000
Pinal	5	62,500	1	20,000	6	82,500
Cochise	4	32,000	1	15,000	5	47,000
Maricopa	3	17,000	1	15,000	4	32,000
Graham	2	19,500	1	11,000	3	30,500
Yuma	2	40,000	1	12,000	3	52,000
Coconino	2	14,500	----	-----	2	14,500
Greenlee	1	20,000	----	-----	1	20,000
Santa Cruz	1	10,000	2	25,000	3	35,000
TOTAL	64	\$851,300	18	\$262,500	82	\$1113,800

From these tables it is apparent that there has been a marked drop in the number of applications submitted and also in the money authorized for both development and accessibility mine loans during the past fiscal year.

The drop is natural as, in the heat of enthusiasm and patriotism to supply the government need of metals for the war purpose, the "cream" of the known properties were the ones upon which the mine operators concentrated their first attention. The mine loan program will continue as far as present information is available.

There is one thought on the future mine loan policy, which has been advanced by one of the field engineers, George A. Ballam of Tucson, namely, that there is a moral obligation on the part of the federal government to assist in the reopening of gold mines which, due to the L-208 Gold Closing Order, were forced to suspend operations. Legislation to this effect has been introduced into Congress.

These properties should receive Reconstruction Finance Corporation assistance as soon as the results of our war efforts are such as to indicate the advisability of rescinding the L-208

stationed in Washington during the war emergency. Broadgate has been able to represent the individual operators in a personal presentation of their problems to the heads of the various agencies and get attention and fair consideration, as well as prompt action, on the specific problem retarding production.

Many of the documents issued in Washington have been blanket and general orders, attempting to cover the entire mining industry. It is obvious that such blanket orders or formulae would work grievous injustices in many individual cases.

Each case was a problem in itself and demanded individual personal presentation in order to get at an equitable determination. The presentation required not only a knowledge of the procedure and proper authority with whom to discuss it, but also an unbiased statement of the facts regarding the case.

The Department, through its office files, and when needed through special field investigations and reports by the field engineers, has been able to supplement the information presented by the operators asking for special consideration of their particular problems.

The close tie-in with the Department, the Arizona Small Mine Operators Association and its various councils, the official status of the Department, its field engineers and a liaison representative, Mr. Broadgate, in Washington, has made it possible to ease up the many difficulties which confronted the small mine operators in their effort to keep up peak production in the state.

It is impractical in the annual report to attempt to enumerate even a portion of the host of problems presented to Washington through the Department. Almost every one of the items mentioned in the report, and many others, have required personal attention by the field engineers and the department office in Phoenix in preparation for presentation to the proper department heads in Washington.

In addition to these specific individual problems, Broadgate has maintained a close personal contact with the Arizona congressional members, namely, Senator Carl Hayden, Senator Ernest W. McFarland, Representative John R. Murdock and Representative Richard Harless.

Many new bills regarding mining have been presented to this congress and our representatives have found the assistance of Broadgate, due to his close knowledge of Arizona mining problems and the feeling of the mining industry in the state, of great value in discussion of the mining legislation.

Congressmen from outside the state have also recognized

His reports enabled this Department to fully and properly advise the various operators.

In January 1944 Director J. S. Coupal and Charles F. Willis attended the Colorado Mining Association and the American Mining Congress at Denver, Colorado. W. C. Broadgate, was also at this meeting as technical consultant for the Senate Small Business Committee.

At this conference present mine conditions and problems relating to the mine industry as a whole were fully discussed. The L-208 Gold Closing Order was one of the major points of discussion, although no headway was made toward getting the order rescinded.

At the meeting we had a long discussion with E. D. Arthur Manager of the Mining Committee of the Los Angeles Chamber of Commerce on coordinating the post-war plans of the Department in a study of the non-metallics of Arizona with their work in southern California with industries using non-metallics. It developed that we were both working along somewhat similar lines and arrangements were made for close cooperation.

The value of cheap electric power from the available water power development on the Colorado and its proper distribution to more or less isolated mining districts is of utmost importance to the mining industry and to the continued prosperity of the state. The Department was requested in the early part of 1943 to make a survey of the mines and mining communities as to the potential value and the probable distribution of electric power for small mines. Most of the field work was completed in the latter part of the 1942-1943 fiscal year and a report submitted in July 1945.

WASHINGTON ACTIVITIES

Many of the factors retarding production, due to the mass of blanket directives, restrictions, orders, etc., emanating and centralized in Washington, have required a close personal contact with the various heads of the agencies concerned in the capitol city.

Charles F. Willis, as chairman of the Board of Governors, has been of great value to the Department in this respect. His years of contact with the economics of mining through his publication of The Mining Journal and as executive secretary of the Arizona Small Mine Operators Association have given him national and Washington recognition in the mining industry.

It has been possible to further develop the necessary close contact with the various agencies concerned with mining by having W. C. Broadgate, Assistant Director of the Department,

Gold Closing Order. In addition to this it is reasonably expected that gold will have an increased dollar value in our post-war economy. Many of the lower grade gold properties may be reopened and provide a source of employment during the post-war period and, with the probable increased price of gold, this could be done on a sound economic basis.

It is the hope and expectation of the small mine operators of the state that, in view of the successful administration of the Reconstruction Finance Corporation mine loan program, some steps be taken to have the Reconstruction Finance Corporation policies continued and expanded along post-war plans of opening up the former mines showing record of gold production, and also provide means of exploration and development of such gold properties which are marginal at the \$35 per ounce value but may be profitable at a higher price for gold.

ACCESS ROAD PROJECTS

Access roads to isolated mining districts and to individual mines has been one of the pet projects of the Department and, even before the war time activity, a mine access road program was started several years ago. Since then the field engineers and the office have assisted many operators in making their applications for roads, and in following them through the various agencies called upon for examination of such roads by the War Production Board. In this work it has been necessary to maintain close contact locally with the U. S. Grazing Service, the U. S. Forest Service, U. S. Indian Service, U. S. Public Roads Administration and the U. S. Bureau of Mines and, where occasion called for it, further investigation was made by Mr. W. C. Broadgate in the headquarters offices of these agencies in Washington.

The first year of the program met with much approval by the mine operators excepting for the delays caused by a cumbersome procedure. Attention and criticism were made on the original procedure and it was subsequently simplified following suggestions made.

The original procedure called for the initiation of an access road project by the mine operators to be made to any one of the agencies mentioned. It was then reported to the U. S. Bureau of Mines and examined and forwarded, if approved, to the U. S. Public Roads Administration and if approved by both of these agencies, it would be reported to the War Production Board, which Board rendered final decision. If the project was recommended, the Grazing, Forest or Indian Services, depending upon which agency had supervision over the lands in which the mine and road were located, were instructed to build the

road. If the road project was rejected by either the U. S. Bureau of Mines or the U. S. Public Road Administration, it was stopped then and there.

Under the new procedure, applications were to be made directly to the U. S. Public Road Administration and forwarded to the War Production Board in Washington for consideration. If the project seemed feasible and advisable, the U. S. Bureau of Mines and the U. S. Public Roads Administration were asked to examine and report on the project to the War Production Board. If approved by the War Production Board the proper service was requested to construct the road. Under this revised procedure our plan has been to notify Mr. Broadgate in Washington when the project was initiated and have him follow it through the War Production Board in order to expedite action.

A summary of the appropriations for access roads to raw materials and timber up to May 1, 1944 follows:

In July 1943 the original fund, \$10,000,000, was exhausted and an additional appropriation of \$17,500,000 was requested and obtained. This additional fund was exhausted in the early part of 1944 and whereas no specific amount was ear-marked in the \$30,000,000 deficiency appropriation for the Public Roads, approved in April 1944, it was understood that a portion of these funds would be available for such mine access roads as were approved by the War Production Board.

MINE ACCESS ROADS

Constructed in Arizona by the U. S. Grazing Service

Name of Project or Group	County	Miles	Estimates Approved
Iron Cap, et al.	Graham	8.5	\$36,425.00
Seventy Nine	Gila	4.0	4,283.03
Spring Manganese	Yavapai	22.0	3,634.45
Moon Anchor, et al.	Yavapai	7.0	13,113.00
Copperville	Mohave	14.0	15,935.28
Parker	Yuma	3.0	5,000.00
Victory	Mohave	4.0	1,856.62
Maynard & Wayne Mica	Mohave	6.0	15,000.00
Ross	Maricopa	2.2	750.00
Cleopatra	Mohave	6.0	6,000.00
Horseshoe	Graham	4.0	1,000.00
Lead Jewel	Graham	3.5	4,000.00
Last Chance	Gila	1.0	1,000.00
Grand Gulch, et al.	Mohave	34.5	9,000.00

MISCELLANEOUS DEPARTMENT ACTIVITIES

Mine operations, under present conditions, call for more than a good property and sufficient financing to pay for equipment and labor. Many operators fail to comply with all the many regulations, restrictions, and directives, so that it was deemed necessary to compile and make available the various points needing attention. This treatise was made and published in Pay Dirt, under the title of "Business of Mining Complicated". Copies were made available to the office without cost.

Many favorable comments were made on the compilation and it has been used as a check by many operators. One item, which had been much overlooked by small mine operators, was the state Privilege Sales Tax which has resulted in many additional dollars finding their way to the state treasury.

A hearing on the problems of the small mine operators in maintaining present production and, where possible, increasing production was held by Senator Ernest McFarland in Prescott, where certain resolutions were prepared asking for consideration in Washington.

A Senate Subcommittee hearing on Public Lands and Surveys was held in Phoenix by Senator Pat McCarren of Nevada. The conflicts between cattlemen and miners were aired in detail and it was shown that legitimate miners seldom had difficulties and that there was little excuse for such conflicts.

The Apex Mining Company operating at Jacobs Lake ran into a dispute in hauling franchises in handling their ores to the Clarkdale smelter. The matter was referred to the Arizona Corporation Commission with Department data and adjustments quickly made which permitted hauling, and production resumed.

Mrs. Bertha Schell of the Camp Wood Mining District, owning mining claims on which locations had been validly made prior to federal and state exchanges of land, was threatened with eviction from her property. Examination by the field engineer and presentation of factual evidence protected the major part of the holdings and saved the land for her.

Charles F. Willis, then Chairman of the Board of Governors spent the latter half of October in Washington, partly on Metals Reserve Company work, on which he is consultant and partly on small mine operators problems, at no expense to the Department. Fortunately his stay there was at the time the cut-off in additional premiums on lead and zinc were made and copper cuts about to be made and he was able to get more detailed information than was set forth in the public announcements.

The procedure for handling access road applications had numerous defects which caused undue delay. Many complaints were registered, due mainly to the delays. This procedure was later corrected by having all applications forwarded direct to the War Production Board by the Public Roads Administration, where determination was made as to whether or not the project justified examination by the Bureau of Mines and the Public Roads Administration and, after reviewing these reports, decision was made.

NEW MINE CONTACTS

Most of the interest in the past few years has been relating to properties and operators desiring government aid but, in the past year, private capital has shown a keener interest in opening up new mines. Many investigators have used both the department files and also the contact with the field engineers in finding properties that would fit their requirements.

The non-metallic investigations by new interests have been a pumice property in the Payson district for San Antonio, Texas interests; a survey of manganese and lime deposits for use as a soil sweetener for agricultural lands; a deposit of red oxide of iron for pigment use. Further work has been done on perlite development, investigation of raw materials for plaster and cement plants; a survey of sands and granite for construction use; intensive search for optical quartz crystals and iceland spar; complete survey of the various strategic mica showings, in conjunction with the Colonial Mica Company, and numerous projects on fluorspar.

The American Metal Company had an engineer in the field making a survey on the molybdenum, copper, lead and zinc properties and picked many of the properties for examination from the department files.

The Shattuck Chemical Company of Denver gathered information on molybdenum and cobalt properties; Wm. B. Baggaley of Wisconsin gave detailed study to perlite and some gold properties.

M. J. Leydig of Montana investigated copper, fluorspar and gold properties; the Yuma Copper was taken over by the Liberator Mines Company and contact made through the Department. Through detailed reports by the Department on the Silverfield Mines, substantial interests have taken over and in addition, many properties have been referred to operators for preparation for mine loan applications.

Name of Project or Group	County	Miles	Estimates Approved
Rambo	Gila	2.0	3,000.00
Silver Hill	Pima	10.0	18,000.00
Prodigal & Garcia	Maricopa	6.7	6,500.00
Magma Chief	Pima	4.0	5,000.00
Jumbo	Maricopa	2.5	1,000.00
U. S. Mine	Maricopa	4.5	6,000.00
Jumbo Copper	Yavapai	2.5	3,000.00
Dover	Greenlee	5.6	10,000.00
Abe Lincoln	Maricopa	5.5	10,000.00
Christmas	Gila	2.0	6,000.00
Four Bagger	Gila	1.5	2,500.00
Tout	Cochise	6.5	8,000.00
Copper World	Mohave	2.0	9,500.00
TOTAL		175.1 Miles	\$205,497.38

MINE ACCESS ROADS

Constructed in Arizona by the U. S. Indian Service

Name of Project or Group	County	Miles	Estimates Approved
Salt River Asbestos	Gila	7.0	\$ 77,000.00
Vanadium	Navajo	60.0	146,000.00
(This road is to mines in Arizona but part of the road is in Utah and New Mexico)			
Drew Springs	Pinal	6.0	2,000.00
TOTAL		73.0 Miles	\$225,000.00

MINE ACCESS ROADS

Constructed in Arizona by the U. S. Forest Service

Name of Project or Group	County	Miles	Estimates Approved
Seventy-two Springs (Regal)	Gila	10.0	\$15,400.00
Helvetia	Pima	14.0	6,916.00
Rosemont	Pima	1.36	7,789.00
King of Lead		1.5	3,000.00
Democrat & Sherman		2.0	2,000.00
Apex	Mohave	2.1	9,000.00
TOTAL		30.96	\$44,105.00

TIMBER ACCESS ROADS

Constructed in Arizona

Name of Project or Group	County	Miles	Estimates Approved
Forest Service:			
Blazed Ridge		12.0	\$11,150.00
Mormon Crossing		25.0	23,854.55
Airline-Snowflake		6.0	6,140.00
Indian Service:			
Saw Mill Road		28.0	121,000.00
TOTAL		71.0 Miles	\$162,144.55

From this summary it should be noted that, from the appropriation for Access Roads to Raw Materials and Timber, mine roads were built in Arizona to 33 different mining projects, covering 279.06 miles, at a total cost of \$474,592.38, and that timber access roads were constructed on four projects covering 71 miles at a cost of \$162,144.55. Since May 1, 1944, several mine road and also timber access roads have been applied for but to date have not been approved. The access road program is, of course, slowing down due to the fact that only less desirable projects are left. The work on the roads mentioned was about 99% completed as of May 1, 1944.

Worthy mine road applications are being given full and complete consideration at this time, where the road construction can be shown of sufficient value to the increased production of war essential and critical minerals or metals.

In order to receive the proper consideration the application should include all information available regarding the property in order that the War Production Board can make an intelligent decision as to whether the construction of the road is justified and if so, allow them to recommend it for examination by the U. S. Bureau of Mines and the U. S. Public Roads Administration. When such an application is made, it is also advisable to send copies to the Department of Mineral Resources so that we may assist, if necessary, in getting prompt action in Washington.

WAR PRODUCTION BOARD

The dependency of the war effort on a sufficient supply of metals and minerals for the highly mechanized Army and Navy requirements, which includes not only the production of actual fighting machines, but their maintenance, replacements, ammunition, supplies, transportation, and an almost inconceivable

The Mardun Company, operating the Sandstone Copper deposit in Coconino County.

R. L. Brown of Tombstone on the operations on the Tombstone Extension at Tombstone and on the Shannon Copper at Gleason

The Humboldt Tailings operated by Chas. H. Dunning.

The pride of the West in the Washington Camp, Santa Cruz County, by Weldon C. Humphrey.

The Carlota Copper, John L. Alexander, operator, the Yuma Copper, George Spry, operator; the Yaeger Copper. W. Kirkpatrick of Prescott; the Tiger Mine; Camp B. Mine; Carrie Claims; Indiana Dump; Emerson Mine; Copper Glance; Shylock Mine; and a number of others on which help and advice were given. Results have generally been favorable and beneficial to the mine operators.

Many contracts with Metals Reserve Company, particularly for manganese contracts, required department help. Among these were the St. Louis Mining Company at Patagonia, Santa Cruz County, for O. W. Hogsett and for G. R. Mahaffey of Dallas, Texas for a custom manganese milling plant for Globe,

MINE ACCESS ROADS

Many of the access road applications have called for field investigation by the engineers and follow up in Washington.

The U. S. Grazing Service, Phoenix, has cooperated closely with the Department and with the mine operators in routing and following up the access road applications and also the actual field construction work.

Assistance was required on many of the road projects and particular attention was given the following.

Abe Lincoln Mine	Wickenburg
Swansea Mine—For	E. C. Lane, out of Bouse
Manganese Mine—For	N. M. McGregor at Alamo
Petrosky Copper	Apex Mining Co. at Jacobs Lake
Pinnacle Peak	Cave Creek
Pride of the West.....	Patagonia
Copper World	Kingman
Tout Mine	Dos Cabezas
Kyle Asbestos	Globe District

tributors threatened a shortage in fuel for power plants at the small mines. Several districts reported their difficulties and a general survey and report was made by the field engineers and a procedure worked out with the Petroleum Administration for the region, whereby relief could be had.

Many of the operators complained of refusal of the smelters to take their ores. A smelter survey was made and the information made available to producers as to the various smelter requirements somewhat softened the problem.

The above are but a few of the more important surveys made during the past year and there were many other studies made of a more minor character which affected smaller groups or local areas only.

QUOTAS AND PREMIUMS

The quota and premium plan may have accomplished its purpose as far as inflation and uncontrolled soaring of metal prices, but it introduced many complex problems for mine operators to solve.

After a year of mine operating under the premium plan the procedure was streamlined and the major difficulties ironed out. The major complaint during the past year has been the length of time consumed in Washington in getting a decision on applications for advance premiums.

When undue delays have been met by the operators, appeals have been made to the Department for assistance. Our procedure in such cases has been for the office in Phoenix to review the application and correspondence relating to it and, if necessary, have the field engineer check and report on the property and the need of advance premiums. All this information was then forwarded to W. C. Broadgate in Washington for personal presentation and discussion of data supporting the application to the particular agency involved.

Many applications have called for continued and intensive work to get results. Others calling for probably more work have not yielded results. Each case was a problem by itself and had to be argued on the facts submitted.

Some of the major items on which work of this nature has been done are the following:

The Oliver Leasing Company, leasing from the Phelps Dodge Corporation in Bisbee, as well as the leases there by David L. Evans, J. S. Maffeo and James McKenna.

The State of Texas Mine, Huachuca Mountains, operated by Grace M. Sparkes of Prescott.

variety of indirect requirements, placed the primary responsibility on the War Production Board.

The Board has been constantly on the alert to maintain a proper balance between supply and demand in order to keep a steady flow of material needs. Where delays and red tape threatened to disrupt the flow of materials, changes in procedure have been made.

In order to keep the producers of the raw materials posted as to revisions in requirements the Department has continued to develop its close personal contact directly with the various branches of the War Production Board in Washington through W. C. Broadgate, Assistant Director, assigned to duties there during the emergency, and by the Phoenix office with the agencies located in the state.

This service to the small mine industry has made it possible for the prompt distribution of information to the operators on subjects directly concerned with the policy regarding their particular product. It likewise has made possible quick readjustments of their plans with the frequent necessary changes in policies to meet fluctuations in demand.

Copper Branch

The production of copper was rated as one of the most essential needs and, in July 1943, the War Manpower Commission placed copper in Class 1, "Most Critical to the War Effort," in establishing ratings as to the U. S. Employment Service for preference in recruiting labor.

This situation continued until November 1943, and, despite the shortage in mine labor due to induction, enlistment and migration of mine workers to higher pay war industries such as ship building, airplane plants, etc., the mines continued to recruit new workers to replace those leaving and production was maintained at close to peak figures.

In November, however, one of the heads of the Copper Branch, in an informal talk before an A.S.M.O.A. meeting, stated that copper production was so greatly in excess of the demand of the war effort that steps had to be taken to find an outlet to distribute the excess copper.

This was followed in December by a published order from the Quota Committee stating that advance premiums, above the "A" premium of 5c per pound, would not be considered after December 31, 1943. This in a measure seemed to confirm the statement that an excess of copper was available.

The psychological effects of these statements were disastrous. The unions immediately asked that men no longer be frozen to jobs which were not critical. Labor, sensing a cut in

production, began to look for other employment. A great many men had been urged from patriotic viewpoints to stay on the job and forego vacations and now felt that they could go unrestrained. There were many other repercussions.

The net result has been a drop in production, due partly to a loss of the younger mine workers to the Army and other war industries and, in no small degree, to the feeling among the mine employees and operators that there was no longer a critical need for copper.

Since January 1, 1944 the consumption of copper has exceeded the combined imports and domestic production so that the deficiency has had to be taken from the reserve stockpile. The recent additional calls on manpower indicate further withdrawals of mine labor which together with a drop in efficiency due to lack of incentive and also to replacing young men by older men, has caused copper to again become the most critical of the common metals.

The early difficulties with priorities and the speeding up of procedure in payment of premiums have been given attention by the War Production Board and the Metals Reserve Company so that little or no difficulty is now experienced by the industry along these lines. Simplification and modification of forms and reports have been made to ease up the paper work formerly required. Manpower is now the most troublesome point in the maintenance of copper production at even its present rate which is below immediate requirements.

Even now, with a copper shortage, copper mines are not included in the critical industries given preference by Selective Service for labor supply. A new order issued by the U. S. Employment Service, to be effective July 1, 1944, indicated an added restriction to manpower distribution in that complete control is now vested in War Manpower.

The Western Division of the Copper Branch of the War Production Board called a meeting to discuss the manpower situation and its probable effect on production in the latter part of May 1944. Charles F. Willis attended for Arizona. As a result of this meeting the Department was asked to make a survey of the situation, the outlook for future labor recruiting and its effect on metal production for Arizona. This was a rush job but fortunately the Department is set up for quick work of this character. Each field engineer was instructed to personally visit and report on each major operation in his district.

The report was completed and mailed to Edwin H. Rott, Assistant Deputy Director for Metals and Minerals, June 17th, and the following comment was made by him: "This is a very thorough piece of work and we assure you the efforts of those

for a quick survey by the Department of the various methods employed in Arizona mines for conserving and making more efficient use of the manpower available. This data was compiled and reported for the purpose of exchanging the most effective plans with others in the mining industry faced with similar problems.

A report to the Steel Shortage Investigation Committee, Representative Frank W. Boykin, Chairman, was requested showing what raw material supplies in Arizona were available, or required further study to provide ores, fluxes, or alloying metals for the continuation of the steel industry at Fontana, California.

A brief report was quickly compiled and the committee was thus helped in getting an appropriation for the intensive investigation of deposits, not only in Arizona, but in other western states.

Following a meeting of the War Production Board Western Division in Salt Lake City, Utah, the Department was asked to make a survey and report on the effect of the new Selective Service rulings on the production of copper, lead and zinc with a forecast of how the near future production would be affected. Mining had not been placed on the preferred list of critical industries and it is hoped this survey may assist in getting manpower priority rating, especially for copper.

Speed was required on this report and plans were being discussed by Selective Service and Army and Navy officials in Washington to balance war needs for critical metals with war needs for younger men in the Army.

Effective July 1, 1944 is a new order from the War Manpower Commission on a nation-wide system of priority, referrals, a ceiling on labor in mines as of June and intensive recruiting by U. S. Employment Service for labor for the mine with high priority rating. This presents a serious problem to the small mines and the results will be fully investigated.

A general survey of the lack of milling facilities for the complex lead-zinc ores in the Chloride area was requested in order to show the potential production being held back in the various mines in that area, which were in position to yield steady production if the lower grade ores could be locally concentrated. This report was made by Elgin B. Holt, engineer in the western district, and was made use of by several groups to prepare projects for a custom mill. The report was also used by Mr. Nye A. Wimer in connection with plans to expand the Tennessee-Schuylkill mill.

The cut of 20% in non-highway gasoline to the local dis-

Region 10, producing 158.3% of its allotted quota, and during the major part of the early drive for industrial salvage, Arizona was the only state without a Federal Agency, the work being done exclusively by the Department. The Department had anticipated the need of salvage efforts and had organized its office and field engineers to take care of this work.

SPECIAL SURVEYS

Apart from the reports on specific individual projects and properties, which is the more or less routine work of the Department and the field engineers, we have been called upon by various Washington war agencies to make special surveys on subjects of national importance where detailed information was required in setting up policies or plans covering the mining industry as a whole.

The Department of Mineral Resources has been recognized in Washington as being set up and equipped to give a quick and complete summary of Arizona conditions on such problems, through its four field engineers and its close contact with the Arizona Small Mine Operators Association which has over 50 councils and covers every mining district in the state.

A request for a manpower survey was received to show the manpower and materials used at the small mines in the state. There was a move proposed which would, if announced plans had been carried through, practically shut down small mines and direct the labor and materials used by them to the larger mines. The survey definitely showed that very little of the small mine labor could be recruited for work at the big mines and that the material consumption was more than offset by the production obtained that would otherwise be lost if, as was shown, the labor employed could not or would not be used at the bigger mines.

A report was made by Colonel C. S. Dargusch, Deputy Director of the Selective Service in Washington, to the effect that no men had been drafted from the mines in Arizona since October 8, 1942. In our effort to maintain sufficient labor to keep peak production further inroads on labor supply were threatened.

A survey quickly made by the Department, covering about 90% of the men employed in mines, showed that in the year following October 8, 1942 the larger mines had lost 695 men and the smaller mines 131 men to the draft and selective service, excluding voluntary enlistments.

Wm. A. Ogg, member of Mining Industries-Manpower Utilization of the War Manpower Commission, Washington, asked

concerned are appreciated. The information divulged in this summary is very interesting and demonstrates the trend of production due to manpower shortage."

Fluxing Ores

With the cutoff in production of siliceous ores from gold mines, due to the L-208 gold closing order, an intensive drive was made in 1942-1943 to open up copper bearing siliceous ore in order to provide the necessary flux for the smelters and, at the same time, produce more metal.

Attention was given this subject by the Department on request from the Copper Branch of the War Production Board and special advance premiums were made available to a number of low grade properties having ores of high silica content.

Changes in ore dressing have been made at some of the larger mills and, in some instances, the improvements have resulted in a decrease in the need for siliceous ores. Furthermore, with a shortage of labor closer attention has been given to smelting metallurgy and, with increasing costs due to wage increases and a low ceiling on the copper price, it has been found necessary to pay more attention to refractory ores in smelter practice. As a result receipt of some high silica ores at certain smelters and of ores of high alumina content by others have been restricted.

This situation became serious as a number of the new properties were found to be high alumina ores, and others high silica ores, and output from them has been restricted and limited. This situation has jeopardized the operations of a number of properties whose owners had been induced by government solicitation to open up.

A summary made by the Department as to the fluxing ore situation at the various smelters showed that one of the larger plants had accumulated such a large stockpile of siliceous ores that storage space for additional receipts was not available and shippers had to be limited in their production because of this fact.

Many of the smelters also were faced with an effort to maintain maximum copper output with a fast dwindling supply of men both for smelter and mine operations. There has been a desire on the part of the smelters to limit the low grade ores receivable on the theory that, with limited smelter facilities due to labor shortage, each ton of low grade ore crowds out a ton of higher grade and thus lowers total metal production for a given labor supply.

Costs have mounted in all mining and smelter operations

and the smelters were prohibited by Office of Price Administration and other restrictions from increasing smelter charges. Appeal for an increased charge for smelting was granted in one instance and this may be followed by other plants. This may cut out some of the more sub-marginal shippers, who are working on a very narrow margin and only able to continue by the advance copper premiums but will make for expanded operations at others because larger quantities of ore can be taken.

What looked like a crisis in obtaining fluxing ores, with the closing of the gold mines under the L-208 order, has thus been avoided by advance premiums and an intensive search and production from the low grade siliceous copper ore. The present situation indicates that too good a job was done in opening fluxing ore properties.

Lead Branch

In the spring of 1943 announcement was made that the supply of lead had reached a critical stage and added production was needed to meet the war time demands.

A special drive was made among the small mine operators and encouragement given them to step up lead production. This was successful and a number of new properties were reopened in Arizona.

This situation continued until November 1943, when advice was received that lead had become easy and sufficient stock-piles and reserves had been made available to meet the restricted demand for war time uses. At this time notice was also given that no further premiums would be considered on new lead production, but that advance premiums already granted would be continued until further notice. Arizona has been relatively free from acute problems relating to lead production.

Zinc Branch

The zinc situation closely paralleled that of lead. Early in 1943 we were urged to step up zinc production from Arizona, due to its being considered one of the most critical of the non-ferrous war metals.

Without warning, however, a notice was issued on October 27, 1943 from the War Production Board, stating that no applications for advance premiums in zinc would be considered thereafter. The notice also stated that no new loans would be granted on zinc properties, but this evidently was wishful thinking on the part of the policy makers of the zinc branch as authorization to make loans was given the Reconstruction Fi-

Office of War Information, War Production Board, release on limitations on advance premiums on copper.

Office of War Information, War Production Board, release on Quota Committee policy on applications for advance premiums prior to new policies under recent releases.

Smaller War Plants Corporation loan applications and instructions for engineers reports on loans.

War Production Board amendments to Preference Rating Order P-56 as of October 29, 1943.

Fluorite: Maximum Price Regulation No. 126 as amended. The increased interest and activity in fluorspar prompted the mimeographing of this amendment.

Mercury: Metals Reserve Company notice regarding discontinuance of "qualified" producers of mercury

Tungsten: Metals Reserve Company notice regarding discontinuance of "qualified" producers of tungsten.

War Production Board Preference Rating Order P-56 as amended on December 24, 1943.

War Production Board, amendment to Preference Rating Order P-56 as of March 3, 1944.

Notice of termination of domestic tungsten purchase program and election to make cash settlements by Metals Reserve Company as of February 29, 1944.

Instructions for filing affidavits for cash settlements for qualified producers to accompany termination program.

Access road procedure—amended. This was a special bulletin prepared by the Department of Mineral Resources to explain the recent changes in procedure for mine access road applications.

INDUSTRIAL SALVAGE

Due to the curtailment of government statistical requirements on the location and movement of industrial salvage and the expansion of the government agency established in Phoenix for this purpose the activity of the Department in this work greatly diminished.

Reports of sizeable salvage, overlooked in the first work or too remote for early attention, continued to be reported by the field engineers and transmitted to the Industrial Salvage Branch of the War Production Board in Phoenix.

It may well be repeated that Arizona was No. 1 state in

The following bulletins were mimeographed and prepared for distribution during the year by the Department.

Information concerning purchase of domestic oxidized zinc-lead ores at Jean, Nevada—dated July 8, 1943, and superseding bulletin dated December 23, 1942.

Information concerning the purchase of small lots of domestic molybdenite concentrates—July 8, 1943.

Affidavit of seller—delivering to Metals Reserve Company, purchaser, domestic molybdenite concentrates.

Sample settlement sheet for molybdenite concentrates.

Program for payment of special addition premium on copper from small copper mines in excess of special monthly production quotas.

Information concerning the purchase of domestic beryl and tantalite-columbite ores, dated August 1, 1943 to supersede bulletin of May 1, 1943.

Advance premium payments on zero quotas of copper, lead and zinc, dated July 19, 1943. Establishment of a revolving fund for smelters and custom mills to expedite payment to small mine operators.

Amendment to ceiling on royalties on copper, lead and zinc, dated August 19, 1943—amending ceiling for lessees, overriding royalties, and increase ceiling where royalty payments have seriously shrunk.

Changes in percentage payment by smelters and custom mills on metal content, dated August 1, 1943. Revising Rule 13 and amending order of December 1, 1942.

Limitation Order L-208 (gold mining) as amended August 31, 1943.

War Labor Board, amendments to General Order 31, September 1, 1943, on permissible wage rate increases.

Report by Department of Mineral Resources on "Potential Tonnage for a Custom Mill in the Chloride District, Mohave County".

Report by Department of Mineral Resources on a general Arizona zinc marketing survey.

New Access Road application form to U. S. Public Roads Administration and changes in procedure.

A revised bulletin on purchase of manganese ores giving a low limit on Metals Reserve Company contracts of 500 tons (instead of 1,000 tons formerly) on 35% plus ores.

nance Corporation by congressional action and could not be withdrawn by a War Production Board announcement.

The ruthlessness of the announcement of the cutback on granting lead and zinc advance premiums caused a great deal of criticism, due to the unfairness of the short notice. Many operators, acting on the formerly announced shortages of lead and zinc and the request of the War Production Board to step up production, had been busy preparing mines for operation and in many instances had deferred applications for advance premiums until the properties were ready for production. The short notice left them stymied in their efforts. We were able to secure interpretations which were helpful to some.

The copper branch, when a similar notice was issued on November 9, 1943, took advantage of the adverse criticism and gave reasonable advance notice of the cut-off of further copper premiums and also left the door open for reversal of policy in the event the situation demanded. They set the date at January 1, 1944.

In September 1943, many of the zinc producers, who had opened up mines for production, were finding difficulty disposing of concentrates to the zinc smelters. A summary and report on this situation was made by the Department to the zinc division. After consideration of this report in November 1943, the zinc branch of the War Production Board made arrangements with the zinc smelters at Amarillo and Dumas, Texas, for the purchase of and the freezing of certain portions of their stockpiles so as to permit them to continue to receive shipments from small producers. No solution was found for handling the higher grade zinc ores normally receivable at the smelters.

Other surveys on the zinc possibilities of Arizona and the lack of adequate zinc reduction milling facilities were made by the Department and submitted to the zinc branch. The war effort has indicated large potential resources of zinc in the state which may give rise to an expanded industry under the post-war economy.

Fluorspar

The demand for metallurgical grade and acid fluorspar increased heavily during the year and steps were taken by the Department to assist in the meeting of the new demands. An upward revision of prices and scaled freight rate program made it possible to consider production from properties which were formerly sub-marginal. One of the major increases of demand, particularly on acid spar, was the new use in the manufac-

ture of a very effective insecticide for army use. The process required the use of hydro-fluoric acid. The demand for acid spar continued firm, but for metallurgical grades softened around the first of the year.

The Duncan area has in recent years shown good fluorspar production and a special investigation by field engineer Macfarlane, in that district, was made and assistance rendered to several of the operators. Other new deposits in the Wickenburg, Tucson and Globe areas were studied and production assisted.

Plans for a milling plant in the Globe area were prepared, but the application for a loan was not authorized.

Asbestos

In 1940 a special survey by the Department on the asbestos deposits in Gila County was made and the report showed a large potential production. Investigation showed that the market for Arizona asbestos was quite limited, due to the fact that the trade could not depend upon a uniformly graded product. The major production came from the Johns-Manville properties and, due to their efficient distribution and grading, they continued in full production.

The marketing of the product was the main difficulty met by the small asbestos operators. Over a year and a half ago a Mr. J. S. Michault discussed with the Department the asbestos possibilities in Arizona and attention was called to the large potential production and the lack of proper facilities for grading and marketing. A project was set up to first investigate the possibilities of obtaining a firm market for Arizona asbestos and then to erect a custom sorting and grading plant.

Many difficulties were encountered in getting government aid to finance the project. Intense interest was created and as a result a U. S. Bureau of Mine development project was set up, approved and carried out. Several mine access roads were authorized.

After a year and a half of effort a project was authorized whereby the Defense Plant Corporation approved the erection of a custom mill and the Reconstruction Finance Corporation authorized a mine loan for further development of the Pine Top Asbestos Mine to furnish a back-log of production for the mill. The sum involved was \$150,000 and the mill was completed in June 1944. Mine development was underway previously but was not speeded until the mill was ready to handle the output.

The erection of this mill has met with enthusiastic approval

existed and withdrawing their purchase of both metals, which meant the producers had to sell in the open market.

The high grade manganese stockpile at Deming, New Mexico, was discontinued and the high grade stockpile moved to El Paso. The stockpile for low grade manganese at Deming, New Mexico continued to buy ore, but rumors started that it would not be sound to make any sizeable mine investment dependent on its long continuation. The oxidized zinc-lead stockpile at Jean, Nevada was discontinued in March, 1944.

In August, 1943 a revision of Rule 13, regarding payment of advance premiums on copper, lead and zinc, by smelters and custom mill was announced. This revision clarified some of the previous difficulties which had risen on settlements. Later, in November 1943, a further revision of Rule 13 was made regarding payments of advance premiums on oxidized lead-zinc ores. The revisions in Rule 13 were made necessary by the complexity of fair settlement under the original rulings and removed some of the former objections.

The cutback in advance premiums on copper, lead and zinc and the cancellation of contracts and bonuses in mercury and tungsten seemed untimely and any financial benefits from the cuts were greatly offset by the discouragement and drop in morale of the producers and also of mine employees.

Part of the present shortage of copper, which was apparent in the early part of 1944 and which has continued, is directly traceable to the psychological effects of these cutbacks.

DEPARTMENT BULLETINS

As announcement of changes in policy or regulations affecting mining were made public, copies of such changes were received by airmail direct from W. C. Broadgate in Washington and mimeographed and prepared for distribution by the Department. The bulletins were promptly sent to all mine operators in the state known to be interested in the subject covered.

The field engineers were immediately advised of the changes and were in position to advise and explain to operators in the field, and to the members of the A. S. M. O. A. councils, full details.

Each month a list of new bulletins available was published in Pay Dirt, the official paper of the Arizona Small Mine Operators Association. In this manner the Department has been able to keep the mine operators in the state in close touch with the frequent changes in rulings and regulations affecting them.

ators. Unfortunately mining was not included in the specified critical industries.

A recent order effective July 1, 1944, has indicated a much more rigid control of labor by the War Manpower Commission by making it necessary for all mines in critical areas employing over 8 men to obtain them only through the U. S. Employment Service.

The effect of this recent order on the small mines may be most damaging as U. S. Employment Service placement of miners will be made according to the preference rating established for the various mines, the larger mines with the better per-man-ton production naturally getting the higher preference.

Through the Department several manpower surveys of mine labor, particularly in small mines, in Arizona have been made. We have been able, through the field engineers, to investigate and report on such problems within a week or ten days after such surveys have been requested.

SELECTIVE SERVICE

The state director of Selective Service and his office, together with the state and local appeal boards have been eminently fair to the mining industry and have given careful consideration to the investigated requests for deferments for mining, insofar as key or essential men have been concerned.

Numerous cases have been referred to the Department by operators who due to failure to follow proper procedure or for other causes, have had their key men called for induction. In such cases it has often been necessary to have one of the field engineers investigate and report on the mine and the mine labor situation, in order to present sufficient evidence to Selective Service for a sound determination.

METALS RESERVE COMPANY

Increased production of molybdenum had been urged by the War Production Board but, on investigation of the marketing of concentrates, it was found that no ready market was available. The results of this investigation were reported to the Metals Reserve Company and in July 1943 the various stockpiles were authorized to purchase molybdenum concentrates.

In conjunction with the copper, lead and zinc branches of the War Production Board, Metals Reserve announced the cut-off in new advance premiums on copper, lead and zinc toward the end of 1943. Early in 1944 Metals Reserve announced the settlement basis for cancelled contracts with qualified producers of mercury, and tungsten, thus eliminating the bonuses which

of the small mine operators in the Globe area as it furnished an assured outlet for their production and promises continued industry after the war has been finished.

Arizona asbestos is the only sizeable supply of iron-free asbestos in the world. The high grades of long-fiber asbestos sell at premium prices. The shorter fibers should find an excellent market in the growing industrial southern California area and, due to freight differentials, should replace other supplies such as the Canadian fiber.

This custom sorting and grading plant, with a firm market provided for the output, should be the foundation for a very substantial peace-time asbestos industry for Arizona.

Tungsten Branch

With the cut-offs in further advance premiums in copper, lead and zinc a great deal of uncertainty in the minds of producers of other metals naturally followed. This uncertainty, as to even the immediate future, resulted in a dropping off in interest in search for new tungsten properties.

In the latter part of December 1943 an announcement was made by the Metals Reserve Company that after December 31, 1943, no additional producers of tungsten could come under the classification of "qualified producers" and thus obtain the \$6.00 premium. A rather complicated election of three methods of termination of the qualified producers contracts was set forth.

The Smaller War Plants Corporation carefully studied a proposal to expand the Jacob's Tungsten Mill at Tucson and, in conjunction with the very favorable opening up of a sizeable body of tungsten ore at the Maudina Mine in the Old Hat Mining District, approved the plant expansion. The Metals Reserve Company established a local stockpiling plan to handle ores for this milling project while the mill was under construction. The project is now in operation.

The cut-off of bonus to the qualified producers of tungsten resulted in a curtailment of the search for and development of new tungsten properties and created a fear in the minds of producers that a drop in prices would result. Tungsten buying by government agencies at bonus prices stops completely on July 20, 1944. Tungsten producers fear a market break similar to what happened on mercury.

Mercury

The announcement of the cut-off in bonus to the "qualified producers" of mercury threatened to work a severe hardship on the three major producers in Arizona. The announcement

of the settlement date, under which contracts with qualified producers were cancelled, came at about the same time as the tungsten cut-off.

A survey of the effects of the cut-off on the major Arizona producers was made by the Department and submitted to the Metals Reserve Company, which Company had made the contracts. One of the Metals Reserve Company engineers was assigned to check on this report and special adjustments were made which were satisfactory to the operators. Examinations of these properties were made by the Metals Reserve Company engineer.

The domestic production of mercury had been stimulated by the advance price prior to the establishment of a ceiling price and, as a result, our domestic supply not only took care of our war needs but permitted an excess which we were able to export to our Allies.

On the cut-off of the bonus the price naturally fell off, and whereas the ceiling for qualified producers was \$196, the open market price in June dropped to \$100 a flask.

Many of the marginal producers cannot operate at a profit on \$100 quicksilver so that some of the smaller low grade properties were forced to close down when the government buying ceased.

Vanadium

The complete and thorough coverage of the various vanadium prospects in Arizona failed to open up any properties capable of any substantial production. Properties in other states and imports have met the critical needs on vanadium. Much work was done in Arizona on vanadium prospects but they all proved disappointing.

Molybdenum

A request for increased production of molybdenum was made direct to the Department by the War Production Board in the spring of 1943 and a statewide survey was made by the Department. Owners of properties were urged to open up properties and a number of applications for loans were made and granted.

In August 1943 molybdenum operations in Colorado were given the No. 1 preference on furloughed soldiers to supply sufficient labor to meet production needs which indicated the critical need of the metal.

Within two months thereafter advice was received that

the demand for this product, which had been established through production from a semi-commercial pilot plant.

Clifford Carpenter of Phoenix investigated the marketing and mining of a diatomaceous earth deposit near Mammoth and applied for a loan to revamp the existing mill and provide working capital to fill orders on hand.

Wm. Thorpe of Phoenix applied for an equipment loan for the Big 4 Manganese Mine near Gila Bend.

Lawson Brothers of Tucson applied for a strictly mine loan on the Paymaster Mine.

P. H. Lund of Globe applied for a loan to erect a custom mill to handle complex copper-lead-zinc ores in the Globe area.

Two applications were made to provide loading ramps where present facilities were inadequate. One was to serve the Helvetia Rosemont mining area and Sahuarita. The other was for John Carroll on copper ores at Wickenburg.

Application was made for equipment and working capital by Jake Bingham of Tucson to concentrate and recover values contained in the incinerated city dump at Tucson.

The Jacobs Tungsten Mill at Tucson has a small plant and needed expansion. Sufficient ore contracts from mines in the Tucson area, capable of steady production, were made which justified expansion. After numerous investigations and much detailed study and work by the Department and the applicant this loan was approved.

Of all the applications made the Tucson ore mill expansion was the only one approved. This was in a measure influenced by the opening up of a sizeable tungsten deposit at the Maudina Mine in the Old Hat Mining District near Oracle.

A recent report indicates that more intensive efforts to assist small mine operations through Smaller War Plants Corporation are necessary and there is every indication that a more liberal policy will be adopted by them.

WAR MANPOWER COMMISSION

The question of workmen for mining operations has been and still is the bottleneck on raw material production. Army furloughs temporarily aided the maintenance of production during 1943. The expansion of Selective Service requirements, to include all men under 26 except those in certain critical industries specified by the Army, and the withdrawal of furloughed soldiers, has caused much concern to the larger oper-

SMALLER WAR PLANTS CORPORATION

Through a broadening of the interpretation of the act establishing the Smaller War Plants Corporation, mining or plants connected with mining operations have been given greater consideration. The scope of this work has recently been further expanded and particular attention has been asked for the mining industry. Thus Smaller War Plants Corporation mine activities in the future should be more impressive than in the past.

The Smaller War Plants Corporation was set up to assist small business and the Senate Small Business Committee understood that mining would be included under that heading. Although opposed, this was finally adopted and instructions issued as to procedure. Results, however, indicated that the early resistance to include mining has not been entirely eliminated.

The Reconstruction Finance Corporation, Defense Plant Corporation, Metals Reserve Company and other federal agencies had definite functions regarding financial aid along various raw materials production projects. There was a gap existing in granting aid to small mine operations, which were borderline cases, which did not strictly fit into the requirements of these agencies. The Smaller War Plants Corporation, as part of its functions, was intended to fill this gap.

Many of the mine operators had been unable to get favorable consideration for their projects because of failure to fit specifications and called on the Department for assistance in preparation of their applications for Smaller War Plants Corporation assistance under the new plan.

As it was a new field, and as the local Smaller War Plants Corporation representative was aware of the function of the Department in assistance to small mine operators, a close co-operation was worked out whereby we would investigate, report and assist the operators. The field engineers were instructed to make special investigations, where necessary, and assist in such applications.

The following projects were given department attention: Pine Top Asbestos Mine, J. S. Michault, applicant, made application for a loan to erect a custom asbestos mill and grading plant at Globe. This was finally referred to Defense Plant Corporation on the mill and to Reconstruction Finance Corporation on a mine loan and the project approved and the mill is now being erected.

L. Lee Boyer of Phoenix, had developed a new process for expanding or exploding perlite, a volcanic glass, which made an excellent insulation and needed plant equipment to meet

molybdenum requirements were being met and about one-half of the production was being stockpiled. The further development of some of the properties which had been started was suspended.

The drastic change in the supply situation was in part due to a revision and recalculation of the Army and Navy requirements and in part to the easing up of tungsten and the replacement of the use of tungsten for some of the higher molybdenum alloys which had formerly been substituted for the higher tungsten alloys.

These changes in published policies and requirements have been discouraging to producers and have resulted in a loss of confidence on the part of operators. Many operators were financially hurt by the encouragement given, followed by a cut-off soon after.

Quartz Crystals

One of the most critical non-metallics has been optical quartz. An urgent request for production was made by War Production Board. Full and detailed publicity was given to the requirements and an active search was made throughout the state by department engineers. T. P. Thayer, engineer for the U. S. Geological Survey, cooperated closely with the Department and the operators in the search for new deposits in the state.

The critical condition for quartz crystals has continued and, whereas no sizeable production has resulted, a few fair prospects have been found in Arizona on which some work is being done.

Iceland Spar

Iceland spar for optical purposes also has been one of the most critical non-metallics and has continued as such. Through publicity as to the critical need by bulletins, items in Pay Dirt and through the field engineers, an active search in the state resulted.

Only a small production has resulted but a number of promising prospects have been located and are being further investigated.

Priorities

The problems involved in priorities for capital equipment and for supplies for mine operation and maintenance of equip-